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March 20, 2015

Mr. Robert L. Roll
Montana Department of Environmental Quality
Remediation Division
1225 Cedar Street
PO Box 200901
Helena, MT 59620-0901

**RE: Remedial Investigation Report,**
**Yale Oil of South Dakota CECRA Facility, Billings, Montana.**

Dear Mr. Roll:

Attached for your review and comment are responses to the Montana Department of Environmental Quality January 30, 2015 letter to ExxonMobil, two copies of revised replacement pages for the ***Remedial Investigation Report*** for the above-referenced site and a CD containing electronic versions of the documents.

This report was prepared by Hydrometrics, Inc., of Helena, Montana at the request of ExxonMobil Environmental Services, on behalf of Exxon Mobil Corporation and the other potentially liable persons listed in the Montana Department of Environmental Quality's *Notice of Potential Liability and Request for Remedial Action Letter* and *Notice of Right to Petition for Allocation*, dated June 8, 2011.

If you have any questions or comments, please contact me at 510.547.8196.

Sincerely,

Jennifer Sedlachek
Project Manager

Enclosure: ***Select Replacement Pages for the Remedial Investigation Report***

c: Fran Nunn, Phillips 66 Refinery
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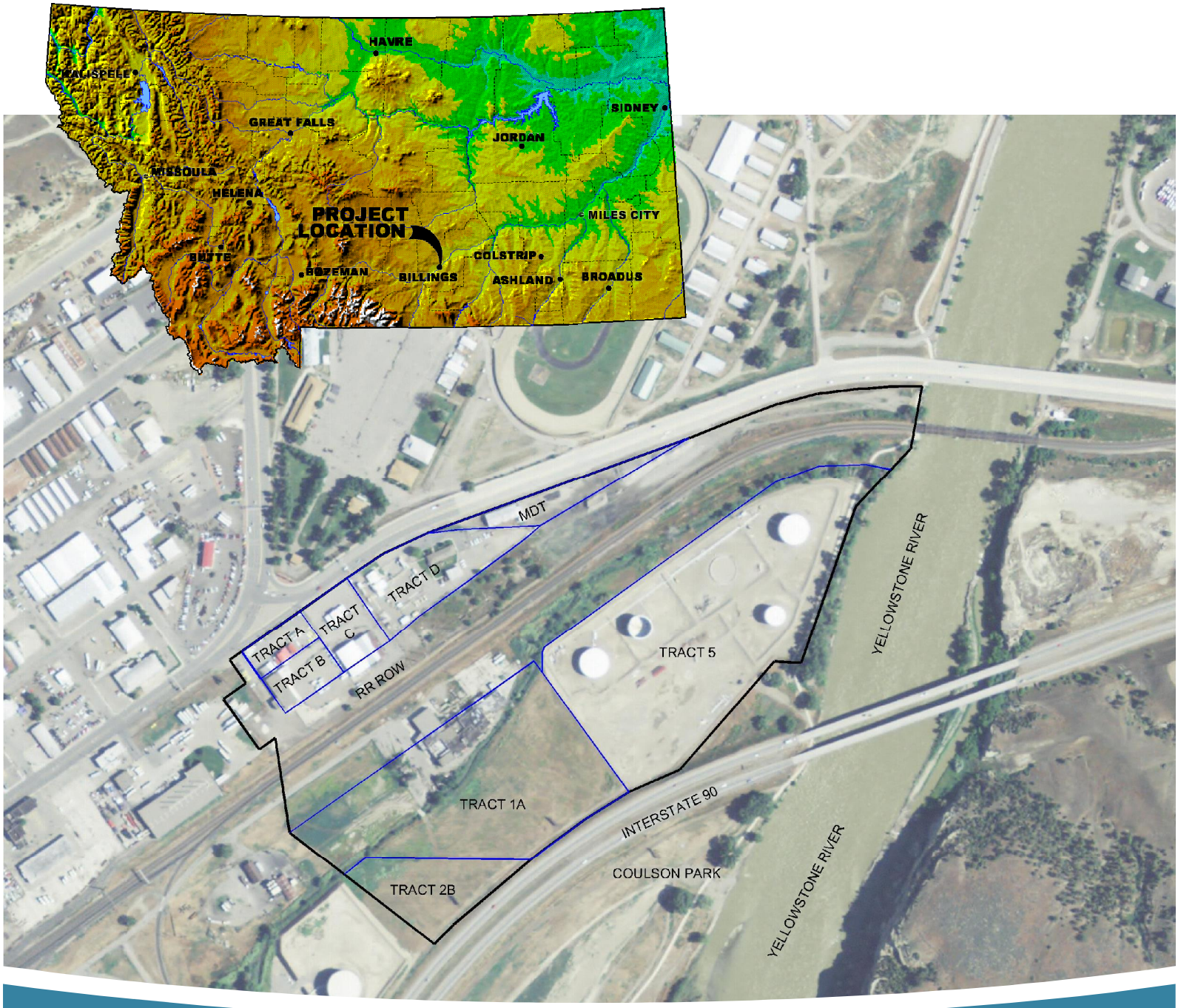
Hydrometrics, Inc.
consulting scientists and engineers

# Remedial Investigation Report

## Yale Oil of South Dakota
## CECRA Facility



# REMEDIAL INVESTIGATION REPORT
# FOR THE YALE OIL OF SOUTH DAKOTA CECRA FACILITY
# IN BILLINGS, MONTANA

Prepared for:

**ExxonMobil Environmental Services, on behalf of ExxonMobil Corporation and the other potentially liable persons listed in the Montana Department of Environmental Quality's Notice of Potential Liability and Request for Remedial Acton Letter and Notice of Right to Petition for Allocation, Dated June 8 2011**

Prepared by:

**Hydrometrics, Inc.**
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December 2013
Revised August 2014
Revised March 2015

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EXHIBIT 1 2004 SITE TOPOGRAPHY

## ACRONYMS AND ABBREVIATIONS

(Alphabetic order)

| | |
|---|---|
| ACM | asbestos-containing materials |
| ASI | Agri-Systems Incorporated |
| AST | Aboveground Storage Tank |
| bgs | below ground surface (re: well construction) |
| BNSF | BNSF Railway Company (Railroad) |
| CARDNO | Cardno ERI |
| CHS | CHS Cooperatives Inc. (CENEX Harvest States) |
| CECRA | Comprehensive Environmental Cleanup and Responsibility Act |
| COPC | Constituent of Potential Concern |
| EPA | [U.S.] Environmental Protection Agency |
| EPH | Extractable Petroleum Hydrocarbons |
| EXXON | ExxonMobil Corporation |
| Facility | Yale Oil of South Dakota |
| FHDSR | Facility History and Data Summary Report (August 2012) |
| FSAP | Field Sampling and Analysis Plan (August 2012) |
| FSAP-A1 | Field Sampling and Analysis Plan - Addendum No. 1 (September 2013) |
| GWIC | Groundwater Information Center (maintained by MBMG) |
| HASP-2011 | Health and Safety Plan (December 2011) |
| HASP | Health and Safety Plan (updated April 2013) |
| IA | Interim Action |
| ID | Inside diameter (re: well construction) |
| IDW | Investigation Derived Waste |
| IRA | Interim Remedial Action |
| IRA-RLAI | Interim Remedial Action – Report of Limited Asbestos Inspection (October 2013) |
| IRA-WP | Interim Remedial Action Investigation-Work Plan (March 2012) |
| IRA-WP-A1 | Interim Remedial Action Work Plan – Addendum No. 1 (August 2013) |

| | |
|---|---|
| IRA-WTDP | Interim Remedial Action-Waste Transportation and Disposal Plan (February 2013) |
| IRA-WDR | Interim Remedial Action-Waste Disposal Report (October 2013) |
| LNAPL | Light Non-aqueous phase liquid |
| MA-EPH | Maine – Extractable Petroleum Hydrocarbons (analysis method) |
| MA-VPH | Maine – Volatile Petroleum Hydrocarbons (analysis method) |
| MBMG | Montana Bureau of Mines and Geology |
| MDEQ | Montana Department of Environmental Quality |
| MDT | Montana Department of Transportation |
| MDU | Montana Dakota Utilities |
| MRL | Montana Rail Link (Railroad) |
| NPRR | Northern Pacific Railroad |
| OD | Outside diameter (re: well construction) |
| PLP | Potentially Liable Person |
| PVC | Polyvinyl Chloride |
| PS | Paint Shop |
| QAPP | Quality Assurance Project Plan (August 2012) |
| RCRA | Resource Conservation and Recovery Act |
| RCRA-Metals | RCRA-listed primary metals of concern: Arsenic (As), Barium (Ba), Cadmium (Cd), Chromium (Cr), Lead (Pb), Mercury (Hg), Silver (Ag), and Selenium (Se) |
| RI | Remedial Investigation |
| RIDS | Remedial Investigation Data Submittal (October 2013) |
| RIR | Remedial Investigation Report |
| RI-WP | Remedial Investigation–Work Plan |
| RR ROW | Railroad right-of-way |
| SAM | Suspected asbestos materials |
| SB | Subsoil (and sample prefix designation) |
| SS | Surface Soil (and sample prefix designation) |
| SSARR | Surface Soil Analytical Results Report (April 2013) |
| SVOC | Semi-Volatile Organic Compounds |

| | |
|---|---|
| SW8260 | Surface Water 8260 (analysis method) |
| TCLP | Toxicity Characteristic Leaching Potential |
| TEL | Tetraethyl Lead (and sample prefix designation) |
| VOC | Volatile Organic Compounds |
| VPH | Volatile Petroleum Hydrocarbons |
| YMW | Yale Monitoring Well (location prefix designation) |

# REMEDIAL INVESTIGATION REPORT
# FOR THE YALE OIL OF SOUTH DAKOTA CECRA FACILITY
# IN BILLINGS, MONTANA

## 1.0 INTRODUCTION

This Remedial Investigation Report (RIR) has been prepared to present information on the sampling efforts, observations, field procedures, and analytical results of the sampling shallow soil, subsoil, ditch sediment, surface water, groundwater, and monitoring well installation and aquifer testing conducted as part of the Remedial Investigation (RI) at the former Yale/Carter Oil Refinery (Facility). All information previously submitted in the Surface Soil Analytical Results Report (SSARR) (Hydrometrics, 2013b) is presented in its entirety, in this document.

The RIR summarizes the methodologies and procedures for activities of the Remedial Investigation (RI) Field Sampling and Analysis Plan (FSAP) as approved August 2012 (Hydrometrics, 2012b), and should be referenced in conjunction with the Facility History and Data Summary Report (FHDSR) (Cardno ERI, 2012) and the Quality Assurance Project Plan (QAPP) for Environmental Data Collection Activities (Hydrometrics, 2012c). Field sampling activities discussed in this RIR followed the FSAP and QAPP documents as the protocol for conducting the field sampling activities; focusing on the number, type, and location of samples collected and the sampling and analytical methodologies employed. All data collected as part of this RIR has been validated, all quality control issues addressed, therefore, the data from this investigation is deemed usable.

### 1.1 REPORT ORGANIZATION

This RIR for the 2012 and 2013 investigations is structured as follows:

- Section 1.0 – Introduction;
- Section 2.0 – Remedial Investigation Documents and Summaries;

- Section 3.0 – Remedial Investigations: Field and Sampling Procedures;
- Section 4.0 – Natural Features Characterization & Environmental Setting;
- Section 5.0 – Nature and Extent of Contamination;
- Section 6.0 – Contaminant Fate and Transport;
- Section 7.0 – Conclusions and Recommendations; and
- Section 8.0 – References.

## 1.2 FACILITY DESCRIPTION

The Yale Oil of South Dakota Comprehensive Environmental Cleanup and Responsibility Act (CECRA) Facility consists of approximately 70 acres on the eastern end of Billings, Montana. The Facility is bounded by the Yellowstone River on the east, Interstate 90 on the south and US Highway 87 East to the north in Section 34, Township 1 North, Range 26 East, Yellowstone County, Montana (Figures 1-1 and 1-2). It includes property formerly used by the Yale Oil of South Dakota Refinery, Yale/Carter Oil Refinery, the Montana Refining Company, a railroad right-of-way, and a livestock feeding/slaughtering operation adjacent to Facility. Present day uses include auto sales, warehouse storage, broadcasting company offices, various petroleum pipeline operations, industrial fabrication, road material storage, railroad, and a petroleum tank farm.

MDEQ defines the Facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA defines "hazardous and deleterious" as hazardous substances, hazardous wastes, or petroleum products "that because of its quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment." MCA§ 75-10-701(8)§. The Facility will be further refined through completion and evaluation of results and findings throughout the RI process.

## 1.3 FACILITY AND TRACT HISTORY

The Facility is located in the industrial area of central-eastern Billings, Montana. The northern portion of the Facility primarily houses auto, broadcasting and warehouse businesses, pipeline operations, and Montana Department of Transportation (MDT)

equipment and material storage. The Facility is bisected by a raised-bed railroad extending from west to east. The Yegen Ditch, located south of the railroad tracks, also approximately bisects the south-half of the Facility from west to east. The Yellowstone River extends south to north near the border of the Facility on the east and Interstate 90 borders the south. The southern portion of the Facility includes a metal fabrication operation and an active petroleum tank farm.

The Facility is divided into various tracts based on current ownership and uses of the lands involved. Historical uses and incidents based on information presented in the FHDSR (Cardno ERI, 2012) and presented below for each Tract included in the Facility.

Figure 1-3 is a historical image of the Yale Refinery during its operation in the circa-1940s. Figure 1-4 shows the as-built plan and footprint of the refinery as of the mid-1940s overlying the 2011 aerial photograph of the East Billings area. Figure 1-5 is an oblique aerial photograph of the refinery during its demolition, circa early-1950s.

### 1.3.1 Tract A

The Billings Stockyard Company purchased tracts A, B, C, and D from G. Panton in 1917. In 1921 F. L. Clark, E. Cardwell, and J.N. Tolman purchased tracts A, B, C and D from the Billings Stockyard Company. Yale Oil purchased Tracts A, B, C and D in 1929 and began constructing and operating a refinery northwest of the Northern Pacific Railroad (NPRR), now BNSF Railroad ROW and south of U.S. Highway 87. Tract A, as well as Tracts B, C, and D, located north of the Northern Pacific Railroad (NPRR) tracks (now BNSF Railroad) were first purchased and operated as a petroleum refinery from 1929 when construction began, until 1949 when operations ceased and dismantling of the facilities commenced. In 1954, the former Yale Oil refinery was split up and sold as smaller tracts. Many refinery-related structures present on Tract A were removed in 1949. As of 1958, only a grease can storage building and a gas and oil storage structure were present on Tract A (partially co-located on Tract B); by 1961, the gas and oil storage structure on the property had been removed. Other structures present in 1958 are still present at the Facility.

From 1969 until 2008, Tract A changes ownership at least eight times. During that time, light manufacturing (trailer construction and sales) was known to have operated on the property. In 2008, Tract A was acquired by Bob and Susan Young (Young, 2010) who currently operate Auto Magic, a used vehicle sales and taxi/limousine service on the Tract.

### 1.3.2 Tract B

The Billings Stockyard Company purchased tracts A, B, C and D from G. Panton in 1917. In 1921, F. L. Clark, E. Cardwell, and J.N. Tolman purchased tracts A, B, C and D from the Billings Stockyard Company. Yale Oil purchased Tracts A, B, C and D in 1929 and began constructing and operating a refinery northwest of the Northern Pacific Railroad (NPRR), now BNSF Railroad ROW and south of U.S. Highway 87. Refinery operations ceased in 1949 and dismantling of the facilities commenced. In 1954, Carter Oil sold Tract B to Farmers Union Central Exchange (CENEX), now CHS, Inc., for use as a warehouse facility to store various petroleum products (CENEX, 2001; EDR, 2011c; ExxonMobil, 2001). CENEX acquired the industrial railroad trackage in 1953. Sanborn maps from 1958 to 1969 show Tract B property labelled as the CENEX warehouse along with several structures labelled "asphalt filling shed," "grease can storage," "grease plant," "oil grease and tire warehouse," "oil storage," "drum storage," and "gas and oil" (BNSF, 2000; CENEX, 2001; EDR, 2011c; ExxonMobil, 2001 in Cardno ERI, 2012). CENEX sold the Tract for use as warehouse space in 1972. It was resold in 1974 to Reporter Big Sky Office (now 360 Office Solutions) who up until November 2013 used the property as a sales office and warehouse for receiving, storing, and delivering paper, office supplies, and office furniture.

### 1.3.3 Tract C

The Billings Stockyard Company purchased tracts A, B, C and D from G. Panton in 1917. In 1921, F. L. Clark, E. Cardwell, and J.N. Tolman purchased tracts A, B, C and D from the Billings Stockyard Company. Yale Oil purchased Tracts A, B, C and D in 1929 and began constructing and operating a refinery northwest of the Northern Pacific Railroad (NPRR), now BNSF Railroad ROW and south of U.S. Highway 87. Refinery operations ceased in 1949 and dismantling of the facilities commenced. From 1953 to 1958, International Harvester, a farm implement company, operated on Tract C. In 1954, Carter Oil sold Tract C

to Horace and Kathryn Wyman (i.e., The Wyman Trust); Karen W. and James C. Bageman are the current owners/trustees of Tract C. Also in 1954, the industrial railroad trackage agreement between Carter Oil and NP was amended and a portion was assigned to Horace Wyman. From 1958 until most recently, the buildings on the Tract B previous constructed and used by the Yale Refinery, have been the site of various tenant uses: a tire re-capping and warehouse/truck repair structure; a Kenworth Truck dealership; an auto sales facility; a bus company; an auto repair shop; a garbage collection company; a business college; a welding supply and trailer building business; automotive detailing shop; auto and truck towing, and a radio station. Reporter Big Sky Printing (360 Office Solutions) leased both warehouses on Tract C.

In mid-1964, the Wyman Trust was given permission by NPRR to construct, operate, and maintain a 4-inch steam drain pipeline extending from their warehouse building on Tract C to the "ponds" south of Tract D. The permission granted by NP was contingent upon Wyman's obtaining permission from Aldrich & Company, an adjoining landowner, and assumption of all costs associated with "construction, reconstruction, repair, operation, maintenance and removal of said facilities." The pipeline was intended "to drain condensation of steam from the cleaning of machine parts" until the settling pond was filled.

### 1.3.4 Tract D

The Billings Stockyard Company purchased tracts A, B, C and D from G. Panton in 1917. In 1921, F. L. Clark, E. Cardwell, and J.N. Tolman purchased tracts A, B, C and D from the Billings Stockyard Company. Yale Oil purchased Tracts A, B, C and D in 1929 and began constructing and operating a refinery northwest of the Northern Pacific Railroad (NPRR), now BNSF Railroad ROW and south of U.S. Highway 87. Refinery operations ceased in 1949 and dismantling of the facilities commenced. In 1954, Carter Oil sold Tract D to Yellowstone Pipeline Company (YPL) to build a pump station for three pipelines transporting refined petroleum products. The pipelines consist of one 10-inch mainline and two 6-inch spurs. The 10-inch mainline extends 531 miles to Spokane, WA. Sanborn maps from 1958 to 1969 show a fuel oil line pumping station on the property. A 10,000-barrel

steel crude-oil tank (Tank 25 of former Yale Oil Refinery) located south of Tract D is present on Sanborn maps from 1958 and 1961, but is no longer present on the 1968 map.

Glacier Pipeline System bought 1.05 acres of Tract D from YPL in 1961. Glacier operates pumping facilities for 10-inch and 12-inch crude oil pipelines extending from the Canadian border to the Phillips 66 Refinery in Billings, MT, or bypassed to an 8-inch line delivering product to the CHS Refinery in Laurel, MT. The 10-inch line extends approximately 54 miles to Roundup, MT; deliveries from the pipeline are made to pipeline tankage, to the Phillips 66 Refinery in Billings, MT, to the ExxonMobil Refinery in Billings, MT, or to an 8-inch line delivering product to CHS Refinery in Laurel, MT.

Continental Pipeline Company bought 0.357 acre of Tract D from YPL in 1963 to construct the Seminoe Pipeline System pipeline pump station and two pipelines that handles an 8-inch refined product pipeline south of Tract 1A extending to Sinclair, WY, and whose operation was divided into two segments. The Billings Seminoe Pipeline System is the origination pump station on the first segment. At present, YPL and Phillip 66 Pipeline LLC currently own Tract D and continue to operate two pump stations and several pipelines on the property.

### 1.3.5 Railroad Right-of-Way

Northern Pacific Railroad Company (NPRR), predecessor in interest to Burlington Northern Railroad Company (BNRR) and the Burlington Northern and Santa Fe Railway Company, now BNSF Railway Company (BNSF), acquired a 400-foot wide strip of land in the southeast quarter of the northwest quarter of Section 34, Township 1 North, Range 26 East in Yellowstone County, Montana by an Act of Congress, dated July 2, 1864.

An oil car filling rack operated south of the railroad tracks (north of the Crosser Meat Company) from the MRC refinery. Portions of the railroad property (south of Tracts A, B, C and D) were also used by Yale Oil and Carter Oil for refinery operations. NPRR, a predecessor to BNSF, entered into an industrial track agreement with Yale Oil for the construction, maintenance, and operation of an industrial track for the benefit of Yale Oil. Following dismantling of the Yale refinery in 1949, the industrial railroad trackage

agreement between Yale Oil and NPRR was amended and assigned to Carter Oil. In 1987, BNSF entered into a lease-purchase agreement with Montana Rail Link, Inc. (MRL) for MRL to provide transportation services on and over the leased property.

Railway Property West of Tracts A and B

Prior to closing the refinery, portions of property west of Tract A and B, located within the Facility boundary, held refinery equipment. Three structures were shown constructed on the property as of 1941. Of the three structures, one is unidentified, one is listed as a paint manufacturing building with an unidentified connected structure, and one is listed as a marketing department repair shop. The 1948 Sanborn map lists this area as a dewaxing plant consisting of a sulphur storage building (the previously unidentified structure), a filter press tile liner building (the marketing department repair shop), which includes a pump house, and an additional building (the paint manufacturing building) whose markings are illegible. The three structures and the platform are still shown on maps for the period 1958 to 1969; however, the paint manufacturing building is identified as an oil storage building, the sulphur storage building as a drum storage building, and the filter press tile liner building as a "VAC" building. In 1987, BNSF entered into a lease-purchase agreement with Montana Rail Link, Inc. (MRL) for MRL to provide transportation services on and over the leased property.

### 1.3.6 Tract 1A

Tract 1A was purchased by the Montana Realty and Loan Company from the Yegen family in 1916. In 1920, C. Crosser purchased a portion of Tract 1A north of the Yegen Ditch. The Yegen family re-acquired Tract 1A and sold it to the Montana Refining Company (MRC) in 1922. The MRC built a refinery and tank farm in 1921 on the southeastern portion of Tract 1A (southeast of the Yegen Ditch and the Crosser Meat Company). An oil car filling rack operated south of the railroad tracks (north of the Crosser Meat Company) from the MRC refinery. Operations ceased at the MRC refinery in 1923; however, the MRC refinery was not officially listed as closed until 1930.

North-half

Crosser Meat Company building and pens were present on the northern portion of Tract 1A by 1923. The company operated the facilities as a slaughter house and sausage manufacturing business. C.R. Crosser purchased Tract 1A in 1931 from the Continental Oil Company (a predecessor of ConocoPhillips Pipe Line Company, now Phillips 66 Pipeline LLC) operating the Crosser Meat Company on the north-western portion of the Tract. Continental Oil Company retained ownership of refinery equipment on Tract 1A (south-half) and reserved the right to entry for three years to remove equipment. Refinery facilities had been removed from Tract 1A by 1948.

Yale Oil Corporation purchased Tract 1A (south of Yegen Ditch) in 1933. This was followed in 1934 by the Midland Empire Packing Company who purchased the portion of Tract 1A north of the Yegen Ditch and taking over the Crosser slaughterhouse operations. Then in 1937 the packing company acquired the portion of Tract 1A south of the Yegen Ditch, creating the present day Tract 1A. Midland Empire Packing Company continued to operate a slaughterhouse and sausage factory from 1934 to 1969 meanwhile making many structural additions to the former Crosser Meat Company facilities. Midland Empire Packing Company owned the property until 1978. The City of Billings became the owner of Tract 1A in 1978 and also leased the property to Midland Foods, Inc.

First Bank (now known as U.S. Bank) purchased Tract 1A in a foreclosure sale in 1988. International Leather Manufacturers purchased Tract 1A from First Bank that same year. Lean Pork, Inc. (1992) leased the scales located at the former packing company property to weigh hogs. A portion of the property was leased to a firm for the storage of rags. A residence located on the property was also leased to various individuals; the residence is no longer present.

Agri-Systems (now ASI Industrial) purchased Tract 1A from Lean Pork, Inc. (R. Popelka) in 2008. By 2011, few structures of the packing company's operations remained on the tract by 2011. A portion of a warehouse structure remains on the northwest boundary of the tract. Stockpiled earthen material, concrete, and brick, rubble and metallic materials from building

dismantling are present on the north-northeast portion of Tract 1A. ASI Industrial currently owns Tract 1A.

South-half

In 1921 The Montana Refining Company (MRC) built a refinery and tank farm on the southeastern portion of Tract 1A (southeast of the Yegen Ditch and the Crosser Meat Company). Tract 1A (portion south of Yegen Ditch) and Tract 5 were transferred to the MRC from the Yegen family in 1922. Operations ceased at the MRC refinery in 1923. However, the MRC refinery was not officially listed as closed until 1930. The MRC holdings and tank farm on Tract 1A and 5 were acquired by Century Oil Company (1926), by Lewiston Oil Company (1929), and by Continental Oil Company in 1931, who sold them to C.R. Crosser (Crosser Meat Company) on the same day. In 1931, the Crossers sold an undivided one-half interest in their properties (portion of Tract 1A south of the Yegen Ditch and Tract 5) to George Birchenough. Both parties then sold the properties to Yale Oil Corporation in 1933. By 1948, the MRC refinery is no longer represented on Sanborn maps of the area.

### 1.3.7 Tract 2B

The United States Government issued a Homestead Certificate to John Alderman for the property in 1881. Documents pertaining to the ownership of the property after John Alderman, and before its purchase by the Yegen Family, were not able to be located. In 1907, Christian Yegen and L. B. Yegen transferred their interest in the property to P. Yegen; the Tract was later sold in 1916 to Montana Realty & Loan Company and then to Yegen Bros. Bankers in 1920.

The property was sold in 1929 to R.B. Brubeck and G.F. Shea, who in turn, sold it to F. C. Pierce the same year. F. C. Pierce sold the property to Pierce Packing Company in 1931. From 1945 to 2009, multiple right-of-way contracts and easements were issued mostly to local pipeline companies. The property was transferred from Pierce Packing Company to Security Bank N.A. in 1976 and then to P.K. Goggins, and transferred a portion of the property to the City of Billings in 1978. Goggins began leasing the property to Conoco, Inc.

in 1990. ConocoPhillips Pipe Line Company, now Phillips 66 Pipeline LLC, purchased the Tract in 2005; they retain current ownership.

### 1.3.8 Tract 5

Yale Oil Corporation purchased Tract 5 and the tank farm in 1933, including a 5,000-barrel storage tank, pipelines, and connections. The 5,000-barrel storage tank is not shown on the 1945 Carter Oil map. However, numerous tanks are present on the property showing storage of gasoline, fuel, road oil, diesel, burner fuel, distillate, crude oil, kerosene, tractor fuel, and casting head gas. Carter Oil sold Tract 5 and the tank farm in 1955, including one 10,000-barrel, one 19,000-barrel, one 34,000-barrel, one 55-barrel, and two 80,000-barrel petroleum storage tanks to Farmers Union Central Exchange (CENEX). CHS currently owns Tract 5 and continues to use the tank farm on the property to store gasoline and distillate fuels. There are currently five storage tanks (Tanks 280 through 284), two control buildings, a power pole, several pipelines, an YPL overflow sump and booster pump, ground bed electrical earthing systems, and a pump station present on the property.

This tract is currently owned by the CHS, Inc. and used as a crude oil and product tank farm and incudes several buried pipelines owned by ExxonMobil, Phillips 66 (i.e., Glacier and Yellowstone pipeline companies), Montana Sulphur and Chemical and CHS. Historically, the tract was owned and operated as a tank farm by Yale Oil/Carter Oil. Two steel-riveted storage tanks originally constructed by Yale Oil are present on the property and no longer in use.

The buried pipeline owned by Montana Sulphur that extends along the east boundary of Tract 5 is unused. ExxonMobil and Phillips 66 continue to use several petroleum pipelines that extend through or across portions of the Tract 5. CHS currently operates several buried and aboveground pipelines which extend throughout Tract 5.

### 1.3.9 MDT Tract

Prior to acquisition by the Montana Department of Transportation (MDT), a portion of the property was part of the right-of-way for U.S. Highway 87 and included the old elevated

route of the Northern Pacific Railroad. MDT acquired the tract in 1935. Ponds and depressions are visible on the tract in a historical air photograph from the early 1950s and on a site plan map of the refinery (Figure 1-4). The one building on the property was apparently constructed after 1945 and before 1951, or near to the time dismantling of the refinery commenced after 1949. From 1948 to the late 1990s, the property was leased to the Montana Army National Guard. Two fuel storage tanks, above ground and underground, were removed in 1991; also Montana Dakota Utilities (MDU) performed trenching in 1991. MDT currently uses the Tract for equipment maintenance and cold storage. Sand, fine gravel, cinders and de-icer storage, and material mixing and loading, take place on the property for use on regional roadways. Petroleum and natural gas pipelines owned by ExxonMobil, Phillips 66 Pipeline LLC, CHS, MDU, and various public and private communication services also extend above and below the Tract.

### 1.3.10 Historic Operations and Known Releases

Concentrations of constituents of potential concern in soil and groundwater at the subject Facility result from the operations of various industrial facilities and known releases. Contained in the FHDSR (Cardno ERI, 2012), and shown on Plates 2 and 6, are locations of potential sources of contaminants of potential concern at the Facility. Industrial operations have included:

- The operation of the former MRC Refinery.
- The operation of the former Yale Oil and Carter Oil Refinery.
- The operation of the YPL and Phillips 66 Pipeline LLC Pump Stations and pipelines.
- The operation of the CHS Tank Farm and pipelines.
- The operation of USTs on the Department of Military Affairs (DMA) property.
- The mixing of asphalt on Montana Department of Transportation (MDT) property.
- Small fabrication operations in warehouses on Tract C.
- The tetraethyl lead plant.
- The Paint Shop.

Numerous investigations of the Facility have been conducted from 1950 to the 2013. Known historic releases at the Facility are described in FHDSR Section 3.0, summarized in Table 10, and shown on Plates 3 and 7; exploration locations are shown on Plates 4 and 8 (Cardno ERI, 2012). A description of Facility investigations is located in Section 6.0; data from these investigations is summarized in Tables 1 through 9. Although not all of the FHDSR data has been validated, it is useful for the guidance of further investigations of the Facility. Potential Sources and Known Releases (Cardno ERI, 2012, Table 10) is included as Table 1-1.

# 2.0 REMEDIAL INVESTIGATION DOCUMENTS AND SUMMARIES

The following are a listing and summary description of documents prepared and/or reports previously submitted for the Yale Oil of South Dakota CECRA Facility. The documents include summary discussions of components within the Remedial Investigation including the Field Sampling and Analysis Plan (FSAP) (Hydrometrics, 2012b) and associated addendums (Hydrometrics, 2013f), Quality Assurance Project Plan (QAPP) (Hydrometrics, 2012c), Health and Safety Plan (HASP) (Hydrometrics, 2013d), Facility History and Data Summary Report (FHDSR) (Cardno ERI, 2012), Interim Remedial Action Work Plan (IRAWP) (Hydrometrics, 2012a), Interim Remedial Action Waste Disposal Report (IRAWDP) (Hydrometrics, 2013c) and Surface Soil Analytical Results Report (SSARR) (Hydrometrics, 2013b).

## 2.1 REMEDIAL INVESTIGATION WORK PLAN

For this Facility, the following documents comprise the Remedial Investigation Work Plan:

- Field Sampling and Analysis Plan;
- Quality Assurance Project Plan;
- Health and Safety Plan; and
- Facility History and Data Summary Report.

Each of the four remedial investigation documents and any relevant addendums, or revisions are summarized below.

A stand-alone document entitled 'Interim Remedial Action Work Plan' (IRA-WP), see Section 2.2, below, was prepared prior to approval of the FSAP and QAPP to address immediate concerns and implement investigation of two specific areas of the Facility.

### 2.1.1 Field Sampling and Analysis Plan

Hydrometrics (2012b) prepared a FSAP in August 2012 to provide guidance on the collection and analysis of groundwater, surface water, and soil samples conducted as part of

the Remedial Investigation (RI) at the former Yale/Carter Oil Refinery (Facility). The FSAP summarizes methodologies and procedures for the RI sampling programs, and is referenced in conjunction with the FHDSR (Cardno ERI, 2012) and the Quality Assurance Project Plan (Hydrometrics, 2012c). The FSAP document is intended as a practical guide to conducting field activities; it focuses on the number, type, and location of samples to be collected and the sampling and analytical methodologies to be employed.

Key components of the FSAP focus field sampling programs with the following objectives:

- Identifying potential sources/areas.
- Characterizing the nature and extent of constituents of potential concern (COPCs) in soil, sediment, surface water and groundwater at the Facility, accounting for past and ongoing investigation and interim remedial action activities.
- Providing information and data to support completion of the human health risk assessment and ecological risk assessment (if necessary), by evaluating the fate and transport of all COPCs in surface and subsurface soils, sediments, and the impacts to groundwater and surface water.
- Providing information and data to evaluate cleanup options.

Data collection to achieve these objectives included sampling and analysis of groundwater, surface water, sediments, surface soil, and subsurface soils. RI sampling tasks for each of the media were summarized along with details regarding sampling locations, methodologies, sample handling, and analytical requirements. A work plan addressing potential vapor intrusion concerns was submitted to MDEQ and approved on January 23, 2014. A summary of that investigation will be provided after data gap activities are performed in 2014 and will be included in a supplemental remedial investigation report.

### 2.1.2 FSAP Addendum No. 1

Addendum No. 1 to the FSAP (FSAP-A1) was approved in November 2013 to include surface soil sampling of background soils on public land in the vicinity of the Yale Oil Facility. FSAP-A1 added Section 3.5 BACKGROUND SOIL SAMPLING to the FSAP and

provides details regarding background soil sample collection as required in Section 3.3 of the FSAP.

Shallow soil samples will be collected at three (3) locations considered geographically similar areas. The locations appear to have similar soil characteristics and hydrology, have been maintained in their present state of land use for more than 50+ years, are unaffiliated with the Facility, are considered relatively undisturbed by historical industrial and commercial uses and development common to east Billings, and potentially represent background (naturally occurring) conditions.

Information on the nature of the Facility COPCs, or other contaminants naturally occurring, or otherwise, in background soils located off-Facility is necessary to provide comparison of Facility soil quality to local soil quality results to evaluate risk to potential receptors, and to provide information for assessing facility specific remediation goals.

### 2.1.3 Quality Assurance Project Plan

A Quality Assurance Project Plan (QAPP) for the Facility was finalized in August 2012 (Hydrometrics, 2012c). The QAPP is intended for use in conjunction with other Yale Oil of South Dakota Facility project documents such as the FSAP and the Interim Remedial Action Work Plan (IRA-WP), and FHDSR to address ongoing environmental activities at the Facility. The QAPP is structured in conformance with the Environmental Protection Agency (EPA) guidance (EPA, 2001 and 2002).

Overall purpose of the QAPP is to provide in one document a clear and concise presentation of the technical approach (planning), procedures and methodologies (implementation), and data review and evaluation (assessment) tasks used to complete environmental data collection, characterization and waste disposal activities for the Facility along with a description of how specific quality assurance (QA) and quality control (QC) activities will be applied and structured. QAPP documents are typically updated to ensure that any revisions pertinent to future data collection activities are incorporated and communicated to project

personnel, and ensure such data collection activities are subject to equivalent planning, implementation, and assessment requirements.

### 2.1.4 Health and Safety Plan

A Facility Health and Safety Plan (HASP) was created (Hydrometrics, 2013d) in compliance with 29 CFR 1910.120 and MCA 50-70, 50-71 to describe the safety and health requirements for the remedial investigation and operation activities conducted at the Facility in addition to requirements and procedures for employee/worker protection. This document was revised and updated based on the Cardno ERI HASP-2011 (Cardno ERI, 2011).

The Facility HASP addresses expected potential hazards that may be encountered at Facility work sites and is required to be at the Facility at all times and accessible for consultation. Specific notification requirements for entry to current owned and tenant properties and Facility work activities are discussed and require pre-approval by the project management staff before mobilizing to the Facility.

### 2.1.5 Facility History and Data Summary Report

The FHDSR (Cardno ERI, 2012) was compiled to summarize available information regarding the history and releases at the Facility (see Table 1-1). The main source of information for the FHDSR was the project file maintained by the MDEQ. Other sources included several reports prepared by Environmental Data Resources, Inc. (EDR, 2011a, b and c), files and records of select PLPs, and other geologic publications (e.g., geologic, community planning, etc.). A Facility chronology was developed from these references and is provided in the FHDSR. Also included are the then available laboratory analytical results for soil, waste, sediment, groundwater, surface water, grab water, and domestic water, remediation system data, well construction details, generalized site plans, maps, and aerial photos containing potential source, known releases, and exploration location information.

## 2.2 INTERIM REMEDIAL ACTION WORK PLAN

The Interim Remedial Action Work Plan was prepared in response to MDEQ's June 8, 2011 letter outlining the Scope of Work for the Facility regarding interim remedial actions to be

conducted simultaneously with the remedial investigation. Interim actions included characterization and disposal of debris and oily waste in trenches and sumps on the railroad right-of-way southeast of Tracts B, C and D.

IRA-WP components involved inspection and sampling activities to assess and estimate waste types and quantities, characterize the presence or absence of hazardous or non-hazardous materials or substances remaining in vessels or trenches located within the defined areas and assistance in planning removal methods, transport and potential disposal methods and facilities.

## 2.3 INTERIM REMEDIAL ACTION WASTE TRANSPORTATION AND DISPOSAL PLAN

An Interim Remedial Action Waste Transportation and Disposal Plan (IRA-WTDP) was prepared (Hydrometrics, 2013a) as required by the IRA-WP (Hydrometrics, 2012a). The IRA-WTDP area encompassed those wastes occurring on a portion of the RR ROW located southeast of Tracts B, C and D.

The purpose of the IRA-WTDP was to minimize potential health, safety, and environmental risks resulting from sampling and/or characterizing various materials and debris, the movement of materials, the operating of equipment during cleanup, and to describe procedures appropriately to remove, transport and dispose of the various waste materials (both hazardous and non-hazardous) from the IRA-WP Facility area. As required, Notification of RCRA Subtitle C Activity was made to the MDEQ's Waste and Underground Tank Bureau regarding all planned investigations and actions planned to remove, transport and dispose of the various waste materials. An EPA Site Identification Number (MTR000207811) was obtained for the Facility. The facility operator (i.e., Yale Joint Defense Group) is acknowledged as a Large-Quantity, Short-Term Generator for waste management and disposal purposes associated with the entire Yale Oil Facility area.

## 2.4 INTERIM REMEDIAL ACTION WASTE DISPOSAL REPORT

An Interim Remedial Action Waste Disposal Report (IRA-WDR) (Hydrometrics, 2013c) was prepared as required by the IRA-WP (Hydrometrics, 2012a) and described in the approved IRA-WTDP (Hydrometrics, 2013a). Waste removal operations were started May 20, 2013 and completed June 7, 2013; waste shipping continued through June 26. Waste characterization results from sampling conducted prior to removal operations are presented in the IRA-WDR. Activities conducted with waste removal and any deviations from the IRA-WP (Hydrometrics, 2013e) are also detailed in the IRA-WDR.

Table 5-1 in the IRA-WDR summarizes the removal, transport, and disposal for each waste material and substances located on the Facility interim action area. All hazardous waste were managed in compliance with the RCRA and Montana state law. Hazardous waste was appropriately labeled, stored with secondary containment, and transported to a permitted RCRA hazardous waste facility (Clean Harbors, Utah) using a licensed transporter (Phillips Services Company (PSC). Wastes were marked, labeled, placarded and accompanied by manifests and shipping papers in accordance with the Department of Transportation (DOT) rules and regulations 49-CFR-172. The interim remedial action areas are now clear of surface debris, oily and hazardous wastes have been removed and properly disposed, and the trenches, separator and sump have been backfilled.

In order to obtain information as to the material being left in-place or potential impacts to adjacent soils, MDEQ requested collection of five opportunity samples near the East Trench, West Trench and Separator. Results from these samples were evaluated along with RI subsurface samples and are contained in this RIR.

## 2.5 SURFACE SOIL ANALYTICAL RESULTS REPORT

The Surface Soil Analytical Results Report (SSARR), dated April 2013 (Hydrometrics, 2013b), was previously submitted to MDEQ as an interim reporting activity to present information on the field procedures and analytical results of the shallow soil sampling conducted as part of the overall RI at the former Facility. DEQ did not approve the SSARR.

The SSARR summarized methodologies and procedures for the shallow soil sampling phase of the approved RI FSAP. Field sampling activities followed the FSAP and QAPP documents as the protocol for conducting the field sampling activities; focusing on the number, type, and location of samples collected and the sampling and analytical methodologies employed. Data included in the SSARR is included in its entirety and evaluated along with other RI data (subsurface soils, groundwater, surface water and sediment) in this RIR (see Section 3.2).

## 2.6 INTERIM REMEDIAL ACTION WORK PLAN – ADDENDUM NO. 1

During the ongoing remedial investigation in 2013, the MDEQ oversight subcontractor observed materials and scattered debris, potentially containing asbestos, surrounding the building and on the property of the MDT Tract. In May 2013, MDEQ requested an addendum to the IRA-WP to incorporate additional asbestos inspection, material sampling and testing. IRA-WP Addendum No. 1 (IRA-WP-A1) was prepared (Hydrometrics, 2013e) and approved by MDEQ, with a specific amendment, on August 13, 2013, requesting all SAM be submitted for laboratory analysis by the transition electron microscopy (TEM) method. The area potentially harboring suspected asbestos materials (SAM) was the exposed ground surrounding the largest building on the MDT property, adjacent to 1st Avenue North (or US 87 East). Inspection and sampling of SAM was conducted in September 2013 in accordance with requirements in the work plan and the QAPP by a Montana-accredited asbestos inspector.

## 2.7 INTERIM REMEDIAL ACTION - REPORT OF LIMITED ASBESTOS INSPECTION

Observations, findings and results of SAM sampling and testing planned in the IRA-WP-A1 document were submitted to MDEQ in October 2013 in the Interim Remedial Action – Report of Limited Asbestos Inspection (IRA-RLAI) (Hydrometrics, 2013h). The report consisted of the Montana-accredited asbestos inspector's accreditation, letter report, sample location map, photographs of samples and GPS locations, and laboratory analytical reports.

Two MDEQ-accredited asbestos inspectors from Tetra Tech (Billings, MT) conducted the inspection and sampling. The presence of asbestos was confirmed, primarily in roofing materials from the building located on the MDT property. Measures to mitigate asbestos will be performed in 2014. Tetra Tech was retained by Phillips 66 Pipeline LLC to conduct weekly picks of wind-blown roof asbestos from its property adjacent to the MDT building during April, May and June 2014, after approval from MDEQ. Subsequently, asbestos mitigation of the MDT Building roof was completed by Tetra Tech by July 31, 2014. Soil removal of asbestos-contaminated soils was not completed in July 2014, as confirmation samples demonstrated that the soils still contained asbestos. Completion of the removal of asbestos contaminated soils at the Facility is anticipated by the end of 2014.

## 2.8 REMEDIAL INVESTIGATION DATA SUBMITTAL

At MDEQ's request, in October 2013, a CD containing the draft Remedial Investigation Data Submittal (RIDS) (Hydrometrics, 2013g) for the Facility RI, was provided which included the surface and subsurface soil analytical results, the June 2013 groundwater and July 2013 surface water and sediment analysis results. The submittal consisted of numerous tables listing the test result concentrations. No interpretation of the data was provided, that being deferred until submittal of this RIR.

## 2.9 BACKGROUND SOILS SAMPLING SUBMITTAL

A data submittal (Hydrometrics, 2014), summarizing the results from background surface soil sampling as outlined in Addendum No. 1 to the FSAP (Hydrometrics, 2013f), was submitted in January 2014. The submittal included analytical results for soils from public lands to assess local background soil conditions. As directed by MDEQ, results from two locations representative of conditions present at the YOSD Facility are included in this submittal and are incorporated into this RI Report for comparison purposes.

# 3.0 REMEDIAL INVESTIGATIONS: FIELD AND SAMPLING PROCEDURES

## 3.1 SURFACE AND UNDERGROUND UTILITY LOCATION CLEARANCE

To the extent possible, potential and known physical hazards were identified prior to sampling. Utility locate services were coordinated through the One Call Utility Locate Service. Buried hazards were located and marked including electrical cables, fiber optic cables, water and sewer lines, and pipelines (natural gas and petroleum). Known sumps, trenches, and remnants of foundation structures or piping systems related to existing public, private and commercial operations and historical refining activities were also noted. The marked utilities were then located for sampling purposes using a survey grade GPS. Subsurface clearance protocols followed the project Health and Safety Plan (Hydrometrics, 2013d) and included consulting as-built or design drawings of the historical refinery property (Figure 1-4), tanks farms and petroleum pumping facilities, and utilizing hand clearing and air-knife excavation techniques.

Clearance techniques varied somewhat between each sampling location, as necessary, based on field conditions, to protect the health and safety of the workers and to penetrate surface materials, soils and subsoils to accomplish the various sampling methods, procedures and objectives.

Some sampling points and monitoring well locations were adjusted in the field based on the presence of buildings, remnant foundations or structures, buried slabs, piping, points located within identified utility corridors, observed or potential physical hazards, and other obstacles identified and marked during subsurface clearance activities or as encountered or observed during soil sampling. As such, at sample locations requiring adjustment, the direction of offset, distance and rationale for adjusting (relocating) the sampling point from the planned staked and GPS-surveyed locations containing the applicable sample designation were described on field sampling forms and reviewed with MDEQ field oversight staff. Resulting GPS locations for all samples are contained in Appendix A.

## 3.2 SURFACE SOIL SAMPLING

Objectives of the RI FSAP (Hydrometrics, 2012b) surface soil sampling program were developed to provide:

- Current information on the type and distribution of all COPCs in surface soils;
- Information to support a Human Health Risk Assessment;
- Effective development and evaluation of alternative remedies for inclusion in the feasibility study; and
- Allow an assessment of health and ecological risks (including fate and transport analysis, if necessary) and development of cleanup levels or mitigation options.

Data collection to assist in achieving these overall objectives included facility-wide and focused-area surface soil sampling and analysis. RI FSAP (Hydrometrics, 2012b) sampling tasks for the surface soil media are summarized in Sections 3.2.1 through 3.2.3 and include details regarding sampling locations, methodologies, sample handling, and analytical requirements.

As discussed in the FSAP, in order to systematically assess the distribution of COPCs across the Facility, a grid approach to sampling was utilized. Square grids were situated over the Facility based on a best-fit scenario to include all areas of former refinery operations, known release and potential source areas. The primary facility-wide major grid sections are based on 250-foot intervals. Based on previous land uses (i.e., in the former refining areas), in areas of known or potential source areas, some major grid intervals were sub-divided into minor grid sections measuring 125 feet square. All grid sections were numbered sequentially. Figures 3-1 and 3-2 show the FSAP proposed locations of all facility-wide soil sampling locations. Actual locations were modified in field and were adjusted based on existing utilities and structures during sampling.

All surface soil samples were collected from 0 to 6 inches for risk assessment purposes. MDEQ considers soils from 0 to 24 inches to be surface soils. As such, RI surface soil sampling was also conducted at selected surface soil locations at 6 to 12 inches and 12 to 24

inches. In addition, select areas related to the former TEL Plant (south of Tract D along the railroad ROW) and the previous paint (shop) manufacturing building (Tract B and the adjacent railroad spur ROW) were subjected to a more focused-area sampling effort based on a smaller grid size of 25 foot intervals (Figures 3-3 and 3-4). Collection and analysis of background soil samples provided the basis for comparing Yale Facility soil quality to local soil quality, to existing regulatory standards, and are useful for assessing site specific remediation goals.

### 3.2.1 Facility Wide Sampling

A key component of the FSAP is a facility-wide focused-site field surface soil sampling program. Based on Facility history and uses, surface soil samples were systematically collected and tested for organics and metals concentrations, as well as additional identified analytes selected based on historical knowledge of potential or known source areas.

Facility-wide sampling was conducted at each grid section (Figures 3-1 and 3-2), with subsamples for grid compositing collected from three target depth intervals (i.e., 0 to 6 inches = A interval, 6 to 12 inches = B interval, or 12 to 24 inches = C interval). Each depth interval was sampled independent of the others. Based on grid section configurations, composite samples included subsamples from up to five locations within each grid section, one from the center of the grid section and one each from the centers of the four grid sub-quadrants located in the northeast, northwest, southwest and southeast portions of the primary grid section. Additionally, a separate independent grab sample was collected from the center point of each grid section. Grab samples were submitted, in accordance with the FSAP, for VPH and/or VOC analysis, and composites were submitted for metals, extractable petroleum hydrocarbons (EPH), PAHs and TEL as appropriate to the specific grid. Composite and grab samples were analyzed as one sample representative of each grid for each respective depth. Thirty-eight (38) grid sections were sampled from 6 to 12 inches and 12 to 24 inches in addition to the 0 to 6 inch interval.

### 3.2.2 Focused Area (TEL and Paint Shop) Sampling

Surface soil sampling methodology and handling for the focused-area surface soil sampling investigations in the former TEL and PS areas was similar to that described above for grab sampling at facility-wide locations. At the center of each 25 foot grid location in these focused areas, a sample from the 0 to 6 inch depth was collected. At 10 percent of the focused area surface soil sample locations, samples were also obtained from 6 to 12 inches and 12 to 24 inches.

Within the TEL focused-area, located predominantly in grids 28 and 43, the area was subdivided into 25 smaller grid sections (Figure 3-3), and grab samples at specified depths (0 to 6 inches, 6 to 12 inches and 12 to 24 inches) were submitted for analysis of lead, tetraethyl lead (TEL), and lead using the toxicity characteristic leaching procedure (TCLP).

Within the former PS area, in grid sections 9, 10, 20, 21 and 36, the area was further subdivided into 35 smaller grid sections measuring 25 feet square (Figure 3-4). Portions of the original sampling grid for the PS area (grids 16 to 31) were off-set approximately 12.5 feet to adjust sample locations so that they were adjacent to, and not underneath, the loading dock. Samples were obtained from the center of each smaller grid as grab samples at specified depths (0 to 6 inches, 6 to 12 inches and 12 to 24 inches) and submitted for analysis of VOCs (8260) and RCRA metals.

### 3.2.3 Background Soils

To assess local background soil conditions, surface soil samples were collected outside of the Yale Facility boundary at three (3) locations: South Park, North Park and Two Moon Park. The locations were selected on the basis of their duration (i.e., both pre- and post-Yale Refinery construction and operation) and existence as undeveloped (non-residential and non-commercial/industrial) land use as well as proximity to the Yale Facility. Samples were collected as grab samples from 0 to 6 inches following the methodology for surface soils. Constituent analysis consisted of PAHs and RCRA metals.

### 3.2.4 Sampling Methodology

Some parts of the Facility contain concrete and asphalt overlays and other unconsolidated fill and surface materials including pit-process gravel, cobbles, imported railroad ballast, coal fines, milled-asphalt cinders, demolition debris composed of concrete and brick, and river alluvium. Concrete and asphalt were removed prior to sampling. In those areas, surface soil sample collection began at 6 inches below any cap in an attempt to reduce or avoid artificial introduction of chemicals and materials from the cap materials or tackifiers. Sampling forms and field notes, provided in Appendix B, indicate the type and thickness of surface overlay material (asphalt, concrete or other material) removed prior to performing sampling. Any deviations from sampling locations presented in the approved RI Work Plan were noted on relevant field forms as to sampling conditions and the direction and distance of adjustment.

Samples were collected with hand tools, primarily a 2 inch by 6 inch hand-auger, or shovel, spade or hand-trowel, based on existing condition of the sample location (or depth). In areas where the surfacing materials or soils are densely compacted, an air-knife was used to advance the sample hole to the particular target depth. A clean hand-trowel was then used to remove sloughed material from the hole bottom and to then scrape in-place material from all sides of the hole-sidewall to allow obtaining a representative material sample for the particular target depth interval. Each recovered subsample was emptied into a clean stainless steel mixing bowl and thoroughly mixed with a clean stainless steel scoop. Approximately 200 grams of the subsample was transferred to a second clean stainless steel mixing bowl for compositing. Each successive subsample from the remaining of the five subsampling grid section locations was similarly collected. After all subsamples from the same depth interval were thus obtained, the contents of the second mixing bowl were again thoroughly homogenized and a representative sample placed into an appropriate and labeled sample container(s).

Grab samples from the center grid points were collected prior to the composite sample collection described above. A representative soil sample from the center grid point was extracted from the hole bottom (target depth) with hand augers, mixed and split into two portions. One portion was placed directly into the sample container (to maximize retention

of volatile constituents) and the other portion placed in a separate bowl as a subsample for the grid composite.

Surface soil samples were placed into 125-ml, amber glass sampling jars with screw caps as provided by the analytical laboratory. In accordance with the FSAP and QAPP, each jar was hand-labeled in the field with the project name, a unique sample number, and the date and time of the collection was hand-written onto adhesive labels attached to each sample jar. All labels were completed using waterproof ink. Surface sample denotation was identified by the grid number (Figure 3-1) followed by 'SS' (identifying as 'surface soil') followed by the depth interval designation, 'A', 'B' or 'C' (i.e., 0 to 6 inches, 6 to 12 inches, 12 to 24 inches, respectively). For example, the identification for a surface soil samples collected in grid 2 would be:

| | | |
|---|---|---|
| 2 - SS - A | - | sample collected from 0 to 6 inches depth; |
| 2 - SS - B | - | sample collected from 6 to 12 inches depth; and |
| 2 - SS - C | - | sample collected from 12 to 24 inches depth. |

Surface soil samples collected during focused-area sampling in the former TEL and PS areas were numbered with the site prefix 'TEL' or 'PS' immediately followed by the particular focused area cell number (Figures 3-3 and 3-4) followed by 'SS' and then the associated depth interval. Identifications for a surface soil sample collected in grid 3 of either the TEL or PS focused areas would be:

| | | |
|---|---|---|
| TEL3-SS-C | - | sample collected from 12 to 24 inches depth; |
| or | | |
| PS3-SS-A | - | sample collected from 0 to 6 inches depth. |

All samples were placed into a cooler containing ice for temporary onsite storage and during transport and delivery to the analytical laboratory for testing.

## 3.3 SUBSURFACE SOIL SAMPLING

Subsurface soil samples were collected throughout the Facility utilizing the same grid system described for surface soils in Section 3.2, above and as shown in Figure 3-2. RI subsurface soil sampling (greater than 2 feet) was conducted at locations based on the established 250 foot grid sections and 125 foot grid sections (in areas of known or potential source areas). Square grids were situated over the Facility based on a best fit scenario to cover all areas of former operations, known releases and potential source areas. Each sampling location was recorded using a mapping or survey grade GPS (see Section 3.10) in accordance with the Facility QAPP (HSOP-5). Similar to surface soils, subsurface soil samples were systematically evaluated for organics and metals contamination, as well as selected additional analytes based on historical knowledge of potential or known source areas. This included characterization of COPCs in vadose zone soils and soils near the groundwater interface, as well as any non-aqueous phase liquids that may be present. Objectives of the RI subsurface soil sampling include the following:

- Provide current information on the type and distribution of all COPCs in subsurface soils;
- Evaluate the relationship of soil COPCs concentrations to observed groundwater COPCs concentrations;
- Allow the effective development and evaluation of alternative remedies for inclusion in the feasibility study;
- Provide information to support the Human Health Risk Assessment; and
- Allow an assessment of health and ecological risks (including fate and transport analysis) and development of cleanup levels.

### 3.3.1 Facility Wide Sampling

Samples were collected from the center point of each grid section. Subsurface samples were also collected from soil borings associated with each groundwater monitoring well location (Section 3.4). The subsurface sampling protocol specified collection of samples at 2 foot intervals, beginning at 2 feet below ground surface (bgs), and ending at total depth of the boring, approximately one to two feet below the groundwater interface. Monitoring well

subsurface soil samples extended to the total depth of the wellbore. RI soil boring locations are shown on Figure 3-2, and at the monitoring well locations shown on Figure 3-5. Locations were marked and surveyed.

A minimum of three subsurface samples were proposed to be collected from each soil boring. One subsurface sample was to be collected from each soil boring at a default depth of 4 feet (or the interval from 2 to 10 feet with the highest PID reading). Samples collected at the groundwater interface and at total depth (one to two feet below groundwater interface) were planned to help assess potential impacts to groundwater and the vertical limits of impacted soils. Sample identification was similar to surface soils. Samples were labeled with the grid number, "SB" for subsurface soil, followed by the depth interval designation in the following example:

- 2-SB-A (Sample collected at 2 to 4 feet, or 2 foot interval with the highest PID reading from 2 feet to 10 feet.)
- 2-SB-B (Sample collected at the water table.)
- 2-SB-C (Sample collected at the total depth of boring, 1 to 2 feet below water table.)

Samples were generally collected from the center points of each grid as modified (offset) during the collection of surface soils.

### 3.3.2 Sampling Methodology

Due to HASP protocols (Hydrometrics, 2013d), varied surface conditions at some locations, and shallow groundwater, the actual sampling procedure and sampling methods deviated from those discussed in FSAP and QAPP. In some cases, subsurface samples could not be collected from the same location as the surface samples due to utilities, access, or debris or obstacles encountered during clearance activities. Deviations from the planned locations were noted on the field logs.

Initially, it was anticipated that subsurface soil would either be sampled using roto-sonic or hollow stem auger methods; however, subsurface clearance protocols precluded sample

collection using mechanical methods until clearance to 8 feet was achieved. Therefore, subsurface samples were collected using a variety of methods based on field conditions and clearance protocols.

Subsurface clearance at monitoring well locations was conducted in January 2013 and followed the protocol of clearing (air-knifing and vacuuming) the hole to a clearance depth of 8 feet and backfilling with clean sand. Beginning in April 2013, samples representing the monitoring well borings were collected from a location offset at least 5 feet from the surveyed location. Surface samples (0 to 6 inches, 6 to 12 inches and 12 to 24 inches) were collected using a hand auger or other hand tools as described in Section 3.2. The hole continued to be advanced by hand to 8 feet or to refusal, whichever came first. "A" samples were collected at 2 foot intervals as far as could be advanced, and PID readings were taken to determine the sample within that range to be submitted for analysis (either 2 to 4 feet, 4 to 6 feet, or 8 to 10 feet) depending on the boring advancement and PID reading. When the monitoring wells were installed at a later date (April 2013), an additional "A" sample was collected from 8 to 10 feet (if not already collected), the PID reading compared to the previously submitted "A" sample collected via hand augering, and the sample submitted for analysis if the PID reading in the 8 to 10 foot interval was higher than the previous "A" samples. These were designated with a "D" suffix (i.e., YMW-13-SB-D). If groundwater was encountered in or prior to the 8 to 10 foot interval, the sample was considered to be from the water table ("B" interval). Sampling forms and field notes for samples collected at monitoring wells locations are provided in Appendix B.

The procedure for grid subsurface soil borings was similar. Each center grid location was initially sampled by hand (auger) to either refusal or to 8 feet, whichever came first. The default method was to advance the hole as far as possible using hand (auger) collection methods up to and including the total depth of the hole. If clearance was not achieved via hand auger, an air knife was then used to clear the hole from refusal to 8 feet, leaving a 6 inch buffer between the bottom of the hole and the next sample interval, to reduce potential loss of volatiles from vacuuming procedures. The hole was then advanced with the geoprobe from 8 feet to total depth (1 to 2 feet below groundwater), with samples collected for any

remaining 8 to 10 feet "A" interval samples (if groundwater had not been encountered), at the groundwater table "B" interval, and/or at 1 to 2 feet below groundwater "C," considered the total depth of the hole.

Any open holes were blocked, or plugged using a hole plug and bentonite system, until sampling could be conducted with the geoprobe. Ground water was encountered at many locations prior to achieving the required 8 foot clearance for the hole. There were a few occasions when the water table had risen between the time of the initial sampling/clearance and before the geoprobe could be mobilized. In these cases, water table ("B") samples were completed using hand methods at a location slightly offset from the initial boring. A table summarizing collection methods is included along with the sampling forms and field notes in Appendix B.

## 3.4 MONITORING WELL INSTALLATION

### 3.4.1 Existing Monitoring Well Usability

Existing monitoring wells used as part of the groundwater monitoring program for the Yale Facility include wells MW01, MW02 and MW03 on Tract 1A and wells MW-4 and MW-6 on Tract 5. Some difficulties were documented during the installation of MW01 and MW02. These wells were evaluated and considered usable for their intended purpose as they appear to be hydraulically connected to the surrounding formation. The purpose and methodology employed to evaluate usability of the five existing monitoring wells listed above was conducted in accordance with the general approach discussed in the RI FASP, Section 3.1. The approach applied to evaluate usability of each existing monitoring well consisted of:

- Consideration of the physical location of the existing well within the facility boundary and its potential to augment the well network resulting from the 14 proposed new monitoring wells;
- Apparent hydraulic connection of the well to surrounding formations based on as-drilled cuttings log and construction details available for the well;
- Apparent location of the well within the groundwater flow system and gradient indicated by the 14 new monitoring wells; and

- Proximity of the well to a potential source area(s) and/or an upgradient location suitable to delineate groundwater quality across the facility.

### 3.4.2 Monitoring Well Location, Construction and Development

The 14 newly installed monitoring wells are used in conjunction with five existing monitoring wells to form the RI groundwater monitoring well network for the RI investigation and subsequent groundwater monitoring. Rationale and objective for placement of the new monitoring wells is to provide for monitoring of groundwater conditions and water quality at the following areas:

- Wells YMW-10 and YMW-11 were installed upgradient of the former refining facilities, near the Facility boundary in the northwest corner on Tract A and the railroad right-of-way (ROW);
- Wells YMW-15 and YMW-20 were installed upgradient of the former refining facilities along the northern boundary along Tract D and the MDT property;
- Wells YMW-16, YMW-18, and YMW-19 were installed downgradient of the former refining facilities including the former Yale/Carter Oil Refinery, associated oil recovery area and the Montana Refining Company area;
- Well YMW-17 was installed at the approximate location of the former refinery TEL Plant;
- Well YMW-21 was installed downgradient of the former refinery TEL Plant in the approximate location of the former refinery oil trap;
- Well YMW-22 was installed downgradient of the former TEL Plant pond area;
- Well YMW-23 was installed on railroad ROW near the northwest corner of the Facility as a downgradient well for the Facility;
- Three monitoring wells located in potential source areas of the former refinery include:
    - YMW-12, installed in the vicinity of the former refinery crude unloading dock;

- YMW-13, installed south of the former refinery's railroad loading platform; and
- YMW-14, installed in the vicinity of the former refinery's pump houses.

The objectives of the five previously installed wells and their continuing purpose for this RIR are:

- Upgradient monitoring of Tract 1A at well MW01;
- Downgradient monitoring of the former refining area at MW02;
- Downgradient monitoring of the former oil recovery area at MW03; and
- Downgradient monitoring near the edge of the Tank Farm and Facility at wells MW-4 and MW-6.

Table 3-1 provides details of the monitoring well construction of the 14 recently installed monitoring wells for the Facility RI. Also included are known construction details of the previously installed wells. Detailed descriptions of the soil types encountered during drilling and the construction of each monitoring well is provided in Appendix C.

Hollow-stem auger drilling methods were employed for monitoring well drilling, construction and installation for the 14 recently installed monitoring wells. Drilling was performed by SK Geotechnical, Billings, MT. A Montana-licensed Monitoring Well Constructor and/or Installer was present during drilling and well construction and installation. Drilling practices followed standard procedures for monitoring well installation as outlined in HF-SOP-9 (Facility QAPP). A well log for each newly installed monitoring well was prepared and submitted to the Montana Department of Natural Resources and Conservation and the Montana State Bureau of Mines and Geology, Groundwater Information Center (GWIC) within 60 days after completing well installation. Monitoring well logs are included in Appendix C.

The majority of monitoring wells were constructed of 2-inch ID (inside diameter) NFS-approved schedule 40 PVC with flush threaded joint couplings, slotted pipe, and end cap.

Wells YMW-11 and YMW-19 were completed with 4-inch ID NFS-approved schedule 40 PVC with 0.020 slot well screen. The 2-inch ID wells were completed with a 0.010 slot well screen. Ten feet of well screen extended across the water table was installed in all wells. The annulus opposite the screened interval was gravity-backfilled from the well bottom to a minimum of one foot above the top of screen interval with 10/20 sieve-size washed silica sand to provide a filter pack. The remainder of the annulus was backfilled with hydrated bentonite chips to seal the annulus and prevent potential fluid migration along the wellbore and outer surface well casing. Monitoring wells YMW-10, YMW-12, YMW-15 and YMW-20 were completed as flush mount wells because they are near business operations and are likely to encounter traffic. Surface completions at 'stickup' monitoring wells on other areas of the Facility consist of above-ground mounts surrounded by 6-inch nominal diameter steel protective casing with locking lid, and a concrete pad around the protective casing. All well installations were completed in accordance with Montana Monitoring Well installation requirements, ARM 36.21.801 *et seq*.

Prior to and throughout monitoring well drilling, subsurface soil samples were collected at each well location in accordance with the sampling and analytical schedule developed for subsurface soils (FSAP, Section 3.4). Soil samples were collected at 2 foot intervals beginning at 2 foot bgs and continuing to total drill hole (borehole) depth. Soil samples from each 2 foot interval were field-screened for headspace gases using a photoionization detector (PID). Additional details regarding subsurface soil sample collection, handling, and field screening that are applicable to samples collected during monitoring well installation are in Section 3.3.

### 3.4.3 Monitoring Well Development

Following well installation, and determination of the presence of LNAPL, the new monitoring wells were developed to reduce turbidity and ensure good hydraulic connectivity with the alluvium. Existing monitoring wells were not redeveloped beyond purging immediately prior to sampling.

Monitoring wells YMW-10, YMW-11, YMW-15, YMW-16, YMW-17, YMW-19, YMW-20, YMW-21, YMW-22 and YMW-23 were developed May 21 and 22, 2013. Wells YMW-12, YMW-13, YMW-14 and YMW-18 were not developed due to the presence of LNAPL. In wells showing evidence of LNAPL, development was deferred to minimize the necessity and difficulty in handling and disposal of potentially significant volumes of hazardous substances or contaminated groundwater. Well performance of undeveloped wells will be evaluated after several monitoring and/or sampling events. If determined that the wells are not performing consistently with wells that were developed following construction, then the affected well(s) may be recommended for subsequent development. To date, the undeveloped wells appear to be performing suitably and development does not appear warranted at this time. Well performance and/or maintenance conditions in all wells, developed or undeveloped, should continue to be routinely evaluated with redevelopment or other actions recommended and implemented, as appropriate.

Development procedures consisted of hand-bailing a minimum volume equal to or exceeding five times the well bore volume in each well. Appendix D contains well development forms. To allow for "re-equilibration" of all wells with the surrounding formation, well development activities took place approximately two weeks after the last monitoring well was installed. The well development procedures employed were in accordance with the QAPP procedures outlined in HF-SOP-9. After development, a minimum period of one week was allowed to elapse prior to groundwater sampling and subsequent static water level measurements.

### 3.4.4 Aquifer Testing Procedures

Aquifer tests consisted of pump tests and slug tests. Pump tests were performed on wells YMW-11 and YMW-19 in July 2013. YMW-11 was re-evaluated using the slug test technique in September 2013 because a consistent flow rate could not be maintained during the initial pump test. Aquifer test data is presented in Appendix E.

Aquifer testing procedures followed those summarized in HF-SOP-100 and HF-SOP-8 (Facility QAPP). Aquifer test data was analyzed using AQTESOLV$^{TM}$ aquifer test software and supplemented with existing Facility data and/or local area information. Analysis based

on unconfined water table aquifer conditions were used. Results of the data evaluation provide information on the groundwater aquifer characteristics (Section 4.6.3) and flow in the Facility area. Groundwater flow directions, gradients and groundwater–surface water interactions are discussed in Sections 4.6.2 and 4.6.4.

Pump Test Procedure

100 minute pumping tests were conducted in wells YMW-11 and YMW-19. The pump tests were conducted by pumping water out of the wells with a suction pump and measuring groundwater drawdown and recovery during and after the pumping. The suction pump used 1 inch poly drop pipe and fittings. The poly pipe and fittings were replaced after each pumping test. Water level changes during the pump test and recovery periods were recorded and measured using electronic 30 psi pressure transducers. Manual measurements were documented using an electronic water level probe and were used to verify the pressure transducers reading.

Slug Test Procedure

In addition to a pump test, a slug test was conducted in well YMW-11. A slug test is conducted by displacing the water level in the cased well using a 3.5 inch diameter by 25 feet long "slug" and measuring groundwater recovery following slug insertion and withdrawal. The slug was attached to ¼ inch diameter braided poly rope that was replaced before and after testing. Water level changes throughout the slug test were recorded and measured using electronic 30 psi pressure transducers and confirmed using electronic water level probes.

## 3.5 GROUNDWATER MONITORING AND SAMPLING

Groundwater was collected in June 2013 and September 2013 from designated wells in the RI monitoring network. Static water levels and LNAPL levels were measured prior to water quality sampling. Wells with measureable LNAPL levels were not sampled.

### 3.5.1 Water Level and LNAPL Measurements

A complete set of water level measurements at all newly installed monitoring wells was recorded on May 16, 2013, before well development activities, and prior to initiating water

quality sampling. This initial set of measurements was used to determine if LNAPL was present in any of the monitoring wells. Due to the presence of LNAPL, DEQ requested that LNAPL be monitored, measured, and recovered monthly until, at least, the completion of the current phase of RI field activities. Monthly monitoring for LNAPL began in July. Monthly water level monitoring at all wells was added in August 2013 to gain a better understanding of water level fluctuations. Results of the routine groundwater water level measurements recorded to date are presented in Section 4.6.2 of this report.

Water level measurements were recorded to the nearest 0.01 foot. Prior to collection of samples or removal/introduction of any equipment into a well, an electric interface/water level probe was used to determine:

1. The presence or absence of LNAPL at the top or bottom of the water column; and
2. The depth of groundwater below a specified measuring point (typically the top of the PVC well casing).

This protocol is consistent with water level measurement procedure discussed in HF-SOP-10 in the Facility QAPP (Hydrometrics, 2012c). Water/LNAPL levels continue to be monitored and recorded on a monthly basis in all RI monitoring network wells.

### 3.5.2 Groundwater Sampling

Groundwater sampling at the Facility was conducted at 19 monitoring wells, including 14 new wells installed as part of the RI, and five existing monitoring wells. Monitoring well locations are shown on Figure 3-5. The objectives of the groundwater sampling were to:

- Characterize groundwater quality, particularly as it relates to COPCs and MNA parameters;
- Characterize groundwater flow, including seasonal patterns, flow, and potential COPCs transport;
- Allow the effective development and evaluation of alternative remedies for inclusion in the feasibility study; and

- Allow an assessment of health and ecological risks (including fate and transport analysis) and development of cleanup levels.

### 3.5.3 Sampling Methodology

Water level measurements, field observations, and any previous analytical results were evaluated to determine the order of wells for subsequent sampling. In general, groundwater sampling proceeded in order from the apparent least to most impacted location as indicated on the basis of the Facility history and any current and previous data collected at the Facility. Groundwater wells with evidence of LNAPL were not sampled. As an interim measure, DEQ requested that LNAPL levels be measured monthly and LNAPL recovered to the extent practical. Wells containing LNAPL were evaluated for potential LNAPL recovery based on the amount of LNAPL and recovery rates in surrounding wells as determined by aquifer tests (Section 4.1.2).

Groundwater samples were collected from Facility monitoring wells using low flow sampling techniques consistent with MDEQ's Site Response Section Low-Flow Purging and Sampling Guidelines (http://deq.mt.gov/StateSuperfund/PDFs/srs_lowflow_memo.pdf) and HSOP-105 in the QAPP (Hydrometrics, 2012c). A 2-inch diameter, low flow PTFE bladder pump was used for well purging and sampling. The sampling pump was typically placed near the midsection of the screened interval. This placement was such that it minimized potential sediment influx and was most efficient to remove the majority of static groundwater in the well to ensure that water sampled was reflective of a representative sample and not aged. Teflon-lined tubing was used throughout purging and sampling of all wells. Well purging continued until field parameters had stabilized.

The initial depth measurement to groundwater was obtained before and after pump placement and recorded periodically coincident with field parameters during well purging and prior to sampling. Field parameters for indication of groundwater stabilization included oxygen reduction potential (ORP), dissolved oxygen (DO), pH, specific conductance (SC) and temperature. These parameters were measured using a flow-through device to minimize potential effects from atmospheric exposure. Turbidity was measured separately.

Measurements were recorded on field sampling forms contained in Appendix B. Field meters were calibrated daily according to factory instructions, with calibration results recorded on calibration forms. Field parameters were recorded every five to six minutes allowing for exchange of water in the flow-through cell to achieve the following stabilization criteria:

| **Parameter (Units)** | **Stability Criteria** |
|---|---|
| pH (standard units) | ± 0.1 s.u. |
| Water temperature (°C) | ± 0.2 °C |
| Specific conductance (µmhos/cm) | ± 5% (SC ≤ 100 µmhos/cm)<br>± 3% (SC > 100 µmhos/cm) |
| Dissolved oxygen (mg/L) | ± 0.3 mg/L |
| Turbidity | ± 10% |

NOTE: Stability criteria obtained from USGS National *Field Manual for the Collection of Water-Quality Data: Chapter A4, Collection of Water Samples (September 2006).*

Due to difficulties in stabilizing turbidity in the field, the turbidity was measured in the lab.

Following well purging and stable groundwater parameter conditions, final field parameter measurements were recorded and groundwater quality samples obtained. Appendix B contains field notes and forms associated with groundwater sample collection.

In accordance with FSAP Section 4.1.4, samples for volatile constituents (VPH and VOCs by Method 8260) were collected first followed by sample collection for non-volatile parameters. Samples were obtained by pumping the well at a low rate (<0.3 liters/minute) and discharging the appropriate sample volume, via the purge tubing, directly into the sample jar. Samples for trace constituents were filtered through a 0.45 µm in-line filter attached to the discharge tubing and prior to preservation. The filter was rinsed prior to sampling by allowing approximately twice the filter volume to flow through it before actual sample collection. All unpreserved sample containers were triple rinsed with sample water prior to sample collection, and then preserved as appropriate for the intended analysis (e.g., nitric

acid preservation to pH <2 for metals analysis), and stored on ice in coolers at approximately 4°C during sampling activities and transport/delivery to the analytical laboratory.

## 3.6 SURFACE WATER SAMPLING

Surface water samples from the Yegen Ditch were collected as part of this RI with the objectives to:

- Assess water quality in the Yegen Ditch upstream of the current Facility boundary;
- Assess water quality in the Yegen Ditch downstream of the current Facility boundary and provide information on any constituent loading to this surface water body from the Facility;
- Allow the effective development and evaluation of alternative remedies for inclusion in the feasibility study; and
- Allow an assessment of health and ecological risks (including fate and transport analysis) and development of cleanup levels.

### 3.6.1 Yegen Ditch

The Yegen Ditch bisects the Facility from southwest to northeast, and flows into the Yellowstone River near the northeast corner of the Facility (Figure 3-5). The Yellowstone River borders the Facility along the southern boundary. The Yegen Ditch currently carries storm water runoff from the industrial areas in east and south Billings. Surface water runoff migrates off the Facility via percolation, infiltration and overland flow. Prior to 1947, north of Tract 5, the ditch turned north flowing under a railway bridge/culvert and crossing the MDT property and discharged into the Yellowstone River northeast of the Yellowstone county Fairgrounds (Cardno ERI, 2012, page 35). In 1947 the city re-routed the ditch to its present course. Along its upper reaches the ditch and tributaries pass through or near numerous industrial facilities.

Four locations (Figure 3-5) along the exposed ditch channel were selected to measure and sample surface water and also provided access and opportunity to collect ditch sediment samples. Access to the measurement locations was obtained by agreement and consultation

with the present property owner. Surface water and sediment sampling was limited to that portion of the original ditch channel currently open and accessible on the Facility. All locations are positioned along the original and exposed ditch course. At proposed sampling location YD-2 the ditch was not accessible (buried and backfilled) for monitoring or sampling. Location YD-5 is positioned approximately 100 feet upstream of the ditch mouth where it discharges into the Yellowstone River. This location appears to be sufficiently low in elevation and may be subject to seasonal flooding or inundation during periods of high-water and runoff. Flow characteristics of the Yellowstone River are discussed in Section 4.5.3.

### 3.6.2 Measurements and Sampling Methodology

Surface water sampling began at the furthest downgradient/downstream location (i.e., YD-5) and progressed upstream to location YD-4, then YD-3 and ending at location YD-1. At each sampling location along Yegen Ditch, surface water monitoring and water sample collection was conducted as follows:

1. Field parameter measurement and water quality sample collection; and
2. Measurement of stream flow.

Surface water field parameter measurements, consisting of pH, specific conductance (SC), dissolved oxygen (DO) and temperature and qualitative sample collection was completed prior to sampling sediments or measuring stream flow so not to disturb streambed sediments or affect water sample quality. Parameter measurements were obtained directly in the channel wherever possible. Field forms for surface water collection are contained in Appendix B. Field meters were calibrated daily according to factory instructions, with calibration results recorded in the field notebook and/or on calibration forms.

Surface water quality sample container use and preservation requirements were consistent with the methods specified in the project QAPP (Hydrometrics, 2012c) and discussed in FSAP Section 4.0. Unpreserved sample containers were rinsed three times with sample water prior to sample collection. Water quality samples were collected by passing the

uncapped sample container beneath the water surface and across the area of flow. Samples were then preserved as appropriate for the intended analysis (e.g., nitric acid preservation to pH <2 for metals analysis), and temporarily stored onsite on ice in coolers for transport and delivery to the analytical laboratory.

Surface water flow measurements, also contained in Appendix B, were obtained at each of the four monitoring sample locations along the Yegen Ditch using a Marsh-McBirney current meter and wading rod. Measurement of streamflow was performed in accordance with the area-velocity method developed by the USGS (USGS, 1977). In general, the entire stream width was measured and divided into approximately 15 to 20 subsections of equal width and the stream velocity measured at the midpoint of each subsection and at a depth equivalent to two-tenths and eight-tenths of the total subsection depth. The velocity in each subsection was then multiplied by the cross-sectional area to obtain the flow volume through each subsection. The subsection flows were then summed to obtain the total discharge (cubic feet per second). Results of stream flows measurements are discussed in Section 4.5.2.

At each monitoring location, streamflow measurements were obtained in a straight reach of the stream and as free of in-stream obstructions as possible to minimize potential measurement errors resulting from converging or turbulent flow paths. Measurement locations YD-1 and YD-3 were placed away from the inlet and outfall to eliminate or minimize effects of culvert affected flow. A brushy dam extending across the ditch channel is located approximately 100 feet downstream of location YD-4 and 370 feet upstream of YD-5. Locations of the ditch measuring points do not appear affected by the dam or impeded water flow and depth.

## 3.7 SEDIMENT SAMPLING

Similar to surface soils and subsurface soils, sediment samples were also systematically evaluated for organics and metals contamination, as well as selected additional analytes

based on historical knowledge of potential or known source areas. Objectives of the RI sediment sampling include:

- Provide current information on the type and distribution of COPCs in ditch sediments;
- Allow the effective development and evaluation of alternative remedies for inclusion in the feasibility study; and
- Allow an assessment of health and ecological risks (including fate and transport analysis) and development of cleanup levels.

Four locations (Figure 3-5) along the exposed ditch channel were selected to measure stream flows and that also provided access and opportunity to collect and sample surface water ditch sediments. Sediment samples were co-located with surface water sample locations. All locations are positioned along the original and exposed ditch course. Sampling began at the furthest downstream location (i.e., YD-5) and progressed upstream ending at location YD-1. At proposed sampling location YD-2, the ditch was not accessible (buried and backfilled) for monitoring or sampling. Appendix B contains sampling forms related to sediment collection.

### 3.7.1 Measurements and Sampling Methodology

Sediment sampling was conducted at four locations along Yegen Ditch at up to 3 points along the cross section of the ditch. Sediment samples were composited for distinct sample intervals (A: 0 to 6 inches, B: 6 to 12 inches, and C: 12 to 24 inches).

An AMS 24-inch multi-stage sediment sampler was used to collect the sediment samples instead of a sediment core sampler indicated in the QAPP. Disposable plastic cores were not used due to the wet sediment. Disposable plastic soil catchers (baskets) were used to retain the sediment in the sampler. A thread on slide hammer was used to drive the sediment sampler to the desired two foot depth. A check-valve flap on the top of the sampler aided in the retention of sediment.

After retrieving the sediment sampler, the sediment was deposited in a stainless steel bowl for sorting and sampling. Field conditions did not allow the hole to stay open to allow three distinct depth samples. Therefore, modifications were made in the field. The preferred method to distinguish sample intervals was to sort the sample based on soil characterization, using either organic divides or soil type divides. For example, "A" sample could be heavy organic (swampy); gravel with organics would be the "B" sample; and gravel without organics would be the "C" sample. This method, however, was not applicable at all locations. YD-1 has organic material in excess of two feet, and YD-5 has gravely material without organics to two feet. If soil types could not be differentiated, then the recovered sample was partitioned into A, B and C intervals based on ratios proportionate to the respective intervals. If a partitioning process was used, and there was a small recoverable quantity of sediment, then a reduced number of sample sets were taken. Samples for the 12 to 24 inch intervals at YD-3 and YD-4 could not be obtained. This process was repeated multiple times until enough sediment was collected to fill the sample jars. Samples jars were labeled and put on ice for later lab analysis.

## 3.8 ASBESTOS SAMPLING

Potential suspected asbestos materials (SAM) were observed at two locations at the Facility: 1) inside the fenced area located south of Tract D, and 2) the exterior grounds and roof of the Montana Department of Transportation (MDT) building on the MDT Tract. Inspection and sampling of materials south of Tract D along the railroad ROW were conducted along with the Interim Action Disposal in May 2012. An additional inspection in the area surrounding the MDT building was conducted September 2013 and included a shoulder-to-shoulder visual inspection of Grids 18, 19, 29 through 35 and 44 through 51. Limited-area inspections and sampling of SAMs were conducted. Inspection and sampling of both areas was performed by a Montana accredited asbestos inspector.

### 3.8.1 Sampling Methodology

Suspected materials were marked with pin flags and/or logged using a GPS device. Up to three samples of each type of material were collected if sufficient material was available. Samples were collected by carefully removing small portions of the suspect material in a

non-abrasive manner, using techniques such as wet slicing, wet boring or similar methods designed to limit contamination of the area during sampling (Tetra Tech, 2012 and 2013). If possible, samples from existing damaged areas or loose pieces of material were collected. Samples were placed in pre-labeled plastic containers immediately after collection and sent to a certified laboratory for analysis using EPA Method 600/R-93/116 including polarized light microscopic techniques (PLM) and dispersion staining and/or Transmission Electron Microscopy (TEM) methodology.

## 3.9 SAMPLE EQUIPMENT DECONTAMINATION

Soils and Sediments

Prior to initial and subsequent reuse, or after extended periods of nonuse, sampling equipment (augers, shovels, spades, trowels, mixing bowls, scoops, etc.) was decontaminated between sampling locations and soil depth intervals using the following sequence:

- Brushing or scraping loose and adhering soil from the equipment;
- Scrubbing equipment with tap water and a non-phosphate detergent;
- Rinsing equipment with a minimal volume of acetone rinse;
- Tap water rinse; and
- Final rinse with deionized water.

Decontamination of drilling augers and equipment consisted of brushing off loose material, followed by pressure washing. Clean and dry equipment (hand tools and receptacles) were placed inside a new, clean plastic garbage bag between transporting to different sample locations and during overnight or extended storage. The effectiveness of the decontamination was evaluated through collection and analysis of Equipment Rinsate blanks and DI Water blank samples.

Water

Equipment (i.e., probes, tapes, cables) inserted into the monitoring wells, including aquifer testing equipment, was decontaminated before each use in accordance with the Facility QAPP (Hydrometrics, 2012c) and procedure HF-SOP-35.

General decontamination consisted of:

- Scrubbing equipment with tap water and a non-phosphate detergent;
- Rinsing equipment with a minimal volume of acetone rinse;
- Tap water rinse; and
- Final rinse with deionized water.

All water generated from decontamination activities was contained for determination of disposal as described in Section 3.11.

## 3.10 DOCUMENTATION

Chain-of-custody procedures were followed throughout the project by utilizing standard chain-of-custody forms to transfer samples from the field to the laboratory. Each cooler of transferred samples was accompanied by the chain-of-custody documentation to record the transfer of samples from the possession of field personnel to the possession of the laboratory. Digital photographs were taken of the location of all RI surface soil samples, and latitude/longitude coordinates recorded using a resource-grade GPS unit. Appendix F contains photographic documentation of RI sampling.

Field notebooks and field sampling forms were used to record pertinent sampling information, including lithologic descriptions of each soil sample (soil material type, color, texture, moisture, petroleum odor and staining, etc.), time, date, and sample number of each laboratory sample. All water quality sampling information, including sample locations, sample numbers, date and time of sample collection, field parameter measurements, water levels, flow measurements, and other notes and observations were documented in waterproof ink in a dedicated project field notebook, and on standard field forms (Appendix B).

## 3.11 LOCATIONAL (GEOGRAPHIC POSITIONING) SURVEYS

Hydrometrics utilized a survey grade GPS unit to set control stations and survey both coordinates and/or elevations of all monitoring wells and planned sample locations (see Sections 3.1 and 3.4). Accuracy of the survey was approximately 0.01 foot horizontally and

approximately 0.01 foot vertically. Vertical control datum used to determine well elevations is the North American Vertical Datum of 1988 (NAVD 88), and is referenced to a nearby USGS benchmark, D484 and verified using benchmark E484. Latitude and longitude coordinates are reported in accordance with the State Plane NAD83 Feet Coordinate System. Operation of the survey grade GPS used to survey both coordinates and/or elevations of all monitoring wells, soil borings and media sample locations was performed under the field direction of Mr. John Bergin, Engineer, Hydrometrics, Inc., Billings, MT; Mr. Bergin is a Registered Professional Engineer in Montana, registration number 16497.

Appendix A lists the ground surface coordinates for all surface soil and subsurface soil boring sample collection locations obtained during the RI investigation. Ground surface elevations were not obtained for soil sampling locations. Table 3-1 lists the measuring point (i.e., top-of-casing, TOC) and ground surface elevations and coordinates for all wells in the RI monitoring well network.

## 3.12 MANAGEMENT OF INVESTIGATION-DERIVED WASTES (IDW)

Liquid Wastes

Purged groundwater, recovered LNAPL, and water used during equipment decontamination were contained for disposal. Well purge waters were discharged directly from tubing into cleaned, 5-gallon PVC buckets with compression lids. The bucket contents were then transferred into an enclosed 500-gallon poly water tank with secondary containment located on Tract C. This location is also paved with asphalt.

Disposal of liquid wastes is ongoing. IDW water was sampled in December 2012, May 2013, and September 2013 and analyzed for metals, EPH and VPH. Results of the testing (Appendix G) are used to determine appropriate disposal of the groundwater and decontamination wastes. Decontamination water (sampled December 2012) from surface soil sampling was disposed at the City of Billings Waste Water Treatment Plant. Water used for decontaminating monitoring well drilling equipment, sampled in May 2013, was found to be hazardous for lead, and was therefore shipped to Clean Harbors along with Interim Action wastes (Hydrometrics, 2013c). Decontamination water from subsurface sampling, purged

groundwater, and recovered LNAPL was sampled in September, 2013 and results were non-hazardous. Disposal for these waters will occur once the tank is full. Shipping records and waste manifests are contained in Appendix H.

Aquifer Testing

Based on the June 2013 groundwater analytical results (no exceedances of RBSLs or Circular DEQ-7 Numeric Water Quality Standards [DEQ-7 standards]) and following DEQ's purge water flow chart (DEQ, 2011a), waters generated during pump testing of YMW-11 and YMW-19 (see Section 3.4.4) was discharged on the ground away from the wells. Therefore, no IDW was generated.

Solid Waste

Composite samples of soils from vacuum clearance procedures, drill cuttings, and subsurface sampling were collected in January 2013 and May 2013. Samples were analyzed for metals, EPH and VPH. These soils were non-hazardous and subsequently disposed at the Billings Regional Landfill. All solid waste was transported in such a manner that prevented its discharge, dumping, spilling or leaking from the transport vehicle.

Other solid IDW waste included inert, solid materials such as rubber gloves, paper, plastic, cardboard, duct tape / electrical tape, etc. Inert waste were collected in plastic garbage bags as common garbage and disposed at the City of Billings landfill.

# 4.0 NATURAL FEATURES CHARACTERIZATION AND ENVIRONMENTAL SETTING

## 4.1 CLIMATE

The region in which the Facility is located has a semi-arid climate and receives relatively limited precipitation (Olson and Smith, 2007). Humidity in the region is relatively low at about 44 percent and winds that average about 11 miles per hour (Western Regional Climate Center, 2007 in Olson and Smith, 2007). Temperatures in Billings in January range from 17.8 degrees Fahrenheit (°F) to 36.4 °F and average 27.1 °F. Temperatures in July range from 58.8 °F to 86.8 °F and average 72.8 °F. Spring, summer, fall and winter temperatures average 46.3 °F, 69.7 °F, 48.2 °F, and 28.0 °F, respectively (NOAA, 2012 in Cardno ERI, 2012).

Annually, Billings averages 13.63 inches of precipitation and 55.1 inches of snowfall. Precipitation averages decrease in the winter months (averaging 1.46 inches) and are at their peak during the spring (averaging 4.90 inches). Snowfall is at its peak during the winter and spring months, averaging 22.8 and 20.5 inches, respectively (NOAA, 2012 in Cardno ERI, 2012). The wettest months are in April through June, and September and October, with incidental early/late spring and early/late summer thunderstorms providing most precipitation. From December through February precipitation accumulates as snow although chinook winds and resulting moderate temperature increases may result in melting and some runoff. Dry winds promote evaporation that far exceeds precipitation; pan evaporation in the Billings area is 53 inches per year (Oregon Climate Service, 2007 in Olson and Smith, 2007). Transpiration in the Billings area is about 26.5 inches from April through October (U.S. Soil Conservation Service, 1980 in Olson and Smith, 2007).

Figure 4-1 (source: http://www1.ancdc.noaa.gov/pub/orders/cdo/224720.pdf) shows total monthly precipitation amounts recorded received at the Billings Water Plant located 1.5 miles south of the Facility, for the months May to October 2013 during the majority of the Facility RI.

Precipitation falling over the region first encounters whatever manner of land surface cover exists at the Facility: non-irrigated, irrigated or urban (streets, roofs, parking lots) lands. Throughout the East Billings area, the land surface is significantly surface-covered excepting a few locally small areas of residential and park lands. Although urban areas are very minor, about 2 to 3 percent of the Yellowstone County area, (Olson and Smith, 2007) summarizes urban land cover impacts on water recharge as:

> *"Urban areas are minor…, but they influence recharge in the river valleys where most of the population resides and most of the ground-water use occurs. The primary impacts of urban land cover are two-fold: (1) recharge is reduced by impermeable surfaces such as pavement and roofed areas, and (2) recharge is reduced because urban land cover usually occurs over previously irrigated lands [thus eliminating the majority of the previous irrigation recharge from that land use]. The primary source of recharge is from precipitation, septic return flows, lawn irrigation. Irrigation ditches that flow through the urban areas also provide much recharge. [Irrigation ditch leakage may provide annual recharge of about 200-700 acre-ft. of water per square mile.] During the growing season most lawn irrigation is a source of recharge (Olson and Reiten, 2002)."*

## 4.2 ECOLOGY

Cardno ERI (2012) reported the plains grassland and plains forest ecotype includes 43,918,691 acres and represents 46.7 percent of Montana, including the Billings area. Two major rivers, the Missouri and the Yellowstone, cross the entire ecotype. The plains grassland ecotype encompasses the largest area in Montana. Vegetation found throughout the ecotype includes wheatgrass, needle-and-thread, bluebunch wheatgrass, blue grama, prairie jundgrass, green needlegrass, thickspike wheatgrass, fringed sage and dense clubmoss. Other widespread species common in certain conditions include little bluestem, prairie sandreed, silver sage, sun-sedge and threadleaf sedge. Most other grasses and grass-like plants are only minor community components or are dominant in restricted areas (Montana Fish, Wildlife & Parks, 2005 in Cardno ERI, 2012).

The Yellowstone River above Billings is rated a moderate habitat for highly valued aquatic species and a substantial habitat for less highly valued aquatic species. From Billings downstream to the confluence of the Bighorn River, the Yellowstone River is rated as a substantial resource for valued aquatic species and a priority habitat for less highly valued aquatic species. There are no critical habitats located within a 15-mile downstream stretch of the Yellowstone River from Billings; however, the area is utilized by the bald eagles but is listed mostly as a migratory pathway with no specific nesting area noted along the 15-mile stretch of river (EPA, 1989 in Cardno ERI, 2012).

The Yellowstone River near Billings is characterized by minor rapids with motor boating, canoeing, rafting, fishing, and picnicking being primary activities near the Billings area. Secondary activities include tubing, swimming, and camping (EPA, 1989 and Montana Fish, Wildlife & Parks, 2005 in Cardno ERI, 2012).

## 4.3 SURFACING AND SOILS

### 4.3.1 Surfacing and Fill Materials

Portions of the Facility contain hardscape overlays of various buildings erected on concrete slabs, concrete and asphalt pads and parking areas, curbed and guttered streets, compacted asphalt millings and other compacted and unconsolidated surface fill materials including pit-processed small and coarse gravel, cobbles, imported railroad ballast, coal fines, and loose demolition debris (e.g., concrete, cinder block, various brick, metal, and river alluvium). Figure 4-2 illustrates the type and areal distribution of the surface cover materials observed throughout the Facility during the 2012-2013 RI investigation activities. In much of the area north of the railroad tracks and directly underlying, surface materials are comparable materials consisting of imported fill of alluvium (cobbles and sandy gravels), angular and rounded washed gravel, and naturally deposited river alluvium (coarse gravel and finer sands and silts). Immediately north of the railroad tracks and south of Tract D and the MDT Tract is a strip of unsurfaced lands contain one moderate size pond.

South of the railroad the majority of lands are barren i.e., near natural (Tracts 1-A south of Yegen Drain and Tract 2-B), and covered by compacted coarse gravel fill (Tract 5, tank

farm). The former Midland Empire Packing Company building and adjacent asphalt and concrete paved lots are the only hardscape in Tract 1A (north of Yegen Drain). ASI demolished a large portion of the concrete and cinderblock building erected by the former owners, Midland Empire Packing Company. Building demolition debris is evident along the northeast side of Tract 1-A near Tract 5. Demolition debris (i.e., concrete, refractory brick, cinderblock, wood and assorted metallic debris) of various sizes and excavated material (i.e., river alluvium) from the relocated, and now enclosed portion of Yegen Ditch, cover much of the surface in this area. Facility topography generally slopes to the east, towards the Yellowstone River as shown on Exhibit 1.

### 4.3.2 Soils and Subsoils

The Facility is located on the west bank of the Yellowstone River. Natural-occurring geologic materials in the Facility vicinity consists of Quaternary age deposits made up of Holocene-age alluvium with Pleistocene and Holocene-age alluvial terrace gravels (Lopez, 2000). Bedrock in the area is Upper Cretaceous-age shales and sandstones.

The majority of soil at the Facility consists of Haverson loam and Haverson-Hysham loams occurring on slopes of 0 to 1 percent (Web Soil Survey). Soils mapping and soil-properties data were obtained by accessing the Montana State Library website and link to the USDA, NRCS Montana State Soil Geographic (SSURGO) Data[base] and Web Soil Survey (http://websoilsurvey.nrcs.usds.gov/app/). Five soil types are mapped (Figure 4-3) and described throughout the Yale Oil facility. In the apparent order of most recent to oldest, the soils consist of:

- Haverson-Hysham Loam (Hh). A mixed distribution of two soil types; the Haverson Loam occurs on 0 to 1 percent slopes on terraces and flood plains of the Yellowstone River to depths of more than 80 inches. The soil is well-drained capable of moderately-high to high water transmission (0.57 to 1.98 inch/hour). A typical soil profile includes 0 to 5 inch loam underlain by 5 to 68 inches of stratified fine sandy loam to clay loam derived from alluvial parent materials. Depth to water is more than 80 inches. The Hysham Loam component also occurs on 0 to 1 percent slopes on

terraces and flood plains of the Yellowstone River to depths of more than 80 inches. The soil is moderately well-drained capable of moderately-high to high water transmission (0.20 to 1.98 inch/hour). Typically, the soil profile includes 0 to 7 inch loam underlain by 7 to 60 inches of stratified fine sandy loam to clay loam derived from loamy alluvial parent materials. Depth to water is about 36 to 72 inches.

- Haverson Loam (Ha). See description above.
- Alluvial land, mixed (Al). This soil type occurs on 0 to 1 percent slopes on terraces and flood plains of the Yellowstone River to depths of more than 80 inches. The soil is well-drained capable of moderately-high to high water transmission (0.57 to 1.98 inch/hour). Typically the soil profile includes 0-5 inches of gravelly loam underlain by 5 to 60 inches of extremely gravelly sand derived from alluvial parent materials. Depth to water about 0 to 42 inches.
- Riverwash (Re). Composition and characteristics are not described in detail. Soil probably consists of recently deposited materials along the immediate banks, terraces and flood plains of the Yellowstone River. Soils are composed of 95 percent river alluvial materials and 5 percent other minor components: a mixture of the Havre, Haverson and Glenberg soils types. These soils occur on slopes ranging from 2 to 5 percent.
- Urban Land (UL). The soil is not described as to its texture or other characteristics and is generally composed of disturbed and fill-placed materials overlying older naturally existing soils.

## 4.4 GEOLOGY

### 4.4.1 Regional Geology

In general, the regional geology of the Billings, Montana area consists of layered and interbedded sedimentary rocks of Upper Cretaceous age consisting of shale, siltstone, and sandstone bedrock dipping to the northeast at about 4 degrees (Figure 4-4). Numerous en-echelon faults have been mapped trending southwest to northeast along a lineament (i.e., Lake Basin Fault Zone) extending from west-northwest of Billings toward the east. Numerous southwest trending normal faults (i.e., Fromberg Fault Zone) are also identified in the Niobrara Shale exposed south of the Yellowstone River. Within the Facility area, no

faults are known or mapped in the bedrock underlying the alluvial deposits blanketing the surface.

Underlying the Telegraph Creek Formation is the Niobrara Shale (Kn). This shale is olive-gray and dark brownish-gray, fissile, and contains abundant thin bentonite beds. The upper-half is calcareous, containing few very thin bentonite beds, and near the top containing thin beds of very calcareous, laminated sandstone, siltstone, and sandy limestone. Medium light gray to pale yellowish-brown concretions from a few inches to 1 or 2 feet in diameter are commonly present. In the Billings area, the Niobrara Shale is about 700 feet thick (Lopez, 2002). The upper contact is placed at the change from calcareous shales to the non-calcareous shales of the Telegraph Creek Formation.

The local bedrock underlying the alluvial gravel deposits is the Telegraph Creek Formation (Ktc) and/or the underlying Niobrara Shale. The Telegraph Creek Formation is mapped along the base of the nearly vertical sandstone bluffs (Eagle Sandstone) exposed to the north and east of the Facility (Lopez, 2002). It consists of shale and sandy shale, brownish-gray to medium dark-gray in color, with thin, inter-bedded sandstone. Dusky-red concretions are common near the base. Individual sandstone beds thicken and become more frequent upward grading into the overlying Eagle Sandstone. Thickness of the Telegraph Creek (shale) is about 150 feet (Lopez, 2002).

The Eagle Sandstone (Ke) is exposed in the vertical cliffs exposed to the north and east of the Facility (Lopez, 2002). The sandstone does not underlie the Facility as a bedrock unit although weathered rock and landslide debris may be encompassed and contained as blocks within alluvial deposits deposited over and extending to depth across the Facility surface. The sandstone is light-brownish-gray; to very-pale-orange, very-fine to fine-grained, cross-bedded sandstone. Thickness is from 250 to 350 feet.

Along the river valleys and tributary streams, the various exposed bedrock units are overlain by alluvium of clay, silt, coarse- and fine-grained sand and well-rounded gravel and cobbles of Pleistocene and Holocene age. Sediments in the tributary drainages are sand, silt, and clay

derived from local Cretaceous sandstone and shale bedrock (Hutchinson, 1983 and Lopez, 2000).

### 4.4.2 Yale Oil CECRA Facility Geology

Alluvial deposits in the Yellowstone River valley have been deposited over older bedrock units on and in the vicinity of the Facility. Alluvial deposits consist of a basal layer of coarse-grained cobbly alluvium overlain by a mantle of finer-grained sandy alluvium. The basal layer is typically 10 to 20 feet thick but may be as much as 40 feet thick in areas of channel scouring. The coarse-grained alluvium consists of sand, gravel and cobbles and is the primary water-bearing unit in the Yellowstone River valley. The overlying fine-grained alluvium may be as much as 100 feet thick. Generally the fine-grained alluvium is thick near the valley margins and near streams draining the uplands. The fine-grained alluvium may also be water-bearing but does not exhibit significant yields (Lopez, 2002 and Olson, 2005).

Erosion and deposition by the Yellowstone River has formed seven terrace surfaces above the modern river floodplain of Holocene age. Modern alluvium (Qal in Figure 4-4) consisting of cobbles, gravel, sand, silt and clay is confined to the active and former recent channels of the river and to tributary creeks and streams discharging across older alluvial deposits. Two of the youngest river terraces are reported present over the Facility. Terrace 1 (Qat1) is the lowest surface including rising about 10 feet above the current floodplain and modern river level near the Facility; it is the most extensive of all the terrace deposits. Total thickness of Terrace 1 alluvium ranges from 20 to 40 feet of mostly cobbles and pebbles with minor sand and silt; depth to gravel is typically about 10 feet. Significant fine-grained alluvium may rest on this terrace (Lopez, 2002 and Olson, 2005).

Terrace 2 (Qat2) is mapped as occurring 10 to 20 feet above the modern river level. Total thickness of this alluvium ranges from 40 to 60 feet (locally 100 feet) of material similar to that of Terrace 1. Terrace 2 may be covered by greater than 40 feet of fine-grained colluvium (Qc, slope wash sand, silt, clay) eroded from the sandstone cliffs or other older alluvium deposits (Lopez, 2002 and Olson, 2005).

Artificial fill (af) consisting of compacted and un-compacted fill, and railroad ballast, has been placed along the roads, highways and railroad approaches on the west bank of the Yellowstone River. Locally the fill covers and is in contact with both the Qat1 and Qat2 terraces.

### 4.4.3 Yale Oil CECRA Facility Stratigraphy

Alluvial Terrace 1, Qat1, of Holocene and Pleistocene age. The area north of the BNSF railroad tracks (Tracts A, B, C and D) is mapped as alluvial gravel Terrace 2, Qat2, of Pleistocene age (Lopez, 2002 and Olson, 2005). Terrace 2 and artificial fill (af) overlying terrace 2 is mapped over most of the MDT tract.

The geological description logs of monitoring wells (Appendix C) present the sedimentary sequence and description of the alluvial sediments present and deposited at the surface and in the subsurface beneath the Facility. The descriptive logs for subsurface soil borings (Appendix C) provide equivalent logs for deep (i.e., to the water table) borings drilled at the center of each sampling grid (Figure 3-2) across the Facility. Geological cross-sections extending west-east and north-south across the Facility are provided in Figures 4-5 through 4-8. Cross-sections show the vertical and lateral changes in sedimentary stratigraphy of the generally fining-upward sequence from a basal unit of coarse-grained materials upward and transitioning into a finer-grained unit within the alluvial terrace (and aquifer) that underlies the Facility. An upper fine-grained facies and an underlying coarse–grained facies have been recognized by previous investigators as being present in each alluvial terrace (i.e., Qat1 and Qat2).

Lithologically, the geologic materials comprising the coarser-grained and finer-grained materials in alluvial terraces Qat1 and Qat2 are for the most part nearly identical (see descriptions in Olson, 2005, 2003 and Hutchinson, 1983); terrace Qat1 being distinguished in drilled boreholes by the presence of large gravels and cobbles with lesser sand matrix. Terrace identification and mapped extent is mostly on the basis of land surface elevation differences, of 10 feet or less, as expressed on the finer-grained unit surface.

The location of groundwater monitoring wells YMW-19 and YMW-23 and their proximity to the Yellowstone River would seem to assure that the coarse-grained gravel and cobbles described near the bottom of both drill holes is correlated with the coarse facies of Terrace Qat1 (on cross-sections labeled Qat1c). Along the lines of cross-sections A-A' and B-B' toward the northwest portion of the Facility the land surface rises (slopes) gently with no apparent sharp or significant step-up in elevation north vs. south of the railroad ROW indicative of successive terrace Qat2. In the subsurface of cross-section A-A' (Figure 4-5), the elevation on top the coarse-grained unit beneath Tracts A, B and C is only slightly higher than the apparently continuous and equivalent coarse facies extending across the entire Facility toward the river. Owing to a lack of any definitive stratigraphic or geologic composition differences and no identification of terrace slopes, and that groundwater monitoring results (Sections 4.6 and 5.5) indicate communication without significant sedimentary barriers; it is decided to assign all alluvial aquifer and terrace deposits, both the upper fine-grained and lower coarse-grained units occurring on the Facility all to Terrace 1 (Qat1) identified by Lopez (2002). In general, the distribution and stratigraphic character of the sediments encountered and described during monitoring well and soil boring drilling is in agreement with that reported on by previous geologic investigations (Sections 4.4.1 and 4.4.2).

In areas of industrial or commercial development, at the surface and in the upper 2 feet, or less, materials may include pavement (concrete or asphalt) underlain by base coarse materials consisting of imported artificial fill of clayey-sandy gravel; in some places also including medium to large cobbles. The surface and base materials may be quite dense owing to vehicular traffic and resulting compaction. In areas where vehicle traffic is not extensive or the surface materials are quite thick and clean of silt or clay, a loose layer of washed angular gravel may be present (Figure 4-2). Coarse artificial fill materials consisting of cobbles and washed angular gravels (ballast) were encountered when in the vicinity of the built-up and raised approaches to Highway U.S. 87/212 (1st Avenue North), the highway and railroad bridges near the Yellowstone River, and adjacent to the elevated rail bed bisecting the Facility.

Fill material is identified as overlying a 1 foot thick layer of oily sludge encountered while drilling monitoring well YMW-22 (Figure 4-5 and Appendix C). Historical information shown on Figure 1-3 (and an early 1950s aerial photograph of the Facility) identifies this area as the location of a former pond in use during the refinery operation. The fill is described as silty clay and silty sand similar to the upper, finer-grained facies of Terrace Qat1. The material may have been excavated from and into terrace Qat1 and stockpiled surrounding the pond as a berm and then replaced to cover the pond site when the refinery was removed. Near monitoring well YMW-21 a small to moderate size pond still exists, the bottom of which is underlain by a layer of oily sludge (Figure 4-5 and Appendix C).

Where fill is lacking, such as south of the railroad tracks, or beneath imported fill to a depth of 6 to 8 feet below the ground surface, geologic materials are generally moderately dense to stiff consisting of a finer-grained mixture of silty, sandy and clayey materials with occasional small gravel and pebbles. The unit is laterally extensive across the entire Facility. On the cross-sections this unit is identified as fine-grained alluvium of terrace Qat1, labeled Qat1f. A fine-grained facies was also recognized by previous investigators (Hutchinson, 1983; Lopez, 2000, Olson 2005, and Olson and Smith, 2007) as present, the upper unit of alluvial terraces Qat1 and Qat2.

Contiguous with and underlying the fine-grained unit is a very coarse-grained unit labeled on the cross-sections as Qat1c. The coarse unit is composed of inter-layered, laterally continuous and abruptly changing beds of well-graded, very large well-rounded gravel, pancaked-shaped cobbles and small boulders in a matrix of loose, coarse sand with minor silt. None of the RIR monitoring well drill holes, the deep soil borings, nor drill holes contained in the GWIC database in this vicinity penetrates the total thickness of the coarse-grained unit.

## 4.5 SURFACE WATER HYDROLOGY

The agricultural area to the west of the Billings City Limits contains several small, unlined ditches initially installed to provide and drain irrigation waters to/from croplands. As the City of Billings expanded, those ditches were encompassed into the city and continue to

function on a seasonal basis (April to October). Inside the city, the open ditches mainly receive runoff and serve little other purpose, although some withdraws for lawn-watering by adjacent landowners does occur. Cove Ditch, High Ditch, and Big Ditch extend along the northwest and north side of Billings between Rimrock Road and the base of the sandstone cliffs; more than 1 mile from the Facility. The ditches terminate near the sandstone cliffs as the water therein eventually ceases due to infiltration. At its terminus, High Ditch turns south through a pipe for about 0.25 mile to surface through the Highlands Golf Course and Pioneer Park and is then piped for about 0.1 mile where it enters the city's buried storm drain system that discharges into Yegen Drain (Ditch).

The FHDSR (Cardno ERI, 2012) summarized several of the many ditches and drains that extend across the Billings city area. Within a 1-mile radius of the Facility, surface waters include the Yellowstone River, Alkali Creek, Yegen Ditch, Billings Bench Water Association Canal (BBWA Canal or Bench Ditch), the Coulson Water Users Association Ditch (Coulson Ditch) and Lockwood Water Plant/Yellowstone River Intake. Each of the above mentioned surface waters, except the Coulson Ditch and the Lockwood Water Plant/Yellowstone River Intake, may potentially impart effects on regional groundwater in east Billings and at the Facility.

### 4.5.1 Sewers, Water Lines and Storm Water Management

For part of east Billings and the service area that includes Facility, the principal sanitary sewer line extends Southwest-northeast along the 1st Avenue North right of way to the north of the Facility. Portions of those lines were identified and marked prior to conducting subsurface investigations conducted during this RI. Sanitary sewer trunk lines extend south from that line to each of the occupied or useable buildings within the Facility. Trunk lines to/from structures that were previously demolished may exist, however, the location, the status of the end point seals or conditions along those sewer lines are unknown.

Potable water mains serving the Facility parallel the sanitary lines along 1st Avenue North and trunk lines also extend to each occupied or useable building within the Facility. A 36-inch diameter water line extends southeast from the water main north of the radio station

(600 1st Avenue North) to the southeast along the west side of the building at 550 1st Avenue North and ends at a hydrant south of the railroad tracks at the former meat packing property on Tract 1A. A hydrant next to the east end of the concrete loading dock within the railroad right of way south of Tract B may still be connected to the same water line.

Storm water from the commercial center and east industrialized areas within the City of Billings all coalesce into a single storm water drain outfall that discharges into an unlined, open ditch at the south end of North 15th Street East (south of the railroad tracks). It traverses for about 0.5 mile before its confluence with Yegen Ditch about 0.1 mile to the southwest of the Facility (Tract 2B) boundary. Of all the aforementioned surface water features, only the Yellowstone River (see Section 4.5.3), Yegen Ditch (See Section 4.5.2) and the City's storm water discharge appear to potentially or directly impose any surface water effects on the Facility.

The Storm water gathering and discharge system for the City of Billings for the Facility area north of the railroad tracks, including the Yellowstone County Fair Grounds and the City's industrialized/commercial east of North 15th Street, all discharge to the Yellowstone River via an outlet along Alkali Creek (Email: Boris Krizek, Public Works Administration, City of Billings, Nov. 15, 2013). Storm water collected east of North 15th Street, north of the railroad tracks, and along Minnesota south of the railroad, discharges from the City of Billings 'Minnesota Street outlet' into the Yegen Drain located at the north end of South 15th Street.

### 4.5.2 Yegen Ditch (Drain)

The Yegen Ditch is a surface unlined storm water storm drain trending southwest-northeast through and approximately bisecting Tract 1A of the Facility and that portion of the RR-ROW south of the railroad and along the north boundary of Tract 5 (former Yale Tank Farm and current CHS Tanks Farm). The ditch is a historical feature. On January 16, 1947, the NPRR permitted a lease with the City of Billings to re-route the Yegen Ditch. The ditch was re-routed to stay on the south side of the mainline of the railway before discharging in the Yellowstone River (Cardno ERI, 2012). Prior to that agreement, north of Tract 5 the ditch

turned northeast, flowed under a railway bridge/culvert, crossed the southeast corner of the MDT (tract) property, and departed the Facility flowing across the Yellowstone County Fairgrounds property north of US Highway 87 East eventually discharging to the Yellowstone River. The route of the historical ditch is shown on the refinery as-built map displayed on Figure 1-4.

Within the Facility boundaries, the Yegen Ditch is constructed at about 2,900 feet long and is about 30 feet wide narrowing with depth to about 10 feet wide at the water surface. The ditch is excavated into native soil about 8 to 15 feet below grade of the surrounding, nearly level land surface. The ditch channel is open and exposed upgradient from its mouth for about 1,800 feet where it discharges into the Yellowstone River (near surface water/sediment monitoring location YD-5). From there, along its upstream reach for about 1,300 feet, the ditch is buried inside a 6 feet diameter steel culvert between ditch monitoring locations YD-1 and YD-3. The ditch is again open and exposed for about 100 feet to the west where it leaves Tract 1A. Where open and exposed, the incised bank margins are composed of sand and some silt with the channel bed composed of alluvial cobbles.

Surface water flow measurements were obtained at each of four monitoring and sample locations along Yegen Ditch using a Marsh-McBirney current meter and wading rod. Methodology used to calculate streamflow (see Section 3.4.3) was performed in accordance with the area-velocity method developed by the USGS (1977). A brushy dam extending across the ditch channel between locations YD-4 and YD-5 does not appear to be sufficiently extensive nor efficient to impede water flow or increase water depth; thus, flow measurements and calculations were capable of being measured.

Table 4-1 presents results of in-stream flow measurements collected at the four monitoring/sampling locations along the exposed reach of Yegen Ditch. Measurements were obtained in July and September 2013. July in-stream flowing water depths range from 1.9 feet (YD-1) to 0.55 feet (YD-5), and were 1.3 feet and 0.5 feet respectively, in early September. For the same dates and channel reach, the flows were calculated at 6.8 to 7.6 cfs respectively, in July and 4.3 to 4.7 cfs respectively, in September. Results of the two

monitoring events indicate a slight decrease in calculated in-stream flow downstream in July. Little variation in flows was seen in September. Evaluation of continued monitoring results should provide information or indications if the results are seasonal or possibly other event-related conditions affecting ditch flow. From YD-1 to YD-5, a distance of 2,897 feet, the channel drops 13.844 feet in elevation, equivalently a gradient of 0.0048 feet per lineal foot.

### 4.5.3 Yellowstone River

The FHDSR (Cardno ERI, 2012, Section 7.3.3) summarizes results of previous investigations and the interaction of both groundwater flows and apparent surface water (river) bank recharge of the modern and lowest alluvial terrace aquifer (i.e., Qat1) adjacent to the Yellowstone River. During peak river stage from May to July, groundwater apparently flows away from the river into riverbank areas as the river recharges the groundwater in the adjacent alluvial deposits. From August to April, groundwater generally flows towards the river or in a more down-river direction. In January 2007, groundwater flow in the western portion of the CHS tank farm (Tract 5) was to the southeast at a hydraulic gradient of approximately 0.01 (Tetra Tech, 2007 in Cardno ERI, 2012). In July 2008, groundwater flow in the eastern portion of the CHS tank farm was to the east-northeast at hydraulic gradients of approximately 0.007 to 0.025 (Tetra Tech, 2008 in Cardno ERI, 2012).

The main hydrologic feature associated with the Facility is the Yellowstone River which flows north-northeast immediately adjacent to and downgradient from the Facility area. A stream gaging station (USGS 06214500) is maintained by the USGS for the Yellowstone River; it is located approximately 1,960 feet downstream on the east (opposite) bank of the river from the Facility. Discharge records for the period 1928 through September 2012 (Table 4-2) indicate the river flows at an average of 6,925 cfs, with the highest discharge occurring in the months of May, June and early July. Low flow periods occur in the winter, usually December through February when melting (runoff) is minimal and subzero temperatures may cause freezing of the river. June typically experiences the largest recorded maximum discharge averaging 25,200 cfs; June 1997 recorded the highest discharge of record at 53,910 cfs. For May and July 2012, the mean discharge averaged 12,800 and 13,600 cfs, respectively.

Figure 4-9 shows the mean daily gage height and discharge rate of the Yellowstone River at Billings for the period beginning October 2012 through October 11, 2013 (USGS, 2013). The chart shows the river experienced its highest daily discharge for the year to date, from 15,000 to 20,000+ cfs from approximately mid-May until early July 2013. Surface water (runoff) was at its peak in mid-June at about 9.5 feet (elevation: 3,090.86 feet) above the normal gage datum of 3,081.36 feet. From May to October water level in the river channel ranged from about 6 feet (3,087 feet elevation) to about 9.5 feet in height.

The Yellowstone River drainage is classified B-2 (Administrative Rules of Montana (ARM) 17.30.611(1)(b)) from the Laurel water supply intake downstream to the City of Billings water supply intake, located about 9,000 feet upstream of the Facility at the mouth of Yegen Ditch. Downstream of the Billings water supply intake, the Yellowstone River drainage and main-stem is classified B-3 (ARM 17.30.611(1)(c)(i)). These classification standards are to be maintained suitable for drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and marginal propagation of salmonoid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply as per ARM 17.30.624 and ARM 17.30.625 (Cardno ERI, 2012, Section 7.3.7).

## 4.6 GROUNDWATER HYDROLOGY

### 4.6.1 Previous Groundwater Investigations

Geology significantly influences and exerts controls of groundwater availability, well depths, well yields, and water quality. Rock and sediment lithology form much of the basis for delineating aquifers. The major aquifers in east Billings and underlying the Facility are alluvial (Olson and Smith, 2007).

The Yellowstone River and riverbank areas are underlain by Quaternary-age alluvium consisting of coarse, well-rounded gravel, cobbles, sand, silt, and clay deposited over older bedrock units at thicknesses ranging from 0 to 100 feet. Study (Olson, 2005) of the alluvial deposits stratigraphy and potentiometric data of over 2,700 wells completed in the alluvial aquifers and terraces along the Yellowstone valley indicate the Yellowstone River Valley

Aquifer is a single hydrogeological unit which consists of seven Quaternary-age terrace surfaces or alluvial aquifers (i.e., Terraces 1, 2a, 2b, 3, 4a, 4b and 5). Terrace surfaces are either separated by discontinuities between the sand and gravel deposits or by thinning of the saturated thickness at the terrace scarp. Direct flow between terraces is reported as either limited or absent (Olson, 2005). In the Facility area the alluvial aquifer is bounded laterally by sandstone bedrock bluffs and vertically by relatively impermeable shale of the Telegraph Creek Formation and Niobrara Shale (Lopez, 2000).

Three alluvial aquifers (Figure 4-4) mapped as Qat1, Qat2 and Qat3 underlie the City of Billings; all exhibit east-northeast groundwater flow at about 20 feet per mile toward the Yellowstone River (Figure 4-10, Olson, 2005). Groundwater water in the modern alluvium of the river (Qal) and terrace Qat1 appear to be hydraulically connected in the vicinity of the Facility. Terraces Qat11 and Qat2 are mapped as the principle groundwater units underlying the Yale Oil Facility. Near Billings, terrace Qat2a is reported approximately 20 to 40-feet above the Yellowstone River (Olson, 2005); groundwater flows from west/northwest to east/southeast and discharges into the Yellowstone River (Hutchinson, 1983).

Section 7.3.2 of the FHDSR (Cardno ERI, 2012) reported on groundwater use in the Facility vicinity. As of August 2012, the Montana Bureau of Mines and Geology Groundwater Information Center (MBMG GWIC) database reported 118 groundwater wells within ½-mile radius of the Facility; however, EDR (2011a) reported six additional groundwater wells not registered in the GWIC database. A search and update of the GWIC database was not conducted for this RIR. The types of wells include domestic, public water supply, irrigation, industrial, monitoring, and test. A map showing the wells located by the EDR database search is included as the first page of Appendix B in the FHDSR (Cardno ERI, 2012); that report also includes Appendix D, Tables 11 and 12 listing wells on and off the Facility discovered in GWIC during the EDR searches (EDR, 2011a, b and c).

The unincorporated industrial and residential area of Lockwood is located to the east on the opposite bank of the Yellowstone River from the Facility. It uses the Yellowstone River as a

domestic water supply; the municipal diversion point is located approximately 1,000 feet downgradient of the Facility on the east bank of the river.

Groundwater beneath the Facility is classified as Class II (ARM 17.30.1006(2)) with a natural specific conductance greater than 1,000 microSiemens/cm at 25°C. Groundwater in the alluvial aquifers is typically hard and has dissolved constituent concentrations ranging from 200 to more than 10,000 mg/L (Olson, 2005). That study of alluvial aquifers determined the median (50 percent) quality of the groundwater sampled in the Yellowstone River valley in Yellowstone County had quality parameters of: 7.4 pH, 1,562 µmhos/cm SC, 11.5$^{o}$C, 1,435 mg/L dissolved constituents and 4,841 mg/L TDS. Laboratory specific conductance from Facility monitoring wells ranged from 778 to 22700 µmhos/cm, with lower ranges (<1000 µmhos/cm) reflecting surface water interaction with the Yellowstone River. Unimpacted wells on the Facility generally ranged from about 1000 to 4700 µmhos/cm and averaged approximately 2300 µmhos/cm.

### 4.6.2 Groundwater Measurements, Gradients and Flow Direction

Measurements of depth to groundwater in Facility groundwater monitoring network wells was conducted monthly from May through October 2013 (Table 4-3 and Figures 4-11 and 4-12). Results indicate groundwater varies from more than 4 feet to approximately 15 feet bgs. Except during June, groundwater levels (and elevations) and flow gradient varied minimally for each of the months of monitoring at the Facility. From May to June 2013 groundwater levels in all network wells rose approximately 1.5 to 3.5 feet then continued to decline about 0.5 to 3 feet in subsequent monthly monitoring through September 2013. In late September and early October, regionally heavy rains occurred (Figure 4-1) resulting in increased groundwater heights approximating those observed in June. A corresponding increase in river runoff (Figure 4-9) was also noted. From late June until about mid-September of the monitoring period, groundwater and river levels were fairly uniform and declining.

Light, Non-Aqueous Phase Liquid (LNAPL) was detected in several network monitoring wells located mostly north of the Yegen Drain and the railroad tracks bisecting the Facility.

The thickness and location of the LNAPL varied which could be reflective of changes in water levels and equilibration of newly installed wells. Table 4-3 lists the date, location and thickness of the LNAPL layer in each network monitoring well. Product thickness ranges from a sheen to 5.46 feet (October, YMW-16) in several network wells located on Tracts B, C, D, the RR strip to the south, and also the northern portion of Tract 1A. The thickness varied along with changes in groundwater water depth or elevation. Figures 4-13 through 4-17 depict the changing thickness of the product in each monitoring well where detected.

During the remainder of the RI investigation, monitoring wells will continue to be monitored on a monthly basis for static water levels and presence of LNAPL. Groundwater quality sampling on a quarterly basis will be conducted in each monitoring well not exhibiting LNAPL. After one year of data are obtained, monitoring and sampling frequency of individual monitoring wells and analytical parameters will be re-evaluated, and may be revised.

Interpretative mapping of field data obtained for each month of groundwater level measurements, and potentiometric surface mapping (Figures 4-18 through 4-23), indicates groundwater under the Facility is present as an unconfined (or water-table) aquifer with flow across the Facility generally from east-northeast during months of both peak and lowest water levels. Groundwater enters the Facility from the southwest near monitoring well YMW-11 and exits the Facility at the Yellowstone River near the mouth of Yegen Ditch. Calculated gradients of groundwater flowing toward the Yellowstone River were 0.0029 feet/feet (June 2013) and 0.0039 feet/feet (August 2013) for the months of highest and lowest recorded groundwater levels. Potentiometric surfaces mapping for 2013 agrees in general terms with previous regional groundwater studies (Hutchinson, 1983 and Olson, 2005). In all figures, the reported water levels have been corrected for the presence of LNAPL in specific wells when and where it was detected.

The localized ‘depression’ in the water table at monitoring well YMW-18 for the month of July 2013 is not believed to be accurate. The reported water level is suspected to be a recording error or resulting from faulty equipment affected by the presence of hydrocarbons

on the groundwater surface. The depression is not supported by water levels at the same location or in the vicinity in prior or succeeding months. Therefore, this water level was not used in developing potentiometric contours.

### 4.6.3 Aquifer Characteristics

Aquifer tests, short-term pumping and slug tests, were performed in two of the groundwater monitoring wells installed as part of this RI. Testing method procedures are described in Section 3.5.4. Monitoring and testing of the alluvium was conducted to characterize hydrogeological conditions of the alluvial aquifer system underlying the Facility. The groundwater system was evaluated for hydrogeological characteristics, depth to groundwater; seasonal (part) variations and water quality (Section 5.5). This evaluation was conducted based on data collected during May through October 2013. Supplemental data will continue to be collected for the period extending from November 2013 to May 2014. Geologic descriptions of monitoring well logs, shallow and deep borehole logs are in Appendix C. Water level data are in Table 4-4; hydrographs are presented in Section 4.6.2, above. Aquifer test data are in Appendix E.

<u>Alluvial Groundwater</u>

Geology of the Facility and surrounding area is described above in Section 4.4. Quaternary age deposits of thick, laterally extensive, unconsolidated riverine alluvium composed of sand, silt, gravel, and cobbles overly the entire Facility. Geologic cross-sections were constructed using data obtained from logs of drill holes for installation of groundwater monitoring wells and boreholes installed for sampling shallow and deep soils throughout the Facility. Fourteen monitoring wells were installed in the youngest (and lowest in elevation) alluvial terrace aquifer (i.e., Qat1), the only aquifer considered present, pursuant this RIR, throughout the Facility. Drill holes were advanced by hollow-stem auger methods to well below the groundwater table, averaging about 15 feet total depth, and terminated without fully penetrating the alluvium.

Lithologies

Descriptions of geologic materials encountered while drilling monitoring well boreholes and in 108 subsurface soil sampling boreholes, were considered to describe and characterize geologic materials and relationships underlying the Facility. Lithologies encountered consisted of a shallow (near surface to about 8 feet bgs), finer-grained layer and a deeper (approximately 8 to 15 feet bgs) layer of coarser-grained alluvial sediments. Shallow sediments consist of unconsolidated, loose sand, silt, some clay, and poorly sorted sandy-silty pebbles or sandy-silty fine-gravel mixtures approximately 7 to 8 feet thick. The deeper coarse-grained layer is conformable and transitional with the upper layer being composed of poorly-sorted, rounded, and large to very large gravel, cobbles with some sand as matrix. The maximum total thickness penetrated in drill holes of the fine and coarse-grained alluvial layers was 16 to 21 feet, but may locally be 100 feet in thickness (Lopez, 2002). The alluvium is reported to be in contact with bedrock consisting of consolidated interbedded sandstone and silty sands and massive, thick shale.

Depth to Groundwater

Groundwater level depth data are presented in Table 4-3 and shown on hydrographs in Figures 4-11 and 4-12. During the monitoring period for this report (i.e., May to October 2013); groundwater levels in alluvial terrace aquifer Qat1 showed fluctuations month-to-month. Across the Facility groundwater ranged from 4.23 feet bgs to 15.03 feet bgs. Highest groundwater levels were observed in late-spring/early-summer, a reflection of recharge from rainfall infiltration and potentially with associated higher flow (runoff) in surface water systems (Yegen Ditch and Yellowstone River). The deeper coarse-grained unit of terrace Qat1 is ubiquitously saturated where penetrated by Facility wells during periods of highest water levels (i.e., October). Unconfined groundwater conditions are encountered in the lowest part of the overlying finer-grained unit where the unit is saturated during periods of highest water levels. Water levels shown on the hydrographs for network monitoring wells indicate that in some wells, the fine-grained unit may be partially saturated or dry when water levels are at their seasonally lowest (i.e., late summer to winter).

One pumping test was conducted in two alluvial terrace monitoring wells, YMW-11 and YMW-19. A slug-in (displacement) and slug-out (recovery) test was also conducted in well YMW-11. All tests were single well tests. Only the two wells were tested in order to avoid testing wells in which LNAPL was observed, and associated waste handling, testing and disposal requirements. Other available wells for aquifer testing were not in preferred locations to provide information on conditions north (refinery area) and south (mostly undeveloped area) of the railroad tracks. Data recorded from the testing was downloaded into AQTESOLV™ software for analysis to calculate hydraulic conductivity, transmissivity, and storativity coefficients.

Results of the computer software analysis of aquifer test data are presented in Appendix E. Pump test data was analyzed in accordance with the Theis method for unconfined aquifer conditions. Slug test data was analyzed pursuant to the Bower-Rice methodology. The Theis solution was developed for nonleaky confined groundwater conditions; however, the software includes the Jacob correction factor allowing its use in unconfined aquifers. The Bower-Rice method is specific to slug test data from a partially or fully penetrating well in a homogeneous, confined and unconfined aquifer. A range of hydraulic conductivity of 0.6 to 5.4 feet per day was calculated. The lower value from YMW-11 may be in response to a test interval that included both a coarse-grained and underlying fine-grained unit; the coarse unit may be transitional and contain more silt and sand thus inhibiting conductivity.

Groundwater Flow

Figures 4-18 through 4-23 illustrate water table potentiometric contours for the unconfined Qat1 alluvial terrace aquifer underlying the Yale Oil Facility. Groundwater flows from southwest of the Facility to the northeast and east towards the Yellowstone River. Groundwater gradients (I), Table 4-4, for months in which the water table was observed at the lowest (August) and highest (June) were calculated between monitoring wells YMW-11 and MW-4 at between 0.00393 to 0.00290, respectively. Transmissivity (T) was calculated at 12.8 to 107 $ft^2$/day in wells YMW-11 and YMW-19, respectively. The average width (W) of the alluvial aquifer across the Facility, along a line through YMW-15 and YMW-19 is about 1,354 feet. Total groundwater flux (Q=T x W x I) through the alluvial terrace aquifer

at well YMW-11 for August 2013 was 0.354 gpm and at YMW-19 in June was 2.18 gpm. Please see Table 4-4 for the calculation of the groundwater flux.

Recharge and Discharge

Recharge to alluvial terrace aquifer Qat1 apparently occurs primarily through infiltration of precipitation falling on the Facility, the Yellowstone Co. Fairgrounds, and from that on lands east of the Billings city center commercial area. In that area, storm water runoff is collected into a drain system that discharges to Alkali Creek north of the fairgrounds. Infiltration of runoff discharged to the Yegen Drain originating from the storm water drain in the city's central business and residential area, and that of other in-channel flow upstream of the Facility, is thought also to contribute to groundwater. Seasonal changes in runoff and water height in the Yellowstone River and resulting bank recharge and withdrawal also are expected to affect groundwater in portions of those Facility tracts closest to the river.

Monitoring results of surface water height and flow in the Yegen Ditch during the months of July and September (Table 4-1) indicate that flows in Yegen Ditch vary only slightly. Gaining stream reaches are indicative of inflow from adjacent or underlying alluvium. Groundwater gradients dictate which direction flow will occur. Hydraulic conductivity, coupled with the gradient, dictate the rate at which flow in the aquifer will occur. Where the saturated aquifer is in direct contact with the open ditch, and where water levels are similar or elevated in the aquifer, flow from the alluvial aquifer to the ditch would be expected. During periods when aquifer groundwater levels are lower than that of surface water in Yegen Ditch, a loss of water to the aquifer would be expected. The same would be expected to occur in that portion of the aquifer in proximity to the Yellowstone River.

### 4.6.4 Groundwater – Surface Water Interactions

The River gage height statistics presented in Table 4-2 (Section 4.5.3), the riverine hydrograph shown on Figure 4-9, and groundwater elevations shown on hydrographs (Figures 4-11 and 4-12, see Section 4.6.2) for the facility network monitoring wells all show corresponding rising and declining water levels for the period May to October 2013. The rising water levels in both surface (river) water and groundwater appears in response to early

spring runoff/precipitation (Figure 4-1, snowmelt and rainfall) and early fall precipitation (rainfall) and runoff events.

Wells MW-4 and MW-6 are situated within about 136 feet and 100 feet respectively, from the river's west edge. In both wells, the well screen bottom elevation, 3,082 feet and 3,076 feet respectively, extend about 1 to 7 feet below the average (low) river gage height (elevation) of about 3083.5 feet reported for the period May to October 2013. The fluctuation in groundwater levels in those wells may in part be affected by changes in the nearby river height. The 1 foot rise of groundwater level in those wells from August to October corresponds with a 1.7 foot rise in river gage height for the same period. From May to October 2013, changes in groundwater in network wells fluctuated consistently with precipitation and concomitant effects of runoff, and with lower levels noted during drought periods reported for the Yellowstone River.

Comparison of the relative changes in groundwater level elevation in all monitoring wells north and south of the Yegen Ditch are similar despite their distance from the Yellowstone River. This is suggestive of a common source, influence and reaction. Routinely monitored elevations of groundwater in these wells are consistently higher, by about 5.5 feet, than the groundwater levels observed in MW-4 and MW-6, and by almost 10 feet to the river gage height elevation.

Flow in Yegen Ditch may likewise increase or decrease relative to discharge from the city's storm water outfall south of the railroad tracks, at the south end of North 15th Street East, and runoff to the ditch from other tributary ditches entering it along entire upstream reach beyond the Facility boundary. Currently, the flow monitoring in the Ditch is conducted quarterly.

Much of the Facility and the majority of the industrial/commercial area in east Billings to the north and west of the Facility is covered or paved with curb and guttered streets, paved parking lots, and various buildings such that the area for infiltration of precipitation is reduced. However, the total monthly precipitation graph in Figure 4-1 (Section 4.1)

compared with the monitoring well hydrographs in Figures 4-11 and 4-12 show corresponding rises and falls indicating a relationship with precipitation.

## 4.7 SURROUNDING LAND USES

The facility is located in and along the east-central portion of the city of Billings in a light industrial and commercial area that also includes localized residential housing and apartments. The BNSF railroad (formerly NPRR) ROW (two sets of rails: 2,960 feet long by 130 feet width) bisects the facility from northeast to southwest. The railroad ROW extends southwest for several miles bisecting the city (see Figure 1-2).

- East: The Yellowstone River extends for about 1,450 feet along the entire eastern boundary of the facility. The River is a perennial flowing surface water feature approximately 600 feet wide and about 15 feet average depth. Property between the river and the CHS Tank Farm property belongs to the City of Billings, is used as pedestrian access to the City's Heritage multi-use trail system, and its zoning classification is "public."
- North: Immediately north of the facility U.S. Highway 87 (i.e., old Hardin Road) extends approximately 2,860 feet west to east along the entire northern border of the facility. The highway is a 5-lane, asphalt-paved roadway approximately 90 feet wide. North of the facility and highway, along its entire length, are the Yellowstone County Fairgrounds (approximately 152 acres) including several small administration and exhibition buildings, two former stables (now exhibition buildings), paved parking areas, grandstand with grass and dirt race track, three steel beam and block construction exhibition halls (43,000 – 108,000 sq. ft.) and 20 horse stables of wood construction (1940s).
- Northwest: A&I Distributors operates a warehouse for sale and distribution of automotive lubrication equipment and products. A&I Distributors leases a portion of MRL property included in the northwest corner of the Yale Oil Facility boundary. Further to the west-northwest the area includes numerous small properties and businesses consisting of use-car sales lots, various warehouses, construction,

automotive and diesel repair/services facilities, product and commercial sales, packaging, and distribution.

- South: U.S. Interstate 90 extends along the entire southern boundary of the facility from a bridge over the Yellowstone River and 1,800 feet to the south-southwest. The roadway is a four-lane, asphalt-paved, divided road approximately 200 feet in width. South of I-90, the City of Billings maintains about 40 acres of natural parkland (Coulson Park). During the mid-1900s, a portion of the parkland was a city operated landfill. The parkland is crossed by several active and abandoned buried petroleum and gas pipelines. Developed park facilities are meager; however, the park is used for some picnicking, biking, pet walking, and river access for fishing and boat launching.
- Southwest: Bordering the facility at the southwest corner, Plains All American LP operates an above ground 130 foot diameter steel petroleum storage tank located within a 4.6 acre (202,500 sq. ft.) earthen berm: the property of which is owned by Phillips 66 Pipeline LLC. One-half mile southwest of the facility Phillips 66 operates a petroleum refinery spanning about 140 acres.
- West: Immediately west of the facility boundary Baker Commodities, Inc. (3.5 acres) operates a refuse transfer station for recycling animal by-products and used cooking oil into poultry and pet foods and biodiesel fuels. One-quarter mile west-southwest of the Yale facility ASI Industrial (Agri-Systems Inc.) conducts steel fabrication to construct grain/feed/milling/ seed handling and manufacturing equipment.

The area surrounding the Yale Oil Facility boundary is classified in three different city zones by the city; south of the railroad tracks, the zone is classed "heavy industrial" (i.e., manufacturing, processing, fabrication and assembly); north of the tracks, the land is considered "controlled industrial" (i.e., businesses and warehouses with light industrial activities). A 200-foot wide zone each side of the BNSF Railroad trackage is considered a buffer zone with no city zoning laws (Cardno ESI, 2012, pages 38 and 39). Most of the Facility is outside the Billings city limits and classified as county parcels.

# 5.0 NATURE AND EXTENT OF CONTAMINATION

Analyses for surface and subsurface soils, groundwater, surface water and sediments were evaluated to determine the nature and extent of contamination at the Yale Oil Facility and are consistent with the objectives outlined in Sections 3.2 through 3.5. This evaluation includes data collected during the RI.

## 5.1 CONSTITUENTS OF POTENTIAL CONCERN

Based on the historical uses, primarily for petroleum refining, distribution and storage, and previous investigations (see FHDSR, Cardno ERI, 2012), the primary constituents of potential concern (COPCs) for soils and sediments at the Facility were identified as volatile petroleum hydrocarbons (VPH), EPH, metals (arsenic, lead, and selenium), and polynuclear aromatic compounds (PAHs). Because of the varied uses of the Facility, additional constituents were added to the investigation as appropriate. Additional analytes to complete the Resource Conservation and Recovery Act (RCRA) 8 metals list (barium, cadmium, chromium, mercury, and silver), volatile organic compounds (VOCs) using method 8260, and TEL were added at selected locations as described in the FSAP. PAH and EPH fraction analysis for the remaining areas, and EPH fraction analysis for known or potential source areas were determined by the Montana Tier 1 Risk-Based Corrective Action Guidance for Petroleum Releases (MDEQ, 2009) screening process.

COPCs for groundwater and surface waters include: VPH, EPH, PAH, RCRA metals and VOCs. In addition, monitored natural attenuation parameters were included in groundwater samples along with organic constituents to evaluate whether or not active biodegradation of the organic constituents in groundwater is occurring. Sampling analytical requirements for the various media and areas are contained in the FSAP.

Analytical data were compiled from each of the individual media (surface soils, subsurface soils, groundwater, surface water and sediments). Summary tables of data are contained in Appendix G, and laboratory analytical reports are contained in Appendix I. These data were evaluated to determine the nature and extent of COPCs and to assess risk. Any constituents

with detected concentrations were further examined and compared with applicable screening levels as follows:

- Risk Based Corrective Action Guidance (RBCA) Risk Based Screening Levels (RBSLs) (MDEQ, 2009);
- EPA Direct Contact Regional Screening Levels (RSLs) (EPA, 2015);
- MDEQ Leaching to Groundwater Soil Screening Process (MDEQ, 2013b);
- Background Concentrations of Inorganic Constituents in Montana Soils (Hydrometrics, 2013i);
- Toxicity Characteristic Leaching Procedure Regulatory Limits (EPA, 2000);
- Circular DEQ-7 Montana Numeric Water Quality Standards (MDEQ, 2012); and
- Ecological Risk Based Screening Concentration (EPA, 2013).

Screening limits for soils were determined using MDEQ's soil screening process (MDEQ, 2013). Background soils analyses for metals and PAHs were used for comparison purposes.

Analytes detected above screening levels/standards for each general sample type or matrix were considered for further evaluation as constituents of potential concern (COPCs). These COPCs for the various media are discussed in the following sections (5.3 through 5.7).

In some cases the best practically achievable detection limit was above the lowest screening level for a constituent. This scenario occurs in cases where: (1) the analytical methods cannot reliable achieve those limits (i.e., benzene and MTBE); or (2) samples with higher hydrocarbon content either require larger extraction volumes and/or samples must be diluted due to interference, resulting in higher reporting limits.

Constituent concentration maps (isocontours), prepared for selected constituents/groups identified as constituents of potential concern for each media are discussed in Sections 5.3 through 5.7. Isocontours were developed as follows:

- Isocontours were displayed based on the applicable screening level(s) for each analyte or groups of analytes.
- If an analyte was analyzed by multiple methods (i.e., benzene by VPH and benzene by 8260), the highest detected value was used in the evaluation.
- If the constituent was analyzed by multiple methods and both results were not detected, the lowest detection limit was displayed to present data which reflected the analytical method with the least interference in the analyses.
- Because MDEQ defines the surface soils as the top two feet, select locations were sampled at the 6 to 12 inch and 12 to 24 inch intervals in addition to the 0 to 6 inch interval used for risk assessment to evaluate concentrations in the deeper surface soil horizons. The data on the surface soil figures represents the highest concentration of each constituent for any of the surface soil horizons (also including field duplicates).

## 5.2 DATA QUALITY

Sample quality control were collected and analyzed in accordance with FSAP Section 4.4. Quality control samples were analyzed in conjunction with the surface soil, subsurface, sediment, groundwater, and surface water sampling at the Facility, and consisted of both field quality control (QC) samples and laboratory quality control samples. Field QC consisted of field duplicates, deionized (DI) blanks and equipment rinsate blanks. Sets (duplicate, DI blank, rinsate blank) of field QC were submitted collected and analyzed. Laboratory QC included holding times, laboratory blanks, surrogate recoveries for organics, laboratory control samples, laboratory control sample duplicates (LCS/LCSD), matrix spikes, matrix spike duplicates (MS/MSD), laboratory duplicates; all of which were analyzed at the proper frequency of 5 percent or as required by method.

All data was assessed for overall completeness and adherence to project objectives through validation and verification. Data validation followed MDEQ's Data Validation Guidelines

(2010b) in conjunction with EPA Functional Guidelines (EPA, 2008 and EPA, 2010) and the project QAPP. Validation summaries were prepared for each sample delivery group. These reports are located in Appendix J and the analytical data packages are on the attached CD.

### 5.2.1 Sampling Summary

YOSD Surface, Subsurface, and Sediment Sampling Summary

Samples were collected between October 2, 2012 and August 12, 2013 by Hydrometrics, Inc., and analyzed at Energy Laboratories in Billings, Montana. These sampling events include 680 samples, 16 trip blanks, 14 DI blanks, 37 rinsate blanks and 39 duplicates. Frequency for field duplicates was 1 per 17 and 1 per 13 for field blanks.

Background soil samples were collected on December 23, 2013 by Hydrometrics, Inc., and analyzed at Energy Laboratories in Billings, Montana. This sampling event includes three samples.

YOSD Groundwater and Surface Water Sampling Summary

The first two quarters of surface and groundwater samples were collected between June 3, 2013 and September 13, 2013 by Hydrometrics, Inc., and analyzed at Energy Laboratories in Billings, Montana. These sampling events include 38 samples, 32 trip blanks, 4 DI blanks, 3 rinsate blanks and 4 duplicates. Frequency for field duplicates was 1 per 9.5 and 1 per 5 for field blanks.

Materials Confirmation Sampling

Fill (sand) material used to backfill cleared monitoring well borings prior to installation was analyzed to confirm that the fill was clean. Backfill material was obtained at Knife River Quarry in Billings, MT. Using the Montana DEQ Digital Atlas/Online Query Service, it was verified that the Knife River Quarry is not located on or adjacent to a contaminated facility. The fill material was analyzed for RCRA 8 metals, VPH, and EPH, the constituents of concern at the Facility. It was estimated that less than 400 cubic yards was used to fill holes, therefore, only one 5-point composite sample was collected and analyzed. Likewise, potable water used during drilling was also analyzed. These results are contained in Appendix G.

### 5.2.2 Validation Summary

All data was grouped into batches, based on sampling dates, and included the field QC listed above. Typical quality control samples exceeding criteria included laboratory blanks, field blanks, laboratory control samples, surrogates, matrix spikes, and matrix spike duplicates. While instances of quality control exceedances were common, likely due to sample heterogeneity for soils as well as the inherent difficulties in analyzing impacted soil, minimal data were affected in terms of quality or usability. Any data associated with these quality control exceedances was flagged with a validation qualifier as follows:

<u>Soil/Sediments</u>

- Low level contamination in laboratory blanks for 2-methylnaphthalene, naphthalene resulted in qualification of selected soil samples. Associated analytical results are likely biased high and were qualified as non-detect, "U". In general, these data were considered non-detect when evaluating constituents, and were assessed along with other non-detect data with elevated detection limits unless the associated concentration was above screening levels. Due to the uncertainty in these analyses, "U" qualified data above screening levels were included with detected data results for evaluation purposes.
- Low level contamination in field rinsate blanks resulted in the qualification of selected soil samples for lead, chloroform, methylene chloride, and PAHs: 2-methylnaphthalene, naphthalene, acenaphthylene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, dibenzo(a,h)anthracene, benzo(a)pyrene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and chrysene. These are likely biased high and were qualified as non-detect, "U". In general, these data were considered non-detect when evaluating constituents, and were assessed along with other non-detect data with elevated detection limits unless the associated concentration was above screening levels. Due to the uncertainty in these analyses, "U" qualified data above screening levels were included with detected data results for evaluation purposes.

- Surrogate spikes recoveries were exceeded in some cases for VPH constituents (TPH, C9-C10 aromatics, C5-C8 aliphatics, C9-C12 aliphatics, benzene, ethylbenzene, toluene, m-p xylene, o-xylene, total xylenes, and naphthalene), and the following PAHs: 2-methylnaphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. These (detected) results were qualified "J" as estimated, with a high bias.
- Matrix spike recoveries were exceeded in some cases which resulted in the qualification of selected data for chloroethane with a low bias as laboratory control recoveries were also low.
- Laboratory control sample recoveries were exceeded in some cases for chloroethane, and resulted in qualification ("J", estimated) of selected data for chloroethane with a low bias as matrix spike recoveries were also low.
- Matrix spike duplicate RPDs were exceeded in some cases; however, evaluation of these exceedances in conjunction with other QC indicated no need for data qualification.
- Field duplicates exceeded QC criteria in some cases for arsenic, barium, chromium, lead; VPH constituents (C9-C10 aromatics, C9-C12 aliphatics, C5-C8 aliphatics, TPH, m-p-xylenes, o-xylene, and total xylenes), EPH constituents (C9-C18 aliphatics, C11-C22 aromatics, and TEH), and the following PAHs: 2-methylnaphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene. Data were flagged "J" as estimated. Qualifiers on these data indicate imprecision in the sampling or analysis methodology; however, bias cannot be determined.

<u>Groundwater/Surface Water</u>

- Low level contamination in laboratory blanks resulted in the qualification of selected groundwater samples for naphthalene and 2-methylnaphthalene, and chromium, lead, acenaphthene, 2-methylnaphthalene, and naphthalene in surface water. These are

likely biased high and were qualified as non-detect, "U". These data were considered non-detect when evaluating constituents, and were in assessed along with other non-detect data with elevated detection limits.

- Low level contamination in field rinsate blanks resulted in the qualification of selected samples for methane and nitrate plus nitrite associated with groundwater and TPH for surface water. These are likely biased high and were qualified as non-detect, "U". These data were considered non-detect when evaluating constituents, and were assessed along with other non-detect data with elevated detection limits.
- One field duplicate exceeded QC criteria for methane. Qualifiers ("J") on these data indicate imprecision in the sampling or analysis methodology; however, bias cannot be determined.
- Nitrite was analyzed past holding times for some groundwater samples associated with the September monitoring. These analyses were evaluated and are considered acceptable.

### 5.2.3 Data Quality Objectives

All analytical data were verified using the following objectives and assessment of those objectives: precision, accuracy, representativeness, comparability, and completeness.

<u>Precision</u>

Precision is the measure of the variability associated with an entire sampling and analysis process. It is the comparison among independent measurements as the result of repeated application of the same process under similar conditions. It is determined by analyzing field and laboratory duplicate pairs and MSD/LCSD pairs. Precision is expressed as the RPD of a pair of values (or results).

Field duplicate pairs were collected, analyzed and evaluated for each analysis performed on every sample matrix. Frequencies of field duplicate pairs submitted to the laboratory for analysis meet the requirement of 5 percent (1 per 20 field samples). Data were qualified as estimated (J) based on field duplicate precision, but no data was rejected. Overall, the field precision is acceptable.

The frequency criterion for MSD or laboratory duplicate pairs is 5 percent of the samples (per matrix) or one per analytical batch of 20 or less per matrix. Laboratory duplicate and MSD samples were analyzed and evaluated for each analysis performed on every matrix and met the frequency of 5 percent. Data were qualified as estimated based on MSD or laboratory duplicate precision, but no data were rejected due to poor duplicate precision.

Accuracy

Accuracy is the degree to which a measurement agrees with its true value and is expressed as percent recovery. Accuracy is assessed by comparing calibration verification, MS, LCS, surrogate, and internal standard recoveries with associated QC limits. Overall, the laboratory accuracy measurements are acceptable. These subjects are discussed in greater detail in the individual batch data validation reports included with the RI report. Data were qualified as estimated based on recovery values, but no data were rejected.

Representativeness

Representativeness is a qualitative parameter and is defined by the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or a process or environmental condition. Sample results were evaluated for representativeness by examining items related to sample collection, including chain-of-custody documentation, sample labeling, collection dates, and condition of the samples upon receipt at the laboratory. Laboratory procedures also were examined, including anomalies reported by the laboratory, either upon receipt of the samples or during analytical processes, adherence to recommended holding times of samples prior analysis, etc. All issues were rectified during data review.

Representativeness is also evaluated by reviewing both field and method blanks. Generally, concentrations detected in the blanks were considerably less than reported results and flagged with laboratory qualifier J indicating they were less than the PQL; therefore, these concentrations did not affect overall data quality. This is discussed further in the individual data validation batch reports included.

Completeness

Completeness is defined as the percentage of measurements judged to be valid. The validity of sample results is determined through the data validation process. All rejected R sample results are considered to be incomplete and unusable. Data that are qualified as U or J are considered to valid and usable.

For data collected during the sampling event, the total number of field sample results is 40,306. Of the total field sample results, two results were rejected so the number of valid field sample results is 40,304. The percent complete (valid and not rejected) is 99.9 percent. Two results were rejected for non-conformance, the lead analysis for YMW-13-SS-C and TEH from the field duplicate YMW-12-SB-AD. The initial analyses for soil from YMW-13 measured 37,400 mg/kg. This sample was reanalyzed with a result of 589 mg/kg, which was consistent with results for other soils directly above and below this interval. Both results are reported. The second rejected value, TEH in soil from YMW-12, measured ten times the original result (16,300 mg/kg vs. 1,960 mg/kg). EPH fractions for both the sample and the duplicate were similar. Therefore, TEH for YMW-12-SB-AD was rejected.

Comparability

Comparability of the data is a qualitative parameter that expresses the confidence with which one data set may be compared with another. Comparability of the data is achieved by using standard methods for sampling and analysis, reporting data in standard units, normalizing results to standard conditions, and using standardized reporting formats and data validation procedures. These goals were achieved by consistently following standard field and laboratory procedures.

For the September groundwater monitoring event, the groundwater was not field filtered and therefore a total recoverable metals analysis was conducted. Dissolved metals results should be less than or equal to total recoverable metals results. The potential effect of analyzing metals as total recoverable as opposed to dissolved, may result in a slightly high bias in the (total recoverable) data when comparing groundwater samples from these and future events.

While a slight positive bias may exist in the total recoverable analysis, the comparability to dissolved analyses is not greatly affected.

Method Compliance

Method compliance is determined by evaluating sample integrity, holding times, reporting limits, and laboratory blanks against method specified requirements. Any data analyzed outside of overall method compliance were further evaluated, and it was determined that the results are acceptable based on the supplied data.

Based on the evaluation of all sample data, 99.9 percent of the data obtained during this reporting period are valid and acceptable for their intended use.

### 5.2.4 Non-conformance / Corrective Action

Deviations from the FSAP and QAPP and corrective actions were either addressed during sampling, prior to analysis, or are discussed in Section 3 and Sections 5.3 through 5.7. Any deviations that may have affected data quality are summarized below.

In some locations, soil conditions were not amenable to advancing boreholes manually. In these cases, either an air knife was used to advance the hole, leaving at least a 6 inch buffer between the bottom of the cleared hole and the sample interval, or open holes were blocked or plugged using a hole plug and bentonite system, until sampling could be conducted with the geoprobe (see Section 3.3.2). In both cases, the potential for loss of volatile constituents may have existed, resulting in a possible low bias.

When soil sampling first started, bottled drinking water was used instead of deionized water for rinsate blanks and decontaminating soil sampling equipment. This deviation from protocols was quickly rectified and did not affect data quality. Bottled drinking water may have potentially affected analyses related to common ions; however, soils were analyzed for metals, VPH, and EPH. These rinsate blanks collected during this time period were absent of inorganic analytes.

There were many cases where the best practically achievable detection limits could not be met as described in Section 5.1. For some analytes, the analytical methods could not reliably achieve the detection limits, and required reporting values cannot be achieved given the current instrument technology. However, there were numerous cases where the detection limits were elevated because sample dilution/and or extraction was required due to high levels of hydrocarbons or non-target compound interference. Both these scenarios were common for many analyses (i.e., TEL, benzene and other VOCs, and PAHs). Elevated detection limits due to dilutions were seen repeatedly in hydrocarbon impacted soil throughout the Facility. The laboratory conducted sample extraction and dilution appropriately. While the data quality per se is not affected, some uncertainty may exist as to the presence or absence of the analytes, particularly in those cases where the detection limit is greatly elevated.

## 5.3 SURFACE SOILS

Surface soils were collected from October 2, 2012 through November 30, 2012 for grid and focused areas. Surface soils associated with monitoring well borings were collected April 9, 2013 through May 2, 2013.

Analytical results for surface soil samples are presented in Table 1-1 of Appendix G by analyses type and location. A total of 316 surface soil samples from 183 locations were inclusive of grid, monitoring well, PS area, and TEL area were collected, including field duplicates and all sample intervals. Analyses included RCRA Metals, VPH, EPH, PAHs, VOCs, TEL and TCLP lead. The number and type of analyses varied based on the sample analysis matrix outlined in the FSAP. Background surface soil analyses are located in Table 1-1B of Appendix G and include analyses for RCRA metals and PAHs. Deviations from the proposed sampling plan are as follows:

- No samples were collected from grid 24 because a building covered the entire grid.
- Grid 70 was split by the railroad tracks, and variations in soil types were observed. As such, samples were collected on both sides of the tracks as 70-SS-A and 70N-SS-A.

- VOC analyses were added to soils from YMW-14 (B and C intervals) based on observed field conditions.
- TEL analyses were added to soils from YMW-21 because of its proximity to the former TEL plant.

Surface soil analyses have been summarized in Table 5-1, which shows the total number of detected and non-detect analyses (including field duplicates), as well as the number of analyses or detection limits which exceed the most conservative screening level in cases of multiple screening levels. In several cases, the required detection limit listed in the QAPP could not be achieved. Analytes with detection limits above the screening level were typically those previously identified in the QAPP as analytes for which the required reporting level could not be obtained. The best practically achievable detection limit was reported for those analytes and those associated with sample matrix interference. Volatile organics using either VPH or 8260 were the most common analytes for which detection limits were greater than the screening levels.

Summary statistics (Table 5-2) of surface soil analyses, inclusive of all facility-wide grid, focused area (PS and TEL), and monitoring well locations have been prepared and show the total number of analyses, the concentration ranges of detected analyses, and the location associated with the maximum exceedance. Analytes with detected exceedances were further evaluated to determine inclusion as a constituent of potential concern based on the results of this RI (Table 5-3). For constituents analyzed by two methods, data from both methods are detailed in Tables 5-1 through 5-3, and the maximum concentration for any method at any given location was used to evaluate the data.

Among those analytes or groups of compounds with analyses exceeding the most conservative screening level, inclusive of all surface soils, were:

- Metals (arsenic, barium, lead and mercury);
- Benzene, ethylbenzene and toluene;
- VPH fractions (C9-C10 aromatics, C5-C8 aliphatics and C9-C12 Aliphatics); and

- EPH fractions (C9-C18 aliphatics and C11-C22 aromatics), and PAHs (2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b) fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene and pyrene).

Paint Shop

Samples collected from focused sampling of the former PS area were analyzed for volatiles (8260) and RCRA metals. All volatile constituents were non-detect. Lead, arsenic, barium, and mercury were detected at levels exceeding screening levels. Lead, arsenic, mercury and barium were also seen in other areas of the facility.

TEL

Samples collected from the focused sampling of the TEL area included total lead, TEL, and TCLP-lead. The majority of these focused area samples contained lead above the screening level(s). Lead concentrations in this area were as high as 3,460 mg/kg (inclusive of sieved and unsieved samples); however, TCLP lead concentrations were all below the lead TCLP limit of 5 mg/L). All TEL analyses were non-detect, though these non-detects must be qualified as none of the laboratory detection limits for the TEL analyses were able to achieve the associated screening levels. The method detection limits for all non-detect TEL results were greater than the commercial EPA RSL.

Asbestos

On May 9, 2012, debris and bulk material lying exposed on the ground surface in the fenced area south of Tract D, consisting of 13 different and various debris-types of SAM, were collected for analysis (Hydrometrics, 2013c). All SAM sampled from the area was analyzed by the polarized light microscopic (PLM) technique with dispersion staining for identification of mineral forms of asbestos (EPA Method 600/R-93/116) and were found to be non-detect for asbestos. No asbestos impacts within the area sampled were indicated and no abatement was warranted.

SAM associated with the exterior grounds and roof of the MDT Building located in Grid 19 were inspected and sampled for asbestos on September 23, 2013. Inspection also included a shoulder-to-shoulder visual inspection of Grids 18, 19, 29 through 35 and 44 through 51 (Hydrometrics, 2013h). Samples which included roofing products, insulation, asphaltic pipe wrap and other debris, were selected and sampled on a non-random basis; the focus being to obtain sufficient volume of sample of each type of suspect material for testing purposes. SAM samples determined not to contain quantities greater than 1 percent by volume were further analyzed via Transmission Electron Microscopy (TEM) methodology. Analysis results identified five types of SAM materials and debris that contained asbestos – miscellaneous material types included roofing debris, roof material and other debris (i.e., transite, gasket and putty) containing 10 to 50 percent Chrysotile (asbestos). Mitigation of the MDT building/grounds was conducted in July 2014 as outlined in the Site-Specific Asbestos Abatement Project Work Plan (Tetra Tech, 2014a) and included removal of roofing materials, clean-up of identified asbestos, and limited surface soil sampling in Grids 18, 19, 29 through 33 and 45 through 49. Confirmation soil samples indicated the presence of asbestos in surface soils. DEQ has required MDT, on behalf of the YOSD PLP Group, to excavate soils in the impacted area of the YOSD Facility and perform confirmation soil sampling activities again.

### 5.3.1 Metals

Arsenic, barium, lead (sieved and unsieved), and mercury were detected in surface soil at concentrations exceeding the most conservative screening levels. Metals concentrations were compared to Background Concentrations of Inorganic Constituents in Montana Soils, EPA Direct Contact Industrial and Residential Regional Screening Levels and MDEQ Leaching to Groundwater Screening Levels.

<u>Arsenic</u>

Arsenic was detected above screening levels in 10 of 46 samples collected in the focused investigation near the former PS. In addition, two arsenic samples collected from grid 21 in the same area also exceeded screening levels. Isolated instances of arsenic exceedances were located in Grid 77 and in soils associated with the installation of YMW-21 in Grid 44.

Collectively, screening levels were exceeded for 5 percent of the analyses. Concentrations exceeding screening levels ranged from 24 mg/kg to 90 mg/kg. When comparing Facility soils to the background soil concentration (see Section 2.9), 39 percent of arsenic results were greater than the background soil concentration in various areas throughout the Facility.

Barium

Barium exceeded screening levels in 18 percent (47/257) of the surface soil samples with concentrations ranging from 427 mg/kg to 3,610 mg/kg. Approximately 30 percent of those exceedances were located near the former PS area. The remainder of the exceedances were seen in soils from other areas of the Facility (see Figure 5-1) such as the former oil loading and pond areas, as well as near the former meat packing plant. The majority of samples exceeded the background soil concentration.

Lead

Surface soils for lead were sieved in the laboratory to less than 250 microns (No. 60 sieve) prior to analysis. Approximately half of all the bulk (unsieved) samples were also analyzed for lead to provide a comparison between lead concentrations in the fines versus the bulk composition. All samples collected for the focused investigations (PS and TEL) and monitoring well locations were analyzed for both fractions. Both sets of lead analyses are contained in Appendix I and summarized in Appendix G, Table 1-1.

Sieved lead concentrations were compared with bulk lead concentrations. In most cases (129/171), sieved lead was higher than bulk lead concentrations. No correlation was seen based on soil type. Considering the highest concentration of either the sieved or bulk analyses in a sample, lead exceeded screening levels at 52 percent of the sample locations. Figure 5-2 shows the distribution and concentration of lead in surface soils at the Facility. Lead was primarily seen across the northern section of the Facility, in the areas of former Refinery operations; however, isolated occurrences were also seen in soils on the south side of Tract 5. The highest concentration of sieved or bulk lead in a sample, as well as the highest lead concentration from any location with multiple sample intervals (0 to 6 inch, 6 to 12 inch or 12 to 24 inch), is reflected on the figure. Lead concentrations above screening

levels ranged from 140 mg/kg to 26,700 mg/kg. The majority of the lead analyses were greater than the background soil concentration.

As part of the focused investigation in the area of the former TEL plant (Figure 3-3), samples were analyzed for TCLP lead, tetraethyl lead, and total lead. Total lead concentrations for these focused area samples ranged from 26 mg/kg to 3,460 mg/kg. Six samples were detected for TCLP lead, ranging from 0.2 mg/L to 1.5 mg/L; however, none exceeded the TCLP limit of 5 mg/L. All tetraethyl lead was non-detect; the method detection limits for all non-detect results were greater than the commercial EPA RSL. A comparison of the lead vs. detected TCLP lead follows, and the complete set of analyses are located in Appendix I.

| **Location** | **Unsieved Lead (mg/kg)** | **Sieved Lead (mg/kg)** | **TCLP Lead (mg/L)*** |
|---|---|---|---|
| TEL11-SS-A | 886 | 761 | 0.2 |
| TEL13-SS-A | 484 | 589 | 0.3 |
| TEL15-SS-A | 1100 | 1320 | 0.3 |
| TEL18-SS-A | 1290 | 1480 | 0.4 |
| TEL20-SS-A | 3460 | 2510 | 1.5 |
| TEL25-SS-A | 900 | 1010 | 0.7 |

* Note: TCLP limit – 5.0 mg/L

Tetraethyl lead analyzed in surface soils from the focused investigation as well as other areas was non-detect; however, the detection limits were elevated above the screening level. The best practically achievable detection limit in clean soils was approximately 10,000 times the lowest screening level. Samples collected for tetraethyl lead were typically associated with areas containing impacted soils. Therefore, detection limits were also elevated due to interferences and/or dilutions caused by hydrocarbon impacts. Because tetraethyl lead breaks down rapidly when exposed to water (i.e., precipitation, run-off), there is a lower probability of surface soils containing TEL than in subsurface horizons above the water table.

Mercury

Mercury was detected above screening levels and the background soil concentration in 3 percent (7/257) of the analyses with concentrations ranging from 1 mg/kg to 5 mg/kg. Sporadic detections of mercury were located in Grids 13 and 14 (including soils from YMW-14), the Paint Shop area, and soil from YMW-20. All other mercury results were non-detect.

### 5.3.2 VPH (Volatile Petroleum Hydrocarbons)

VPH analyses were conducted on all facility wide surface soils. VPH data was evaluated using MDEQ RBSLs from Table 1 in the RBCA guidance (MDEQ, 2009) for residential and commercial soils. VPH fractions (C9-C10 aromatics, C5-C8 aliphatics and C9-C12 aliphatics), naphthalene, and benzene, toluene, and ethylbenzene were detected above RBSLs for residential soils (the most conservative), and are therefore considered COPCs. Benzene, toluene, and ethylbenzene are discussed further in Section 5.3.3. Naphthalene was analyzed using both VPH and method 8270 for PAH analysis and is further discussed in Section 5.3.5.

VPH Fractions

Concentrations for VPH fractions, C9-C10 aromatics, C5-C8 aliphatics and C9-C12 aliphatics exceeded the RBSL in 8 percent of the surface soil analyses. These exceedances were typically co-located. The C9-C10 aromatic constituent tends to exemplify the distribution of VPH fractions, as it represents areas where all VPH fractions exceed their respective RBSLs as shown in Figure 5-3. Concentrations exceeding RBSLs ranged from 104 mg/kg to 4,010 mg/kg for C9-C10 aromatics, 70 mg/kg to 3,950 mg/kg for C5-C8 aliphatics and 106 mg/kg to 4,240 mg/kg for C9-C12 aliphatics.

### 5.3.3 VOCs (Volatile Organic Compounds)

In addition to VPH analysis, selected grid locations for the deeper soil horizons (6 to 12 inch and 12 to 24 inch) and the focused PS investigation were also analyzed using method 8260. Some overlap in the constituents occurs between the methods, namely benzene, ethlybenzene, toluene, and methyl tert-butyl ether (MTBE). Results for both methods were considered when evaluating benzene and other VOCs. Overall, benzene exceeded the RBSLs in 6 percent of the analyses. Total xylene concentrations were all less than the

RBSL. No RBSL exists for m-p xylene and o-xylene, therefore RSLs were used for direct contact and screening levels (SLs) based on MDEQ's soil screening process for leaching to groundwater. Toluene and ethylbenzene exceeded their respective RBSL in 1 percent and 2 percent of the analyses, respectively. One result exceeded screening levels for methylene chloride; however, this constituent is a common laboratory contaminant and may not be representative of actual site conditions.

Benzene, Toluene, and Ethylbenzene

The VPH method generally produced lower detection limits than method 8260 for benzene, toluene, and ethylbenzene. However, all non-detect results for benzene were still reported above the RBSL. The best practically achievable limit was reported. Concentration ranges of constituents (inclusive of both analytical methods) exceeding the screening levels are summarized as follows:

| Constituent | Concentration Range |
|---|---|
| Benzene | 0.049 – 39 mg/kg |
| Ethylbenzene | 7.7 – 35 mg/kg |
| Toluene | 12 – 37 mg/kg |

Figure 5-3, showing VPH exceedances, generally demonstrates the distribution of VOCs and includes former refining and pond areas and the LNAPL plume area. The distribution of benzene (see Figure 5-4) is more isolated to the plume area itself. While benzene was generally not detected in the former oil recovery and pond areas, the detection limits were elevated in some cases. Some isolated benzene exceedances were also seen in soils from YMW-10, YMW-15, YMW-20 and at grid 8; all associated with parking/traffic areas.

### 5.3.4 EPH (Extractable Petroleum Hydrocarbons)

EPH analyses were conducted on all facility wide surface soils. EPH data was evaluated using MDEQ RBSLs for residential and commercial soils from Table 1 in MDEQ's RBCA Guidance (MDEQ, 2009). For those samples not already designated for PAH analysis in the FSAP, the need for additional EPH fraction and PAH analyses was determined using the

RBCA screening process. EPH fractions C9-C18 aliphatics and C11-C22 aromatics were detected above RBSLs for residential soils (the most conservative), and are therefore considered COPCs.

EPH Fractions

EPH fractions were analyzed when the EPH screen value was greater than 200 mg/kg. Concentrations of C9-C18 aliphatics and C11-C22 aromatics exceeded their respective RBSLs in 25 percent and 29 percent of the analyses, respectively. EPH fraction C19-C36 aliphatics concentrations were below RBSLs. Figures 5-5 and 5-6 demonstrate the distribution of EPH fraction analysis. These fractions were typically located in the same areas (the former refinery, pond, loading and oil recovery areas). C9-C18 aliphatics also exceeded RBSLs in grid 99. Concentrations exceeding RBSLs ranged from 203 to 14,600 mg/kg for C9-C18 aliphatics, and 450 mg/kg to 11,700 mg/kg for C11-C22 aromatics.

### 5.3.5 PAH (Polynuclear Aromatic Hydrocarbons)

PAHs were analyzed as outlined in the FSAP, or as determined by the EPH screen analysis.

Several PAHs were detected at levels exceeding their respective RBSL. These include 2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-C,D)pyrene, naphthalene, and pyrene, and are therefore considered constituents of potential concern. Naphthalene was analyzed using the VPH method, and is also included in the PAH analytes using method 8270. Both sets of analyses, including maximum concentrations at any given location, were considered when evaluating naphthalene as a constituent of potential concern. Overall, 3 percent of all naphthalene results exceeded RBSLs.

As shown on Table 5-3, benzo(a)pyrene concentrations exceeded the RBSLs for 62 percent of the analyses. Other PAHs exceeded their respective RBSLs less frequently. These PAH exceedances are generally co-located with benzo(a)pyrene, and therefore, benzo(a)pyrene was used to represent PAH distribution in shallow soils on Figure 5-7.

PAHs that were detected above RBSLs, and their concentration ranges (also above RBSLs) are as follows:

| PAH | Concentration Range |
|---|---|
| 2-Methylnaphthalene | 1.4 - 44 mg/kg |
| Benzo(a)anthracene | 0.22 – 187 mg/kg |
| Benzo(a)pyrene | 0.022 – 147 mg/kg |
| Benzo(b)fluoranthene | 0.21 – 127 mg/kg |
| Benzo(k)fluoranthene | 3.1 - 91 mg/kg |
| Chrysene | 39 - 164 mg/kg |
| Dibenz(a,h)anthracene | 0.021 – 49 mg/kg |
| Fluoranthene * | 407 mg/kg |
| Indeno(1,2,3-C,D)pyrene | 0.21 – 102 mg/kg |
| Naphthalene | 4.4 - 45 mg/kg |
| Pyrene * | 320 mg/kg |

* One analysis exceeded RBSLs

Facility surface soils with detected concentrations were typically greater than background soil concentrations; however, background soils also contained low level concentrations of most PAHs, and benzo(a)pyrene in the background soils exceeded the Residential RBSL.

## 5.4 SUBSURFACE SOILS

Subsurface soils were collected from April 24, 2013 through August 12, 2013.

Analytical results for subsurface soil samples are presented in Table 1-2 of Appendix G by analyses type and location. A total of 393 subsurface soil samples inclusive of grid, monitoring well, and Interim Action opportunity samples from 127 locations were collected, inclusive of all sample intervals and field duplicates. Samples were collected for RCRA Metals, VPH, EPH, PAHs, VOCs and TEL. The number and type of analyses varied based on the sample analysis matrix outlined in the FSAP. Deviations from the proposed sampling plan are as follows:

- No samples were collected from grid 24 because a building covered the entire grid.
- Samples were not collected at depth (interval “C”) from grids 4 and 11 due to refusal.

- No “A” interval (2-10 feet) sample was collected from grid 79 because groundwater was encountered at 2 feet.
- Additional analyses were conducted for samples 45-SB-A for TCLP and SVOC analyses and for SVOCs for sample 45-SB-B.
- TEL was inadvertently added to analyses for grids 1 through 3.
- Six additional opportunity samples were collected during Interim Remedial Action Waste Disposal.
- VOC analyses were added to soils from YMW-12 and YMW-14 based on observed field conditions.
- TEL analyses were added to soils from YMW-21 (“A” and “B” intervals) because of its proximity to the former TEL plant.
- Several PID readings were measured, but not recorded on the field data sheets for the “B” and “C” interval samples. Note that PID readings for B and C intervals were informational only and were not used to determine sample analysis.

Subsurface soil analyses have been summarized in Table 5-4, which shows the total number of detected and non-detect analyses (including field duplicates), as well as the number of analyses or detection limits which exceed the most conservative screening level in cases of multiple screening levels. In several cases, the required detection limit listed in the QAPP could not be achieved. Analytes with detection limits above the screening level were typically those previously identified in the QAPP as analytes for which the required reporting level could not be obtained. The best practically achievable detection limit was reported for those analytes and those associated with sample matrix interference. Volatile organics using either VPH or 8260 were the most common analytes for which detection limits were greater than the screening levels.

Summary statistics (Table 5-5) of subsurface soil analyses, inclusive of all facility-wide grid, monitoring well, and opportunity sample locations have been prepared and show the total number of analyses, the concentration ranges of detected analyses, and the location associated with the maximum exceedance. Analytes with detected exceedances were further

evaluated to determine inclusion as a constituent of potential concern based on the results of this RI (Table 5-6).

Among those analytes or groups of compounds with analyses exceeding the most conservative screening level at a frequency greater than 5 percent, inclusive of all subsurface soils, were lead, benzene, ethylbenzene, naphthalene, VPH fractions (C9-C10 aromatics, C5-C8 aliphatics and C9-C12 Aliphatics), EPH fractions (C9-C18 aliphatics and C11-C22 aromatics), and TEL. PAH exceedances, while common in surface soil analyses, were all but absent in subsurface soils with the exception of naphthalene.

### 5.4.1 Metals

Arsenic, barium, mercury, and lead were detected in subsurface soil at concentrations exceeding the most conservative screening levels. Metals concentrations were compared to Background Concentrations of Inorganic Constituents in Montana Soils, EPA Direct Contact Industrial Screening Levels, and MDEQ Leaching to Groundwater Screening Levels. Arsenic, barium, lead and mercury exceeded screening levels in 1 percent, 2 percent, 8 percent and 1 percent the analyses, respectively. Arsenic, barium, and mercury had minimal exceedances (5 or fewer out of 332 analyses).

<u>Lead</u>

Lead exceeded screening levels in 8 percent of analyses at 20 out of 127 subsurface sample locations. "A" interval samples, which generally ranged from 2 to 8 feet bgs contained the majority of the exceedances (5 percent), while the "B" interval collected at the groundwater interface made up the remaining exceedances. No lead concentrations exceeded screening levels from samples collected below the groundwater interface ("C" interval). Figures 5-8, 5-9 and 5-10 show the distribution and concentration of lead from each subsurface sampling interval. Soils containing lead exceedances are located in areas associated with former Refinery operations, particularly the area of the former TEL plant and ponds. Lead concentrations above screening levels ranged from 169 mg/kg to 19,300 mg/kg from "A" interval sample and from 151 mg/kg to 5,990 mg/kg from samples collected at the groundwater interface ("B" interval).

### 5.4.2 VPH (Volatile Petroleum Hydrocarbons)

VPH analyses were conducted on all subsurface soil samples. VPH data was evaluated using MDEQ RBSLs for subsurface soils, less than 10 feet to groundwater, from Table 2 in MDEQ's RBCA Guidance (MDEQ, 2009). VPH fractions (C9-C10 aromatics, C5-C8 aliphatics and C9-C12 aliphatics), and benzene, toluene, ethylbenzene, m-p, o, and total xylenes, and naphthalene were detected above RBSLs, and are therefore considered COPCs. Benzene, toluene, ethylbenzene, and xylenes are discussed in Section 5.4.3 and naphthalene is discussed in Section 5.4.5.

VPH Fractions

Concentrations for VPH fractions exceeded the RBSL for 48 percent of C9-C10 aromatics analyses, 31 percent of C5-C8 aliphatics analyses, and 31 percent of C9-C12 aliphatics analyses of subsurface soils. These exceedances were typically co-located. The C9-C10 aromatic constituent tends to exemplify the distribution of VPH fractions, as it represents areas where all VPH fractions exceed their respective RBSLs as shown in Figures 5-11, 5-12 and 5-13 for each of the sample intervals. Concentrations ranges exceeding RBSLs ranged as follows:

| | **"A"** | **"B"** | **"C"** |
|---|---|---|---|
| **VPH Fraction** | **(mg/kg)** | **(mg/kg)** | **(mg/kg)** |
| C9-C10 Aromatics | 116 to 4,570 | 184 to 23,600 | 108 to 4,760 |
| C5-C8 Aliphatics | 232 to 8,110 | 229 to 4,570 | 211 to 5,560 |
| C9-C12 Aliphatics | 1,010 to 8,370 | 1,050 to 33,900 | 1,050 to 12,100 |

Subsurface soils containing VPH fractions are located across the former Refinery operating areas, oil loading areas, pond areas and on Tract 5.

### 5.4.3 VOCs (Volatile Organic Compounds)

In addition to VPH analysis, selected grid locations were also analyzed using method 8260. Some overlap in the constituents occurs between the methods, namely benzene,

ethlybenzene, toluene and xylenes (BTEX), and methyl tert-butyl ether (MTBE). Both sets of analyses, including maximum concentrations at any given location were considered when evaluating benzene and other VOCs as a constituents of potential concern. Overall, benzene and ethylbenzene exceeded the RBSLs in 18 percent and 14 percent of the analyses, respectively. Other analytes with minimal exceedances (<5 percent) include toluene, xylenes, and chlorobenzene. Concentrations exceeding RBSLs or screening levels for each interval are as follows:

| | **"A"** | **"B"** | **"C"** |
|---|---|---|---|
| **VOC** | **(mg/kg)** | **(mg/kg)** | **(mg/kg)** |
| Benzene | 0.044 – 23 | 0.06 - 22 | 0.19 – 50 |
| Ethylbenzene | 11 - 205 | 14 - 170 | 11 - 184 |
| Toluene | NA | 10 | 13-16 |
| m-p Xylene | 164 - 406 | 106 - 156 | 153 – 357 |
| o-Xylene | NA | 215 | NA |
| Total Xylene | 406 | 346 | 382 |
| Chlorobenzene | 0.75 | NA | NA |

NA – Not applicable. No concentrations detected above screening levels.

Benzene

The VPH method generally produced lower detection limits than method 8260. However, all non-detect results were still reported above the RBSL. The best practically achievable limit was reported. The distributions of benzene exceedances for each sampling interval are contained in Figures 5-14, 5-15 and 5-16. Benzene in subsurface soils is seen in the vicinity where LNAPL also exists in all subsurface horizons. The soils from locations with the highest benzene concentrations typically contained visual staining.

Ethylbenzene

Ethylbenzene concentrations exceeding the RBSL for each sample interval are listed above. Locations with ethylbenzene exceedances were co-located with either benzene exceedances or VPH fraction exceedances (Figures 5-11 through 5-16).

Xylenes

Xylene concentration ranges exceeding RBSLs or screening levels for leaching to groundwater for each sample interval are listed above. Locations with xylene exceedances were co-located with benzene exceedances and VPH fraction exceedances (Figures 5-11 through 5-16).

### 5.4.4 EPH (Extractable Petroleum Hydrocarbons)

EPH analyses were conducted on all subsurface soils. EPH data was evaluated using MDEQ RBSLs subsurface soils less than 10 feet to groundwater, from Table 2 in MDEQ's RBCA Guidance (MDEQ, 2009). For those samples not already designated for PAH analysis in the FSAP, the need for additional EPH fraction and PAH analyses was determined using the RBCA screening process. EPH fractions C11-C22 aromatics and C9-C18 aliphatics were detected above RBSLs, and are therefore considered COPCs.

EPH Fractions

EPH fractions were analyzed when the EPH screen value was greater than 200 mg/kg. Concentrations of C11-C22 aromatics and C9-C18 aliphatics exceeded their respective RBSLs in 52 percent and 31 percent of the analyses, respectively. EPH fraction C19-C36 aliphatics concentrations were below RBSLs. Figures 5-17 through 5-22 demonstrate the distribution of EPH fraction analyses. These fractions were typically co-located in the

former refinery, pond, loading and oil recovery areas, with some isolated exceedances on or near Tract 5. Ranges of concentrations exceeding RBSLs are as follows:

| | **"A"** | **"B"** | **"C"** |
|---|---|---|---|
| **EPH Fraction** | **(mg/kg)** | **(mg/kg)** | **(mg/kg)** |
| C11-C22 Aromatics | 485 - 21,200 | 438 – 20,500 | 402 – 14,400 |
| C9-C18 Aliphatics | 2,310 – 20,400 | 2,010 – 35,000 | 2,060 - 18,600 |

Concentrations and frequency of exceedances decreased at total depth for both fractions.

### 5.4.5 PAH (Polynuclear Aromatic Hydrocarbons)

PAHs were analyzed as outlined in the FSAP; PAHs also were analyzed as determined by the EPH screen analysis.

Naphthalene was detected at levels exceeding the RBSL, and 2-methylnaphthalene was detected at levels exceeding MDEQ's leaching to groundwater screening level. Naphthalene was analyzed using the VPH method and is also included in the PAH analytes using method 8270. 2-methylnaphthalene was also analyzed with the PAH analyses as well as in an extended analyses of method 8270 constituents. Both sets of analyses, including maximum concentrations at any given location, were considered when evaluating naphthalene as a constituent of potential concern. Overall, 11 percent of all naphthalene results exceeded the RBSL, 37 percent of 2-methylnaphthalene, and the two 1-methylnaphthalene results in the extended analysis exceeded screening levels. Benzo(a)pyrene exceeded the RBSL on one occasion, however, it was qualified as non-detect due to a detection in an associated blank. Otherwise, all other PAHs were not detected at levels exceeding their respective RBSLs.

Method 8270 generally produced lower detection limits than the EPH method. The distributions of naphthalene exceedances for each sampling interval are contained in Figures 5-23, 5-24, and 5-25. Naphthalene for subsurface soils is seen in the former Refinery operating, oil recovery and pond areas, with one exceedance in grid 99. Detections of 1-methylnaphthalene and 2-methylnaphthalene above screening levels were typically co-

located with EPH fraction exceedances (Figures 5-17 through 5-22). Concentration ranges exceeding RBSLs/screening levels for each interval are as follows:

| | **"A"** | **"B"** | **"C"** |
|---|---|---|---|
| **PAH/VPH** | **(mg/kg)** | **(mg/kg)** | **(mg/kg)** |
| Naphthalene | 9.8 - 92 | 10 – 259 | 10 - 93 |
| 1-Methylnaphthalene | 38 | 2.5 | NA |
| 2-Methylnaphthalene | 2.6 - 127 | 2.4 - 182 | 1.9 - 140 |

### 5.4.6 Tetraethyl Lead

Tetraethyl lead was analyzed using method 8270 for a select number of subsurface soils near the area of the former TEL plant. Because TEL breaks down in water, no TEL was analyzed for soils below the water table ("C" interval). TEL was detected above the screening level in 3 of 23 analyses (13 percent). The majority of the remaining results were reported with elevated detection limits above the screening level. Screening levels cannot be achieved with current analytical methods, particularly in impacted soils.

Detected concentrations of TEL were seen in soils from grids 28 and 43, ranging in concentration from 0.091 mg/kg to 0.51 mg/kg. An additional sample that was collected during the installation of YMW-17, contained TEL at 0.74 mg/kg at the groundwater interface (YMW17-SB-B). The initial sample was reported; however, both sets of laboratory analyses are contained in Appendix F. It should be noted that the YMW-17 is near in proximity to the sample collected from grid 43. All TEL was detected in the vicinity of the former TEL plant.

### 5.4.7 Extended Analyses

An extended list of analyses was requested by MDEQ to further characterize sludge-like material in the former TEL plant and pond area. In addition to the planned analyses, samples from grid 45 were analyzed for waste characteristics and TCLP analysis (metals, VOCs, SVOCs, Pesticides and Herbicides) and an extended list of semivolatiles by 8270. Both 45-SB-A, collected at 2 to 4 feet and 45-SB-B, collected from 4 to 5 feet, were both analyzed for

the extended SVOCs and 45-SB-A was also analyzed using TCLP. These analyses are contained in Table 1-2 in Appendix E.

All analyses passed TCLP. Lead by TCLP measured 3.7 mg/L and benzene measured 0.034 mg/L. The total lead and (VOC) benzene concentrations were 5,920 mg/kg and 0.72 mg/kg, respectively. All semivolatiles were non-detect except 1-methylnaphthalene, 2-methylnapthalene and naphthalene, which were detected above screening levels (EPA Direct Contact RSLs or MDEQ Leaching to Groundwater) in one or both samples.

## 5.5 GROUNDWATER

Analytical results for groundwater samples are presented in Table 1-3 of Appendix G by analyses type and location. A total of 32 groundwater samples including field duplicates were collected in June and September 2013. Due to the presence of LNAPL, Wells YMW-12, YMW-13, YMW-14 and YMW-18 were not sampled in June, and wells YMW-13, YMW-15, YMW-16 and YMW-17 were not sampled in September. Samples were collected for Trace constituents including RCRA Metals, ions, VPH, EPH, PAHs, VOCs and MNA parameters. Because TEL was minimally detected in subsurface soils, TEL analyses were added.

Deviations from the proposed sampling plan are as follows:

<u>June</u>

- Due to difficulties stabilizing turbidity in the field, turbidity was subsequently analyzed in the lab for the June sampling event.

<u>September</u>

- Turbidity and ferrous iron were not analyzed. The addition of turbidity to the analyte list was not carried forward to the September event, and it was therefore not analyzed. Ferrous iron, while listed on the analyte list under MNA parameters, was not listed on the metals analyte list and was therefore not logged in at the laboratory or analyzed.

- Calcium, Magnesium, Potassium, and Sodium were not included on the chain of custody and were run at a later date. The lab re-issued a new report which included the new values.
- For this event, field filtering was not included so metals are reported as total recoverable instead of dissolved. Total recoverable analyses may be the same or slightly higher than dissolved analyses and would represent a more conservative scenario.

Groundwater analyses have been summarized in Table 5-7, which shows the total number of detected and non-detect analyses (including field duplicates), as well as the number of analyses or detection limits which exceed the DEQ-7 standard and RBSLs. In several cases the required detection limit listed in the QAPP could not be achieved. Analytes with detection limits above the screening level were typically those previously identified in the QAPP as analytes for which the required reporting level could not be obtained. The best practically achievable detection limit was reported for those analytes and those associated with sample matrix interference. PAHs, benzo(a)pyrene and dibenz(a,h)anthracene, and volatile organics using method 8260 were the most common analytes for which detection limits were greater than the screening levels.

Summary statistics (Table 5-8) of groundwater analyses, inclusive of both sampling events have been prepared and show the total number of analyses, the concentration ranges of detected analyses, and the location associated with the maximum exceedance (see Table 5-9).

Groundwater concentrations were compared with DEQ-7 Numeric Water Quality Standards and the RBSLs. Among those analytes or groups of compounds with analyses exceeding standards were MNA analytes (ferrous iron and nitrates), metals (arsenic, lead and selenium), benzene, ethylbenzene, naphthalene, VPH fractions (C9-C10 aromatics, C5-C8 aliphatics and C9-C12 Aliphatics), total purgeable hydrocarbons, TEH and EPH fractions (C9-C18 aliphatics, C19-C36 aliphatics, and C11-C22 aromatics), and PAHs (benzo(a)pyrene, benzo(b)fluoranthene, debenz(a,h,)anthracene, indeno(1,2,3-c,d)pyrene, and naphthalene).

### 5.5.1 Physical Parameters, Nutrients and Ions

Nitrate exceeded the maximum contaminate level (MCL) in seven wells in one or both events. High chloride, specific conductivities, and TDS were observed in groundwater from YMW-22 in June, up to an order of magnitude greater than other Facility wells. EPA secondary maximum contaminate levels (MCLs) were exceeded for total dissolved solids (TDS) in groundwater from all Facility wells. Secondary MCL exceedances were also seen in wells MW01, YMW-20, YMW-22 and YMW-23 for chloride. Sulfate concentrations were measured above the secondary MCL in all Facility wells except MW02, YMW-12, YMW-14, YMW-18 and YMW-21.

### 5.5.2 Trace Constituents

Trace constituents were analyzed as total recoverable in September and as dissolved in June.

These constituents were evaluated together, with the understanding that the September results represent both total and dissolved fractions and may be biased high. Arsenic, lead and selenium were detected in groundwater at concentrations exceeding the standard.

<u>Arsenic</u>

Arsenic was detected above standards in June at MW02 and YMW-22 and at YMW-12, YMW-18, MW02 and MW03 in September. Concentrations ranged from 0.015 mg/L to 0.024 mg/L. Concentration distribution maps for arsenic are located in Figures 5-26 and 5-27.

<u>Lead</u>

Lead was detected above standards in June at YMW-22 and at YMW-21 and YMW-22 in September. Concentrations ranged from 0.026 mg/L to 0.045 mg/L. Lead concentration distribution maps are located in Figures 5-28 and 5-29.

<u>Selenium</u>

Selenium was detected above standards in one well (MW03) in June at 0.191 mg/L.

### 5.5.3 VPH (Volatile Petroleum Hydrocarbons)

VPH data was evaluated using MDEQ RBSLs/DEQ-7 standards for groundwater. TPH, VPH fractions (C9-C10 aromatics, C5-C8 aliphatics, and C9-C12 aliphatics), benzene, ethylbenzene and naphthalene were detected above RBSLs and/or DEQ-7 standards. Benzene is discussed in Section 5.5.4, and naphthalene is discussed in Section 5.5.6.

VPH Fractions

Concentrations for TPH and VPH fractions, C9-C10 aromatics, C5-C8 aliphatics and C9-C12 aliphatics in groundwater analyses exceeded the RBSL in 19 percent, 9 percent, 16 percent and 9 percent of the analyses, respectively. These exceedances were co-located. TPH demonstrates the distribution of VPH fractions, as it represents all locations where any of the VPH fractions exceed their respective RBSLs as shown in Figures 5-30 and 5-31. Concentrations exceeding RBSLs ranged as follows:

| | **June 2013** | **September 2013** |
|---|---|---|
| | **(µg/L)** | **(µg/L)** |
| TPH | 2,230 - 22,900 | 1,050 - 9,020 |
| C9-C10 Aromatics | 2,780 | 1,270 - 1,350 |
| C5-C8 Aliphatics | 1,330 - 13,500 | 4,470 - 5,760 |
| C9-C12 Aliphatics | 1,840 - 5,460 | 1,150 |

Wells with groundwater concentrations exceeding RBSLs have all contained measurable LNAPL for one or more months. While wells with measurable LNAPL were not sampled, field notes indicate a sheen on the discharge for many of the wells with RBSL exceedances.

### 5.5.4 VOCs (Volatile Organic Compounds)

In addition to VPH analysis, all groundwater was analyzed for VOCs as well. Some overlap in the constituents occurs between the methods, namely benzene, ethlybenzene, toluene and xylenes (BTEX), and methyl tert-butyl ether (MTBE). Both sets of analyses, including maximum concentrations at any given location, were considered when evaluating benzene

and other VOCs. Overall, benzene exceeded the DEQ-7 standard in 22 percent of the analyses. Ethylbenzene also exceeded the DEQ-7 standard in one sample.

Benzene

Concentrations exceeding the DEQ-7 standard ranged from 6.3 µg/L to 7,860 µg/L. The distribution of benzene exceedances (Figures 5-32 and 5-33) generally correspond to the area where LNAPL has been observed and may also be reflective of entrained LNAPL from minute globules trapped in soil pore space within the groundwater.

### 5.5.5 EPH (Extractable Petroleum Hydrocarbons)

EPH data was evaluated using MDEQ RBSLs for groundwater. TEH and all EPH fractions C9-C18 aliphatics, C19-C36 aliphatics, and C11-C22 aromatics were detected above RBSLs for groundwater.

EPH Fractions

EPH fractions were analyzed in all groundwater samples. Figures 5-34 and 5-35 demonstrate the distribution of TEH analysis. Groundwater samples from two wells (YMW-15 and YMW-16) in June were co-located where TEH exceedances are also represented. As shown in the figures the area affected is the area of observed LNAPL. Concentrations exceeding RBSLs are as follows:

| | **June 2013** | **September 2013** |
|---|---|---|
| | **(µg/L)** | **(µg/L)** |
| TEH | 1,190 – 16,000 | 1,300 – 2,120 |
| C9-C18 Aliphatics | 5,260 – 6,270 | NA |
| C19-C36 Aliphatics | 1,960 – 4,330 | NA |
| C11-C22 Aromatics | 5,310 – 5,440 | NA |

NA – Not Applicable

### 5.5.6 PAH (Polynuclear Aromatic Hydrocarbons)

PAHs were analyzed for all groundwater samples as outlined in the FSAP. Naphthalene was analyzed using the VPH method and is also included in the PAH analytes using method 8270. Both sets of analyses were considered when evaluating naphthalene. Naphthalene was detected at levels exceeding the DEQ-7 standard at two sample locations: YMW-14 in September and YMW-15 in June with concentrations ranging from 107 µg/L to 336 µg/L. Benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene and indeno(1,2,3-C,D)pyrene exceeded their respective DEQ-7 standards on one occasion (YMW-21 sampled in September). Otherwise, all other PAHs were not detected at levels exceeding their respective RBSLs or DEQ-7 standards.

## 5.6 SURFACE WATER

Analytical results for surface water samples are presented in Table 1-4 of Appendix G by analyses type and location. A total of 10 surface water samples including field duplicates were collected in July and September 2013 at four locations along Yegen Ditch. Samples were collected for RCRA Metals, ions, VPH, EPH, PAHs and VOCs. TEL was added to the July sampling, because TEL was minimally detected in subsurface soils. No evidence of TEL existed in sediments (Section 5.7), sampled concurrently with the July surface water sampling. Therefore, TEL was not included during the September sampling event. No sample was collected from YD-2. The Yegen Ditch is contained in a buried culvert at this location. The only other deviation from the proposed sampling plan was that dissolved oxygen was not included during the July event due to an oversight. Dissolved oxygen was subsequently measured during the September event.

Surface water analyses have been summarized in Table 5-10, which shows the total number of detected and non-detect analyses (including field duplicates), as well as the number of analyses or detection limits which exceed DEQ-7 surface water or other applicable standards/screening levels. In several cases the required detection limit listed in the QAPP could not be achieved. Analytes with detection limits above the screening level/standards were typically those previously identified in the QAPP as analytes for which the required reporting level could not be obtained. The best practically achievable detection limit was

reported for those analytes and those associated with sample matrix interference. Mercury for the September event, several PAHs and volatile organics using method 8260 were the most common analytes for which detection limits were greater than the screening levels.

Summary statistics (Table 5-11) of surface water analyses, inclusive of both sampling events have been prepared and show the total number of analyses, the concentration ranges of detected analyses, and the location associated with the maximum exceedance. The field conductivity for YD-1 in September appears to be an anomalous number and therefore was not included in the statistics.

Surface water concentrations were compared with DEQ-7 Numeric Water Quality Standards, including human health and acute and chronic aquatic life standards. Arsenic was detected above the human health standard in all surface water samples. Arsenic concentrations found in samples collected along the Yegen Ditch on the Facility were consistent with concentrations in upstream samples. Concentrations ranged from 0.18 µg/L to 0.25 µg/L. Arsenic concentrations at surface water locations are shown on Figures 5-26 and 5-27. Selenium was detected in all samples above acute aquatic life standards (0.024 µg/L to 0.035 µg/L), but less than human health standards. Lead was detected above chronic aquatic life standards in five samples; however, all of these results were qualified as non-detect "U" due to contamination in an associated blank.

## 5.7 SEDIMENTS

Analytical results for sediment sampled from Yegen Ditch are presented in Table 1-5 of Appendix G by analyses type and location. A total of 11 sediment samples including field duplicates were collected in July at four locations (co-located with surface water sampling sites along Yegen Ditch). Samples were collected for RCRA Metals, ions, VPH, EPH, PAHs, VOCs and TEL. No sediment samples were collected from YD-2. The Yegen Ditch is contained in a buried culvert at this location. Sediments for the 12 to 24 inch interval were not collected at YD-3 and YD-4, as there was little recovery due to gravels. Total Organic Carbon (TOC) was inadvertently omitted from the chain-of-custody and was therefore not analyzed.

Sediment analyses have been summarized in Table 5-12, which shows the total number of detected and non-detect analyses (including field duplicates), as well as the number of analyses or detection limits which exceed the screening level. In several cases the required detection limit listed in the QAPP could not be achieved. Analytes with detection limits above the screening level were typically those previously identified in the QAPP as analytes for which the required reporting level could not be obtained. The best practically achievable detection limit was reported for those analytes and those associated with sample matrix interference. Detection limits were greater than the screening levels for several volatile organics using method 8260.

Summary statistics (Table 5-13) of sediment analyses have been prepared and show the total number of analyses, the concentration ranges of detected analyses, and the location associated with the maximum exceedance. Analytes with detected exceedances were further evaluated to determine inclusion as a constituent of potential concern based on the results of this RI.

Sediment concentrations were compared with available Ecological Risk Based Screening Concentrations for Freshwater Sediment. Metals (arsenic, chromium, lead and selenium), toluene, and numerous PAHs were detected in many of the sediments at levels exceeding the Ecological Risk Based Screening Concentrations.

Metals

Arsenic, chromium, lead, and selenium were measured at concentrations greater than screening levels in 45 percent, 9 percent, 55 percent and 91 percent of sediment analyses. Arsenic, lead, and selenium were detected in sediments above screening levels from all locations and chromium was above screening levels only at YD-1.

PAHs

Several PAHs exceeded Ecological Risk Based Screening Concentrations including Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene,

benzo(g,h,i)perlyene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-c,d)pyrene, phenanthrene, and pyrene in at least one sediment sample. Benzo(b)fluoranthene and indeno(1,2,3-c,d)pyrene exceeded screening levels in all sediment samples. PAHs were seen throughout ditch sediments; however, the highest concentrations of PAHs were located in the 0 to 6 in interval at the upgradient location, YD-1.

## 5.8 SUMMARY OF NATURE AND EXTENT OF CONTAMINATION

During this RI investigation, various media have been systematically sampled and analyzed to determine the nature and extent of contamination at the Facility. These data have been evaluated to determine those constituents of potential concern; namely those constituents with concentrations detected on a recurring basis above the applicable screening levels developed for the protection of human health and the environment. Constituents of potential concern, derived through systematic evaluation are summarized in Table 5-14. All media types (soils, groundwater, surface water and sediment) within the Facility boundary are impacted to some degree with hydrocarbons and metals.

In general, surface and subsurface soils, and groundwater, are affected by both purgeable and extractable hydrocarbons, including benzene, ethylbenzene and naphthalene. Heavier hydrocarbons and PAHs were seen more often in surface soils, while subsurface soils tended to contain higher instances of lighter end aromatic hydrocarbons. Lead and PAHs above screening levels were detected almost exclusively in surface soils. Lead concentrations above screening levels were located primarily in the vicinity of the former TEL plant and former refinery ponds. Naphthalene concentration exceedances were mainly located in the vicinity of the Tract C warehouses and Tract D. In addition, the MDT property and areas east and south east were confirmed to have surface debris containing asbestos with the potential for impacts to surface soils.

### 5.8.1 Potential Sources of Contamination

Primary sources of hydrocarbons and lead impacts to soil and groundwater appear to be related to the former Yale Oil Refinery. This is evidenced from stained soils, elevated VPH and EPH aliphatic and aromatic concentrations, LNAPL on the water table in the area of the

former Refinery, sludge-like material in the former pond areas, and elevated lead and barium concentrations throughout the former refining areas. In addition, the presence of TEL in soils, although infrequent, can be directly attributed to historical refining practices. As hypothesized, surface soils near the former PS area are a potential source for arsenic and other metals. Sources for barium may be related to past and present painting operations. The source of asbestos is primarily roofing material from the MDT building and may affect surface soils in adjacent areas downwind of the building.

### 5.8.2 Potential Surface Water and Sediments Impacts

Arsenic and selenium in waters from the Yegen Ditch appear to be primarily sourced upstream of the Facility. Evidence of hydrocarbons was also seen in sediments from the Yegen Ditch, even upstream of the Facility. Previous releases, runoff from surface soils, and groundwater interactions may influence surface water in the ditch as metals and PAHs are seen throughout the ditch sediments. C9-C18 aliphatics were detected above direct contact surface soil RBSLs near the location of a former release. However, it is possible that other sources, not directly related to former Facility operations, are likely to contribute as evidenced by constituents seen at the upstream location, YD-1. Even though ditch sediments do not appear to be affecting surface water quality, sediments are impacted. Surface water and sediment were not collected from the former refinery ponds and were not included in comparison to screening/cleanup levels.

### 5.8.3 Potential Groundwater Impacts

Groundwater near the former refining areas is impacted with free phase and dissolved hydrocarbons. Both lighter and/or heavier end hydrocarbons were seen in groundwater within monitoring wells. Metals in groundwater are less definitive. While lead and arsenic are seen in limited areas and downgradient of the former refinery, arsenic and selenium are also seen in areas south of former refinery operations.

# 6.0 CONTAMINANT FATE AND TRANSPORT

This section presents fate and transport information for COPCs at the former Yale Oil Refinery. A discussion of toxicological characteristics and contaminant fate and transport processes are included in the evaluation.

## 6.1 REVISED CONTAMINANTS OF POTENTIAL CONCERN

Based on the results of the remedial investigation, a revised list of COPCs for the various media has been prepared. Included are any analytes for any media which exceeded the lowest available primary standard/screening level, exclusive of MNA parameters or those analytes exceeding secondary screening levels. The inclusion of some of these constituents is based solely on a single data point or location, which may not be representative of the Facility, in general. These constituents as well as those non-detect data with detection limits elevated above applicable standards/screening levels will be evaluated during the future risk assessment for applicability as constituents of concern and the determination of site specific screening levels or site-specific cleanup levels, if necessary.

| ANALYTE | Surface Soils | Subsurface Soils | Groundwater | Surface Water | Sediments |
|---|---|---|---|---|---|
| **Metals** | | | | | |
| Arsenic | X | X | X | X | X |
| Barium | X | X | | | |
| Chromium | | | | | X |
| Lead | X | X | X | | X |
| Mercury | X | X | | | |
| Selenium | | | X | X | X |
| Tetraethyl lead | X | X | | | |
| **Volatile Petroleum Hydrocarbons** | | | | | |
| C5-C8 Aliphatics | X | X | X | | |
| C9-C10 Aromatics | X | X | X | | |
| C9-C12 Aliphatics | X | X | X | | |
| Total Purgeable Hydrocarbons | | | X | | |

| ANALYTE | Surface Soils | Subsurface Soils | Groundwater | Surface Water | Sediments |
|---|---|---|---|---|---|
| **Volatile Organic Compounds** | | | | | |
| Benzene | X | X | X | | |
| Ethylbenzene | X | X | X | | |
| Toluene | X | X | | | |
| m-p Xylene | | X | | | |
| o-Xylene | | X | | | |
| Total Xylenes | | X | | | |
| Chlorobenzene | | X | | | |
| **Extractable Petroleum Hydrocarbons** | | | | | |
| C11-C22 Aromatics | X | X | X | | |
| C19-C36 Aliphatic | | | X | | |
| C9-C18 Aliphatics | X | X | X | | |
| Total Extractable Hydrocarbons | | | X | | |
| **Polynuclear Aromatic Hydrocarbons** | | | | | |
| 1-Methylnaphthalene | | X | | | |
| 2-Methylnaphthalene | X | X | | | |
| Acenaphthene | | | | | X |
| Anthracene | | | | | X |
| Benzo(a)anthracene | X | | | | X |
| Benzo(a)pyrene | X | | X | | X |
| Benzo(b)fluoranthene | X | | X | | X |
| Benzo(g,h,i)perylene | | | | | X |
| Benzo(k)fluoranthene | X | | | | X |
| Chrysene | X | | | | X |
| Dibenz(a,h)anthracene | X | | X | | |
| Fluoranthene | X | | | | X |
| Indeno(1,2,3-c,d)pyrene | X | | X | | X |
| Naphthalene | X | X | X | | |
| Phenanthrene | | | | | X |
| Pyrene | X | | | | X |
| **Other** | | | | | |
| Asbestos | X | | | | |
| Nitrate ($NO_3$-N) | | | X | | |

## 6.2 GENERAL TOXICOLOGICAL INFORMATION

Toxicological information is provided for the most commonly detected constituents. Information on toxicological effects was taken from the Agency for Toxic Substances and Disease Registry (ATSDR, 1999, 2000, 2007a, 2007b, 2007c, 2007d, 2009a, 2009b and 2010).

### 6.2.1 Petroleum Hydrocarbons

Petroleum hydrocarbons are a large group of chemical compounds that originate from crude oil and are composed of hydrogen and carbon (ATSDR, 1999). This RI classifies petroleum hydrocarbons into two groups: VPH and EPH. Volatile petroleum hydrocarbons include gasoline-range organic compounds, jet fuel, mineral spirits, and other volatile fuels. Extractable petroleum hydrocarbons generally include heavier fuels such as diesel-range organic compounds, motor oil range compounds and other extractable fuels.

Adverse health effects from exposure to petroleum hydrocarbons may range from irritation of the throat, skin, or eyes, to illness such as fatigue, headache, nausea and drowsiness, to damage of the central nervous system, immune system, circulatory system (blood), liver, spleen, kidneys, developing fetus and lungs, to death. Different compounds affect the body in different ways and little is known about many compounds in the petroleum hydrocarbon family. Specific health effects depend on variables such as the type of compound, duration of exposure and concentration of exposure.

### 6.2.2 Metals

#### 6.2.2.1 <u>Barium</u>

Barium occurs in nature as a metallic element in various compounds. Some barium compounds are used in industrial settings as additives for oils and fuels; in the production of barium greases; and as a component in sealants.

Barium may be inhaled in dust, ingested by eating or drinking soil, plants or water, or rarely, absorbed through the skin. Most barium that enters the human body is excreted within 1 to 2 weeks. The remaining barium may remain in the bones and teeth (ATSDR, 2007a).

Health effects from barium exposure are linked to the ease with which the compound dissolves in water or in the stomach. Ingestion of soluble barium compounds may induce vomiting, abdominal cramps, diarrhea, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness. Large doses may cause changes in heart rhythm, paralysis, or death.

#### 6.2.2.2 Lead

Lead is a naturally occurring constituent of many minerals. Lead is also found in manmade products including fuels, paints, ammunition and batteries. Two types of lead compounds are found in the environment: inorganic (lead, its salts and oxides/sulfides) and organic (alkyl). Lead is generally retained in the upper layers of soil due to a strong bond with soil; it does not tend to leach to subsoil or groundwater. Inorganic lead compounds are the predominant forms of lead in the environment and typically associated with industrial contamination (ATSDR, 2007b).

Tetraethyl lead was once used as a gasoline additive to increase octane rating. Leaded gasoline was phased out in the United States in the 1980s, and lead was banned for use in gasoline for motor vehicles beginning January 1, 1996. Tetraethyl lead has been identified as a COPC for the Facility in subsurface soils near the former TEL plant.

Adverse health effects of lead (inorganic) may result from exposure through diet, air, drinking water, dust, and paint chips. Health effects are a result of both the duration and concentration of exposure. Lead may be ingested (oral), inhaled, or absorbed through the skin. The toxic effects of lead are the same regardless of the route of entry into the body. The efficiency of lead absorption depends on the route of exposure, age, and nutritional status. There may be immediate toxic effects and cumulative chronic effects (resulting from years of exposure).

Toxic effects of lead in humans have been well documented (ATSDR, 2007b). Lead can affect almost every organ and system in the body and may ultimately result in death. Lead

causes systemic effects (respiratory, cardiovascular, gastrointestinal, hematological, musculoskeletal, hepatic, renal, endocrine and ocular), immunological and lymphoreticular, neurological, physiological, reproductive and developmental effects.

The main target for lead toxicity is the central nervous system, both in adults and children (ATSDR, 2007b). Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. The Centers for Disease Control and Prevention (CDC) has set the standard elevated blood lead level for adults to be 10 micrograms per deciliter (µg/dL) of the whole blood.

Children (young and unborn) are more vulnerable to lead poisoning than adults (ATSDR, 2007b). A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. Even at much lower levels of exposure, lead can affect a child's mental (IQ deficits, attention disorders, and behavioral problems) and physical growth (systemic effects). The CDC has established a reference level of 5 µg/dL to identify children with elevated blood lead levels (CDC, 2012 in DEQ, 2008a).

#### 6.2.2.3 Arsenic

Arsenic is a naturally occurring element and is often found combined with other elements forming either organic or inorganic arsenic. Natural arsenic is frequently found in minerals and ores that contain copper or lead and may be released through volcanic eruptions or through combustion processes (smelters and power plants). Arsenic has been used in products such as wood preservative, pesticides, additives in animal feed, metal mixtures or alloys, lead-acid batteries, semiconductors, and light-emitting diodes (ATSDR, 2007c).

Arsenic may be ingested (food or water) or inhaled into the human body. Many common arsenic compounds can dissolve in water and are therefore found in the environment in both surface and groundwater (ATSDR, 2007c). People are exposed to small amounts of natural arsenic on a regular basis. Both inorganic and organic forms are excreted through urine

within several days with the possibility that some inorganic arsenic may remain for several months or longer. Children are prone to higher exposures due to hand to mouth activities such as playing in the dirt.

Inorganic arsenic is recognized as a poison (ATSDR, 2007c). Low doses of arsenic may result in irritation of your stomach and intestines, stomachache, nausea, vomiting, and diarrhea. Low doses may also decrease production of red and white blood cells, which may cause fatigue, abnormal heart rhythm, blood-vessel damage resulting in bruising, and impaired nerve function causing a "pins and needles" sensation in your hands and feet. Long-term exposure often creates a pattern of skin changes associated with changes in blood vessels of the skin and possibly skin cancer. Arsenic may also lead to cancer of the liver, bladder, and lung. Circulatory and peripheral nervous disorders may result from long-term inhalation of arsenic. High doses of arsenic may result in death.

Data on health effects from organic arsenic in humans is limited. Results from animal studies indicate organic arsenic may be less toxic than the inorganic forms. In animals, exposure to organic arsenic compounds can cause low birth weight, fetal malformations, and fetal deaths.

### 6.2.3 Polynuclear Aromatic Hydrocarbons

Polynuclear, or polycyclic, aromatic hydrocarbons (PAHs), are a class of organic compounds produced by incomplete combustion or high-pressure processes. PAHs form when complex organic substances are exposed to high temperatures or pressures (ATSDR, 2009a and 2009b). They are ubiquitous in the environment as a natural component of most fossil fuels, forest fires, and volcanoes. PAHs are common constituents of petroleum hydrocarbon mixtures such as diesel, motor oil, and asphalt. They are also the result of incomplete burning of fossil fuels and organic substances such as garbage, tobacco and charbroiled meat. Dyes, paints, plastics, insulating materials, building materials and rubber are known to contain PAHs. Compounds classified as PAHs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-C,D)pyrene and naphthalene have been identified as COPCs for this Facility.

PAHs are solids with low volatility at room temperature, and low solubility in water. The weak solubility leads to accumulation in soil and plants. Many PAHs can be photo-oxidized and degraded to simpler substances (ATSDR, 2009a and 2009b).

Exposure to PAHs may take place through ingestion, inhalation, and absorption through the skin. PAHs will generally be excreted from the body in a matter of days. However, PAHs can spread and target fat tissues (ATSDR, 2009a and 2009b). Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene and indeno(1,2,3-C,D)pyrene are known animal carcinogens and are classified as either probable or possible carcinogens to humans. Chronic exposure to PAHs can result in non-carcinogenic effects to the pulmonary, gastrointestinal, renal and dermatologic systems. Animal studies show that certain PAHs affect the hematopoietic, immune, reproductive, and neurologic systems and cause developmental effects. Data is not available to show these effects in humans (EPA, 2008).

It is difficult to ascribe observed health effects in epidemiological studies to specific PAHs because most exposures are to PAH mixtures (ATSDR, 2009a and 2009b). Benzo(a)pyrene is commonly used as an environmental indicator for PAHs due to its high carcinogenicity.

### 6.2.4 Volatile Organic compounds (VOCs)

VOCs are organic compounds that evaporate readily into the air. VOCs identified as COPCs at the Facility include benzene, ethylbenzene and toluene. The following sections provide a brief overview of these VOCs.

#### 6.2.4.1 <u>Benzene</u>

Benzene is a colorless liquid with a sweet odor originating from both natural and industrial sources. Benzene is present in crude oil, gasoline and cigarette smoke. The chemical is made mostly from petroleum and is used to make other chemicals, such as styrene (for Styrofoam® and other plastics), cumene (for various resins) and cyclohexane (for nylon and synthetic fibers). Benzene is also used in the manufacturing of some types of rubbers, lubricants, dyes, detergents, drugs and pesticides (ATSDR, 2007d).

Benzene in air reacts with other chemicals and breaks down within a few days (ATSDR, 2007d). Benzene in water or soil breaks down slower. It is slightly soluble in water and can pass through the soil into underground water. Exposure mainly occurs through inhalation, however, it may also be ingested through food or water. Benzene enters the bloodstream, and may be temporarily stored in the bone marrow and fat. From here, it is converted to metabolites in the liver and bone marrow. Most of the metabolites of benzene leave the body in the urine within 48 hours after exposure. Others may create adverse health effects.

Adverse effects are determined by a variety of factors including the concentration and duration of exposure (ATSDR, 2007d). Acute reactions may include vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, coma and death. Chronic exposure may lead to damage in the tissues that form blood cells, especially the bone marrow, the immune system and reproductive organs. Long-term exposure to benzene can cause leukemia, cancer of the blood-forming organs.

#### 6.2.4.2 Ethylbenzene

Ethylbenzene is a colorless, flammable liquid that smells like gasoline. It occurs naturally in coal tar and petroleum. It is also found in manufactured products such as inks, insecticides and paints. Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals (ATSDR, 2010).

This chemical may be found in air, soil or water. Exposure is typically through inhalation, but may also result from ingestion. High levels of ethylbenzene inhalation for short periods can cause eye and throat irritation or dizziness (ATSDR, 2010). Data from animal studies have shown exposure may result in damage to the inner ear, hearing and kidneys. Ethylbenzene has been classified as a possible human carcinogen.

#### 6.2.4.3 Toluene

Toluene is a clear, colorless liquid with a distinctive smell. This substance occurs naturally in crude oil and in the tolu tree. It is produced in the process of making gasoline and other

fuels from crude oil, in making coke from coal, and as a by-product in the manufacture of styrene. Toluene is produced through combustion of tobacco products. It is added to gasoline along with benzene and xylene. Toluene is recognized as a solvent and is used in making paints, paint thinners, fingernail polish, lacquers, adhesives and rubber (ATSDR, 2000).

Toluene exposure is a result of ingestion, inhalation, or absorption through the skin. The chemical enters the bloodstream and is mostly exhaled or excreted in urine within 12 hours. Some toluene is converted by the human body to less harmful chemicals. Adverse health effects are dependent on a number of factors including dose, duration of exposure and personal characteristics (age, health, susceptibility, etc.).

Toluene may have serious adverse effects on the brain. It can cause headaches, sleepiness, and, confusion, weakness, drunken-type actions, memory loss, nausea, and loss of appetite, hearing and color vision loss. Studies have not provided data to support conclusions on permanent effects of long-term exposure to low dosages of toluene. High doses of toluene may impair speech, vision, or hearing, cause loss of muscle control, loss of memory, poor balance, kidney damage and decreased mental ability. Some of these changes may be permanent. High doses of toluene may interfere with breathing and heart function and result in death.

## 6.3 CONTAMINANT FATE AND TRANSPORT PROCESSES

Fate and transport processes that may attenuate levels of contaminants present in soils, sediments and groundwater include dispersion, dilution, sorption, volatilization, surface and subsurface chemical degradation and biodegradation. Fate and transport data collected during the RI include soil pH, moisture, TCLP analyses associated with the focused TEL sampling, monitored natural attenuation parameters, and lithological observations. Attenuation processes are categorized into two groups: nondestructive attenuation mechanisms and destructive attenuation mechanisms. Attenuation processes are discussed below and in particular related to the fate and transport processes that are applicable at the Yale Oil of South Dakota CECRA facility.

### 6.3.1 Nondestructive Attenuation Processes

Nondestructive attenuation mechanisms result in decreasing contaminant concentrations, and/or mobility of contaminant, without a reduction of the mass of the contaminant. These processes include the physical dispersion, volatilization and dilution processes and the chemical sorption process (WDE, 2005; DEQ, 2008b).

#### 6.3.1.1 Petroleum Hydrocarbons

Releases of petroleum products occur due to spills and leaks. The products then migrate through the soil either through bulk migration or compound migration. Bulk migration refers to the movement of petroleum product through the soil under the forces of gravity and capillary action. Compound migration refers to individual compounds which separate from the bulk mixture and dissolve into the air or water (DEQ, 2008b).

Bulk Migration

Product which infiltrates through bulk migration generally travels fast relative to compound migration (due to the rate of dissolution). Many compounds that are insoluble and immobile in water are soluble in bulk oil and will migrate along with the bulk oil flow. Factors that affect the rate of bulk oil infiltration include soil moisture content, vegetation, terrain, climate, rate of release, soil particle size and oil viscosity. As bulk oil migrates through the soil column, a small amount of the product mass is retained by soil particles. The bulk product retained by the soil particles is known as "residual saturation." Residual saturation can act as a continuing source of contamination as individual compounds separate from the bulk product and migrate independently in air or groundwater. Adverse impacts to groundwater may occur if rainwater infiltrates through soil that contains residual saturation and initiates the downward migration of individual compounds.

Bulk oil flow is affected by numerous product-specific and site-specific factors. If the density of the bulk product is less than water (motor and heating oils), the product will migrate due to the product head. The product will continue to migrate laterally until the release is stopped and the product head dissipates. In contrast, organic liquids with a density

greater than water will continue to migrate downward through the water table aquifer under the influence of gravity. Downward migration ceases when the product is converted to residual saturation or when an impermeable surface is encountered. Product distribution in the subsurface is typically heterogeneous and complex due to product and site variables.

Compound Migration

Compound migration may occur as bulk product migrates through the soil column; individual compounds may separate from the mixture and migrate independently. Chemical properties such as volatility, solubility, and sorption potential will come into play to determine which compounds will separate from the bulk.

In general, compounds with a vapor pressure in excess of $10^{-2}$ millimeters of mercury (mm Hg) are more likely to be present in the air/vapor phase than in the liquid phase. Conversely, compounds characterized by vapor pressures less than $10^{-7}$ mm Hg are more likely to be associated with the liquid phase. The rate of volatilization is also a function of air and soil temperature, humidity, wind speed, soil type, moisture content, oil composition, solar radiation and thickness of the oil layer (DEQ, 2008b).

Solubility generally decreases with increasing molecular weight of the hydrocarbon compounds. For compounds having similar molecular weights, the aromatic hydrocarbons are more water soluble and mobile in water than the aliphatic hydrocarbons (ASTM, 1995) and branched aliphatics are less water-soluble than straight-chained aliphatics.

Lighter petroleum products, such as gasoline, contain constituents with higher water solubility and volatility and lower sorption potential than do heavier petroleum products, such as fuel oil. Data compiled from gasoline spills and laboratory studies indicate that these light-fraction hydrocarbons tend to migrate readily through soil, potentially threatening or affecting groundwater supplies. In contrast, petroleum products with heavier molecular weight constituents, such as fuel oil, are generally more persistent in soils because of their relatively low water solubility and volatility and his sorption capacity (DEQ, 2008b).

#### 6.3.1.2 Metals

Lead

When they are released to the atmosphere, lead particles are dispersed and ultimately removed from the atmosphere by wet or dry deposition. Approximately 40 to 70 percent of the deposition of lead is by wet fallout. Large particles, particularly with aerodynamic diameters of more than 2 microns, settle out of the atmosphere fairly rapidly and are deposited relatively close to emission sources; smaller particles may be transported thousands of kilometers (ATSDR, 2005 in MDEQ, 2008a).

Lead tends to form compounds of low solubility with the major anions found in natural waters. The amount of lead dissolved in surface waters depends on the pH and the dissolved salt content of the water. The maximum solubility of lead in hard water is about 30 µg/L at pH above 5.4 and the maximum solubility of lead in soft water is approximately 500 µg/L at pH above 5.4 (EPA, 1977 in MDEQ, 2008a). Hydroxide, carbonate, sulfide, and, more rarely, sulfate may act as solubility controls in precipitating lead from water.

At pH less than 5.4, the formation of lead sulfate limits the concentration of soluble lead in water, while at pH above 5.4, formation of lead carbonates limits the amount of soluble lead (EPA, 1979b in MDEQ, 2008a). The speciation of lead in water also depends on the presence of other ligands in water. Lead is known to form strong complexes with humic acid and other organic matter (Denaix and others, 2001; Gao and others, 1999; Guibaud and others, 2003 in DEQ, 2008a). The adsorption of lead to organic matter, clay and mineral surfaces, and coprecipitation or sorption by hydrous iron and manganese oxides increases with increasing pH (Callahan and others, 1979 in DEQ, 2008a).

Nearly all forms of lead that are released to soil from anthropogenic sources, such as lead sulfate, lead carbonate, lead sulfide, lead hydroxide, lead chromate, and lead chlorobromide, are transformed by chemical and biotic processes to adsorbed forms in soil (Chaney and others, 1988). The transformation process involves the formation of lead complexes with binding sites on clay minerals, humic acid and other organic matter, and hydrous iron oxides (Chaney and others, 1988; Chuan and others, 1996; Sauve and others, 1997 in DEQ, 2008a).

The ability of soils to bind lead depends on the pH of the soil and the cation exchange capacity of the soil components (such as hydrous iron oxides on clay and organic matter) (Chaney and others, 1988 in DEQ, 2008a). Only a small fraction (0.1 to 1 percent) of lead appears to remain water-soluble in soil (Khan and Frankland, 1983 in DEQ, 2008a). The solubility of lead in soil depends on pH, being sparingly soluble at pH 8 and becoming more soluble as the pH approaches 5 (Chuan and others, 1996 in DEQ, 2008a). Between pH 5 and 3.3, large increases in the solubility of lead in soil are observed. These changes in the solubility of lead appear to correlate with the pH-dependent adsorption and dissolution of iron and manganese oxyhydroxides. In addition to pH, other factors that influence the solubility of lead in soil are total lead content and the concentrations of phosphate and carbonate in soils (Bradley and Cox, 1988; Ge and others, 2000; Pardo and others, 1990; Sauve and others, 1997 in DEQ, 2008a).

Barium

Under natural conditions, barium is stable in the +2 valence state and is found primarily in the form of inorganic complexes. Conditions such as pH, Eh (oxidation-reduction potential), cation exchange capacity, and the presence of sulfate, carbonate, and metal oxides (e.g., oxides of aluminum, manganese, silicon and titanium) will affect the partitioning of barium and its compounds in the environment. The major features of the biogeochemical cycle of barium include wet and dry deposition to land and surface water, leaching from soil to groundwater, adsorption to soil and sediment particulates, and biomagnification in terrestrial and aquatic food chains (ATSDR, 2007a).

The length of time that barium will last in air, land, water, or sediments following release of barium into these media depends on the form of barium released. Barium compounds that do not dissolve well in water, such as barium sulfate and barium carbonate, can persist for a long time in the environment. Barium compounds, such as barium chloride, barium nitrate or barium hydroxide, that dissolve easily in water usually do not last in these forms for a long time in the environment. The barium in these compounds that is dissolved in water quickly combines with sulfate or carbonate that are naturally found in water and become the longer lasting forms (barium sulfate and barium carbonate). Barium sulfate and barium carbonate

are the barium compounds most commonly found in the soil and water. If barium sulfate and barium carbonate are released onto land, they will combine with particles of soil (ATSDR, 2007a).

Arsenic

Arsenic cannot be destroyed in the environment. It can only change its form, or become attached to or separated from particles. It may change its form by reacting with oxygen or other molecules present in air, water, or soil, or by the action of bacteria that live in soil or sediment. Arsenic released from power plants and other combustion processes is usually attached to very small particles. Arsenic contained in wind-borne soil is generally found in larger particles. These particles settle to the ground or are washed out of the air by rain. Arsenic that is attached to very small particles may stay in the air for many days and travel long distances. Many common arsenic compounds can dissolve in water. Thus, arsenic can get into lakes, rivers, or underground water by dissolving in rain or snow or through the discharge of industrial wastes. Some of the arsenic will stick to particles in the water or sediment on the bottom of lakes or rivers, and some will be carried along by the water. Ultimately, most arsenic ends up in the soil or sediment (ATSDR, 2007c).

#### 6.3.1.3 Polynuclear Aromatic Hydrocarbons

PAHs have been detected in groundwater either as a result of migration directly from contaminated surface waters or through the soil. PAH compounds tend to be removed from the water column by binding to suspended particles or sediments, by volatilization to the atmosphere, or by being accumulated by or sorbed onto aquatic biota. Because of their low solubility and high affinity for organic carbon, PAHs in aquatic systems are primarily found sorbed to particles that either have settled to the bottom or are suspended in the water column (DEQ, 2008b).

Sorption of PAHs to soil and sediments increases with increasing organic carbon content and with increasing surface area of the sorbent particles. Volatilization of PAHs from soil may be effective for some compounds, however, others are not easily volatilized.

#### 6.3.1.4 Volatile Organic Compounds

Contamination of groundwater with VOCs can result in volatilization into indoor air when the groundwater is used as a water source. In addition, contamination of groundwater and subsurface soil can result in migration of these chemicals into indoor air through vapor intrusion.

The high volatility of benzene is the controlling physical property in the environmental transport and partitioning of this chemical. Benzene is considered to be highly volatile with a vapor pressure of 95.2 mm Hg at 25 °C. Benzene is moderately soluble in water, with a solubility of 1,780 mg/L at 25 °C, and the Henry's law constant for benzene ($5.5 \times 10^{-3}$ atm-$m^3$/mole at 25 °C) indicates that benzene partitions readily to the atmosphere from surface water (Mackay and Leinonen, 1975). Since benzene is soluble in water, some minor removal from the atmosphere via wet deposition may occur. A substantial portion of any benzene in rainwater that is deposited to soil or water will be returned to the atmosphere via volatilization (ATSDR, 2007d).

Benzene released to soil surfaces partitions to the atmosphere through volatilization, to surface water through runoff, and to groundwater as a result of leaching. The soil organic carbon sorption coefficient (Koc) for benzene has been measured with a range of 60–83 (Karickhoff, 1981 and Kenaga, 1980), indicating that benzene is highly mobile in soil and readily leaches into groundwater. Other parameters that influence leaching potential include the soil type (e.g., sand versus clay), amount of rainfall, depth of the groundwater, and extent of degradation. In a study of the sorptive characteristics of benzene to groundwater aquifer solids, benzene showed a tendency to adsorb to aquifer solids. Greater soil adsorption was observed with increasing organic matter content (Uchrin and Mangels, 1987). An investigation of the mechanisms governing the rates of adsorption and desorption of benzene by dry soil grains revealed that periods of hours are required to achieve equilibrium and that adsorption is much faster than desorption (Lin et al., 1994). The rate of volatilization and leaching are the principal factors that determine overall persistence of benzene in sandy soils (Tucker et al., 1986).

### 6.3.2 Destructive Attenuation Processes

Destructive attenuation mechanisms result in the removal of contaminant mass by biological and chemical (abiotic) degradation processes. Biological degradation is an important mechanism for the destruction of petroleum hydrocarbons in subsurface environments. Biological degradation may transpire by (1) the use of the contaminant by microorganisms as a primary growth substrate, or (2) the simultaneous degradation of two compounds, referred to as co-metabolism (WDE, 2005; Tetra Tech, 2008 in DEQ, 2008a).

#### 6.3.2.1 <u>Petroleum Hydrocarbons</u>

Biologic degradation of petroleum hydrocarbons has been described in length throughout literary journals. The following is a succinct excerpt from an RI document (DEQ, 2008b) with similar Facility conditions to Yale Oil.

Indigenous microbes found in many natural settings have been shown to be capable of degrading organic compounds. The final products of microbial degradation are carbon dioxide, water, and microbial biomass (ATSDR, 1999).

The rate of petroleum hydrocarbon degradation depends on the chemical composition of the product released to the environment as well as facility-specific environmental factors. Generally, the straight chain hydrocarbons and the aromatics are degraded more readily than the highly branched aliphatic compounds (Havlicek, 1988 in DEQ, 2008a). The *n*-alkanes, *n*-alkyl aromatics, and the aromatics in the C10-C22 range are the most readily biodegradable; *n*-alkanes, *n*-alkyl aromatics. Aromatics in the C5-C9 range are biodegradable at low concentrations by some microorganisms, but are generally preferentially removed by volatilization and thus are unavailable in most environments. The *n*-alkanes in the C1-C4 ranges are biodegradable only by a narrow range of specialized hydrocarbon degraders. Finally, *n*-alkanes, *n*-alkyl aromatics, and aromatics above C22 are generally not available to degrading microorganisms.

A large proportion of the water-soluble fraction of the petroleum product may be degraded as the compounds go into solution. As a result, the remaining product may become enriched in

the alicyclics, the highly branched aliphatics, and PAHs with many fused rings (ATSDR, 1999).

Bacteria that decompose petroleum products use oxygen as an electron acceptor are important in the degradation process. The rate of biodegradation will depend, in part, on the supply of oxygen to the contaminated area, because aerobic metabolism is much faster than anaerobic metabolism. When there is an insufficient amount of dissolved oxygen available, organisms that can use other electron acceptors may degrade the contaminants but at slower rates (EPA, 2006). The ideal pH range to promote biodegradation is close to neutral (6 to 8). For most species, the optimal pH is slightly alkaline, that is, greater than 7 (Dragun, 1988 in DEQ, 2008a). The moisture content of the contaminated soil will affect biodegradation of oils through dissolution of the residual compounds, dispersive actions, and the need for microbial metabolism to sustain high activity. The moisture content in soil affects microbial locomotion, solute diffusion, substrate supply, and the removal of metabolic by-products (ATSDR, 1999).

Excessive moisture will limit the gaseous supply of oxygen for enhanced decomposition of petroleum hydrocarbons. Most studies indicate that optimum moisture content is within 50 to 70 percent of the water-holding capacity (Frankenberger, 1992 in DEQ, 2008a). Generally, as the temperature increases, biological activity tends to increase up to a temperature where enzyme denaturation occurs. The optimal temperature for biodegradation to occur ranges from 18 °C to 30 °C. Minimum rates would be expected at 5 °C or lower (Frankenberger, 1992 in DEQ, 2008a).

At least 11 essential macronutrient and micronutrient elements must be present in the soil in proper amounts, forms, and ratios to sustain microbe growth (Dragun, 1988 in DEQ, 2008a). These 11 elements are nitrogen, phosphorus, potassium, sodium, sulfur, calcium, magnesium, iron, manganese, zinc and copper. Nitrogen is usually the main limiting nutrient that governs the rate of decomposition of petroleum hydrocarbons. However, small amounts of phosphorus fertilizers may also be necessary to stimulate biodegradation (Mills and Frankenberger, 1994 in DEQ, 2008a).

The rate of biodegradation in soils is also affected by the volume of product released to the environment. At concentrations of 1 to 0.5 percent of oil by volume, the degradation rate in soil is independent of the concentrations of oil. However, as the concentration of oil rises, the first-order degradation rate decreases and the oil degradation half-life increases. Ultimately, biodegradation virtually ceases when the oil reaches saturation conditions in the soil (30 to 50 percent oil) (Eastcott and others, 1989 in DEQ, 2008a). Suarez and Rifai (1999 in DEQ, 2008a) summarized measured field and laboratory biodegradation rates for petroleum hydrocarbons and chlorinated solvents in groundwater. Median benzene, toluene, ethylbenzene and xylenes half-lives ranged from 17 to 231 days.

#### 6.3.2.2 Polynuclear Aromatic Hydrocarbons

Atmosphere

As described by DEQ (2008), the processes that transform and degrade PAHs in the atmosphere include photolysis and reaction with nitrogen oxide, nitric anhydride, hydroxyl radicals, ozone, sulfur dioxide, and peroxyacetyl nitrate (Baek and others, 1991; NRC, 1983). PAHs have a wide range of volatilities and therefore are distributed in the atmosphere between the gas and particle phases. The 24-ring PAHs exist, at least partially, in the gas phase (EPA, 2006).

Most PAHs in the atmosphere are associated with particulates (Baek and others, 1991). Two types of chemical reactions appear to be the predominant mode of transformation of these PAHs: (1) reactions between PAHs adsorbed on the particle surfaces and oxidant gases such as nitric oxide, ozone, and sulfite that do not appear to be influenced by exposure to ultraviolet irradiation; and (2) photooxidation of PAHs irradiated either under solar radiation or simulated sunlight which produces a variety of oxidized derivatives such as quinones, ketones, or acids (EPA, 2006). Kamens and others (1986) estimate that, even in highly polluted air, photolysis is the most important factor in the decay of particle-sorbed PAHs in the atmosphere, followed by reaction with nitric oxide, nitric anhydride and nitric acid. Degradation of PAHs on particle surfaces by ozone has been found to be an important pathway for their removal from the atmosphere (EPA, 2006).

Water

The most important processes that contribute to degradation of PAHs in water are photo oxidation, chemical oxidation, and biodegradation by aquatic microorganisms (Neff, 1979). Hydrolysis is not considered an important degradation process for PAHs (Radding and others, 1976). The rate and extent of photodegradation vary widely among the PAHs (Neff, 1979). There is no easily defined trend in the rates of photolysis that could be correlated with the chemical structure of PAHs.

PAHs in water can be chemically oxidized by chlorination and ozonation. PAH degradation from chlorination has been reported by Harrison and others (1976a and 1976b). Pyrene was the most rapidly degraded PAH. Benzo(a)anthracene, benzo(a)pyrene, and perylene were also highly degraded. Indeno(1,2,3-c,d)pyrene and benzo(g,h,i)pyrene were intermediate with respect to relative degradation. Benzo(k)fluoranthene and fluoranthene were the most slowly degraded of the compounds tested. The PAH-related by-products that result from chlorination are not fully known (Neff, 1979). Ozonation in water is generally slower and less efficient than chlorination in degrading PAHs (Neff, 1979).

No correlation between biodegradability and molecular weight is evident in three- to four-ring PAHs. Concentrations of DO above 0.7 mg/L are adequate for biotransformation, and the presence of a minimal concentration of PAH is required for biodegradation to proceed (Borden and others, 1989). The minimum total PAH concentration before biotransformation may be inhibited under ambient nutrient conditions may be 30 to 70 µg/L (Borden and others, 1989).

Soil

Environmental factors that may influence the rate of PAH degradation in soil include temperature, pH, oxygen concentration, PAH concentrations and the contamination history of the soil, soil type, moisture, nutrients and other substances that may act as substrate co-metabolites (Sims and Overcash, 1983). The size and composition of microbial populations in turn can be affected by these factors.

PAHs are usually divided into two groups based on their molecular weights (Kanaly and Harayama, 2000 in DEQ, 2008a). For example, reported half-lives in soil and sediment of the three-ring phenanthrene molecule may range from 16 to 126 days while for the five-ring molecule benzo[a]pyrene they may range from 229 to 1,400 days (Shuttleworth and Cerniglia, 1995).

Studies on biodegradation of PAHs suggest that adsorption to the organic matter significantly reduces the bioavailability for microorganisms, and thus the biodegradability, of PAHs, including naphthalene (Weissenfels et al., 1992).

There is considerable variability in reported naphthalene soil half-lives. The estimated half-life of naphthalene reported for a solid waste site was 3.6 months (Howard, 1989). In less contaminated soils, more rapid biodegradation is expected to occur (Howard, 1989). In soils with 0.2 to 0.6 percent organic carbon and 92 to 94 percent sand, the half-lives were 11 to 18 days (Klecka et al., 1990). In another study, sandy loams with 0.5 to 1 percent organic carbon had naphthalene half-lives of 2 to 3 days (Park et al., 1990). Biodegradation is accomplished through the action of aerobic microorganisms and declines sharply when soil conditions become anaerobic (Klecka et al., 1990 in DEQ, 2008a).

Heitkamp and Cerniglia (1988) published the first study on the isolation of a bacterium from the environment that could extensively degrade PAHs containing four aromatic rings. Also, Mahaffey and others (1988) presented the first direct demonstration of ring fission during HMW PAH biodegradation. Mueller et al. in 1989 (DEQ, 2008a) demonstrated for the first time that the utilization of a PAH containing four or more aromatic rings as a sole source of carbon and energy by bacteria is possible. They showed that a seven member bacterial community isolated from creosote-contaminated soil was capable of utilizing fluoranthene. In addition, the community was capable of biotransforming other HMW PAHs in a concentration range of 0.3 to 2.3 mg/liter when grown on fluoranthene. During the ensuing decade, a diverse number of observations regarding the biodegradation of HMW PAHs by bacteria were published (Kanaly and Harayama, 2000 in DEQ, 2008a).

Park and others (1990) measured PAH biodegradation rates in two soil types under aerobic conditions. Experimental results indicated half-lives ranged from 2 days (naphthalene) to 420 days (dibenz[a,h]anthracene). Coover and Sims (1987) documented a decrease in PAH biodegradation rates with decreasing soil temperature. Although there are differences in the biodegradation half-life values estimated by different investigators (Park and others, 1990; Wild and Jones, 1993; Symons and others, 1988 in DEQ, 2008a), their results suggest that the biodegradation half-lives of PAH with more than three rings will be considerably longer (more than 20 days to hundreds of days) than for the PAHs with three or fewer rings. Mean half-lives were found to be positively correlated with log Kow and inversely correlated with log water solubility. Previous exposure of the test soils to PAHs enhanced the rate of biodegradation of low KRY Final RI Report/March 2008 5-22 molecular weight PAHs but had little effect on the loss of higher molecular weight compounds (Wild and Jones, 1993).

#### 6.3.2.3 Volatile Organic Compounds

Laboratory and field studies have shown that microorganisms mediate the degradation (biodegradation) of the common gasoline compounds (MTBE and BTEX) under both aerobic and anaerobic conditions. Aerobic microorganisms readily oxidize BTEX compounds (benzene, toluene, ethylbenzene, and xylene) while using them as primary substrates.

## 6.4 CONCEPTUAL SITE MODEL

A Site Conceptual Model (SCM) is a comprehensive representation of facility environmental conditions with respect to potential contaminant sources, release mechanisms, exposure pathways, and potential receptors. As a dynamic model, the SCM has been, and will continue to be, updated throughout the RI and risk assessment as additional Facility data are collected and evaluated. The revised SCM is shown in Table 6-1.

### 6.4.1 Primary Sources and Release Mechanisms

Primary sources identified at the Facility consist of both surface and subsurface sources and are related to past and current Facility use. Portions of the Facility have been or are currently being used for refinery operations, automotive and recreational vehicle sales, office space,

warehouse storage, tractor/trailer sales/service, highway equipment storage, road material mixing and stockpiling, meat packing, petroleum storage (above ground tank farm and underground storage tanks), and various pipeline operations. Former refinery operations also included both a TEL and a PS.

The primary release mechanisms associated with these sources include surface spills, impoundments, and operational discharges for surface sources; and leaks and operational discharges for subsurface sources.

### 6.4.2 Secondary Sources and Release Mechanisms

Secondary sources, those media that have been impacted as a result of the primary sources, were previously identified as surface soils, subsurface soils, sediments and groundwater. An additional secondary source identified through the RI is LNAPL. Secondary release mechanisms include the following:

- Fugitive dust emissions from surface soil;
- Surface water runoff from surface soil;
- Leaching from surface and subsurface soil;
- Volatile emissions from subsurface soil, groundwater, and LNAPL; and
- Excavation (i.e., trenching).

### 6.4.3 Exposure Pathways

An exposure pathway describes the course that a chemical takes from a source to a receptor. Potential exposures were identified for the Facility by considering the following four factors:

- A source of potentially toxic chemicals;
- A contaminated media, such as soil;
- An exposure or contact point with contaminated media; and
- An exposure route for chemical intake by a receptor.

An exposure pathway is considered complete when it has all four factors. Designation of an exposure pathway as complete indicates that exposure is possible, but does not necessarily mean that exposure will occur. When any one of the factors is missing in the pathway, it is considered incomplete.

Exposure pathways include surface and subsurface soil, groundwater and LNAPL, and indoor and outdoor air. Several potentially complete exposure pathways were identified for the Facility and include the following:

- Incidental ingestion of surface soil, subsurface soil, groundwater, and surface water;
- Dermal contact with surface soil, subsurface soil, sediments, surface water, groundwater and LNAPL;
- Inhalation of fugitive dust; and
- Inhalation of volatile emissions.

### 6.4.4 Receptors

Based on the current and anticipated future use of the Facility (i.e., continued industrial land use), several potential receptors were identified, as follows:

- Future on-site residential;
- Current/future, on-site commercial/industrial indoor workers;
- Current/future, on-site commercial/industrial outdoor workers;
- Current/future, on-site construction workers;
- Current/future, on-site trespassers;
- Current/future, off-site park recreators;
- Current/future, off-site commercial/industrial indoor workers;
- Current/future, off-site commercial/industrial outdoor workers;
- Current/future, off-site construction workers;
- Terrestrial ecological receptors; and
- Aquatic ecological receptors.

The Facility is located in a highly industrialized area. No significant ecological resources have been identified at the Facility at this time. The receptors and the CSM will be revised as more information is collected from off-site properties through additional investigations.

### 6.4.5 Risk Assessment

A human health risk assessment and, if necessary, a potential review of ecologically sensitive terrestrial and aquatic receptors present in the area of the Facility, will be performed for this Facility in the future. The SCM may be modified through further evaluation of data from all investigations at that time.

# 7.0 CONCLUSIONS AND RECOMMENDATIONS

Objectives of this remedial investigation were to identify potential sources/areas; characterize the nature and extent of constituents of potential concern in soil, groundwater, surface water and sediment at the Facility; provide information and data to support completion of the human health risk assessment and ecological risk assessment (if necessary); and provide information and data to evaluate future cleanup options. Data collected through this RI address those objectives.

## 7.1 CONCLUSIONS

The nature and extent of contamination was investigated through collection of surface soils, subsurface soils, groundwater, surface water and sediments. An extensive body of analyses were examined and the data was distilled to identify constituents of potential concern affecting Facility media. These data were also examined to identify potential sources/areas. Constituents of potential concern in one or more media exceeding applicable standards/screening levels include:

- Metals (arsenic, barium, chromium, lead, mercury, and selenium);
- Nitrates;
- BTEX;
- Naphthalene;
- TPH and VPH fractions;
- TEH and EPH fractions;
- PAHs;
- Tetraethyl lead;
- Asbestos; and
- Nitrate.

## 7.2 TEL/FORMER POND AREAS

Investigations in the former TEL plant area confirmed that this area, including the former and existing ponds, contains lead and hydrocarbon levels that exceed screening levels. Also in

this vicinity are former and existing ponds. This area generally extends through the area north of the tracks encompassing grids 28 to 34 and 42 to 50. Highly stained soils and some sludge-like material were encountered in surface and subsurface soils in this area. In addition, a concrete trench and separator containing oily material was cleaned out during the Interim Remedial Action Waste Disposal activities in 2013.

Metals

- Concentrations exceeding screening levels for lead in this area are seen in surface soils and shallow subsurface soils. Even though lead concentrations in the affected area diminish with depth, and lead does not appear to be highly leachable, lead concentrations above the DEQ-7 standard are present in groundwater in this vicinity (wells YMW-21 and YMW-22).
- Barium was seen above screening levels, primarily in surface soils in the former pond areas.
- Arsenic was observed above the Montana Background Threshold Value (22.5 mg/kg) in surface soils in the TEL area as well as upgradient of the TEL area and within the paint shop area of the former refinery. This may be the cause for arsenic concentrations above the DEQ-7 standard in groundwater at well YMW-22.
- Subsurface soils are impacted with TEL in isolated areas.

Hydrocarbons

- EPH fractions (C9-C18 aliphatics and C11-C22 aromatics) exceed screening levels throughout surface and subsurface soils, decreasing in extent and concentration with depth.
- VPH fractions (C9-C10 aromatics, C5-C8 aliphatics, and C9-C12 aliphatics) exceed screening levels throughout both surface and subsurface soils, but to a lesser extent in surface soils.
- Benzene is also detected above screening levels in a few instances in both surface and subsurface soils.
- PAHs exceed screening levels primarily in surface soils, but impact to subsurface soils is minimal.

## 7.3 FORMER REFINING AREA

The former refining area encompasses much of the north section of the Facility, on or near grids 1 to 8, 10 to 19, 21 to 27, 36 to 41 and overlaps with the TEL/Pond areas. Within the former refining area, is a LNAPL plume area, on or near grids 3 to 8, 12 to 17, 23 to 29, 38 to 43, 55 to 58 and 62 to 64 with free phase LNAPL; and the PS area, grids 9, 10, 20, 21 and 36.

Metals

- Lead (analyzed as total lead) exceeds screening levels in surface soils in the mid-section of this area, overlapping the TEL/Pond Area. However, lead concentrations decrease in concentration with depth in areas within grids 25, 26 and 39 (in LNAPL plume area).
- Lead, arsenic, mercury, and barium exceed screening levels in surface soils in both the PS and former refining areas.

Hydrocarbons

- EPH fractions (C9-C18 aliphatics and C11-C22 aromatics) exceed screening levels in all sampled soils in the former refining area.
- VPH constituents (C9-C10 aromatics, C5-C8 aliphatics, and C9-C12 aliphatics) exceed screening levels in the LNAPL plume area in surface soils and these constituents also exceed screening levels across the former refining area in subsurface soils.
- Benzene exceeds screening levels in surface soils in grids 4 to 5, 12 to 14, 24 to 25, 39 and benzene is also detected across the LNAPL plume area in subsurface soils.
- Ethylbenzene and naphthalene exceed screening levels in subsurface soils throughout the former refining area.
- Xylene exceedances were limited to subsurface soils in grids 6, 15-17, 26 and 39.
- PAHs, including naphthalene exceed screening levels in surface soil, but concentrations diminish with depth.
- Groundwater in the plume area is impacted primarily with LNAPL; benzene, VPH and EPH fractions exceed screening levels/standards in the LNAPL plume area.

## FORMER OIL LOADING/RECOVERY AREA

A former oil loading and oil recovery area was located south of tracks, and east of the meat packing plant in or near grids 54 to 64.

Metals

- Lead was detected only sporadically in surface soils at concentrations above screening levels.
- Barium is detected above leaching to groundwater screening levels in surface soils in much of this area.

Hydrocarbons

Surface soils contain VPH fractions (C9-C10 aromatics, C5-C8 aliphatics and C9-C12 aliphatics) and EPH fractions (C9-C18 aliphatics and C11-C22 aromatics) above screening levels near the former oil recovery system in grids 61 to 63, near YMW-18. EPH and VPH constituents and naphthalene are also present above screening levels in subsurface soils within this area.

## 7.4 SURFACE WATER AND SEDIMENTS

Arsenic and selenium in surface water and metals (primarily arsenic, lead, and selenium), toluene, and PAHs in sediments were detected at concentrations above standards/screening levels. These constituents are present in upstream sample locations as well as throughout the reach of the Yegen Ditch across the Facility. Surface soils along the Yegen Ditch do not contain concentrations of arsenic and selenium above screening levels. While no observable trends exists from upstream to downstream sediments, the shallow (0 to 6 inch) interval of YD-1 typically contained higher concentrations of PAHs than the other locations; however, PAHs were detected more often at YD-4. Sediments from YD-3 contained higher concentrations of EPH and VPH constituents than the other locations. Surface water and sediment were not collected from the former refinery ponds and were not included in comparison to screening/cleanup levels.

## 7.5 GROUNDWATER

Groundwater fluctuations are influenced by the Yellowstone River. The extent of the hydrocarbon impacted area appears to be confined with the Yegen Ditch acting as a hydraulic barrier. Both lighter and heavier hydrocarbons, as well as benzene impacts are measured in groundwater in areas north of Yegen Drain. Lead detected groundwater above DEQ-7 standards near the former TEL plant/pond area is consistent with lead contamination in surface and subsurface soils. Arsenic was detected in groundwater above DEQ-7 standards at monitoring wells YMW-12, YMW-18, YMW-22, MW02 and MW03. Arsenic is present in shallow soils near the PS area as well as within the rail road right-of-way corridor north of the rail road tracks.

Elevated nitrate is present in facility monitoring wells. Nitrate concentrations in many of the wells may likely be related to livestock uses. The area historically was used to contain stock for slaughter, and a current stockyard is still in use upgradient of the Facility. Upgradient wells YMW-10, YMW-11 and MW01, all contain nitrates above the DEQ-7 standard/MCL as do other Facility wells including YMW-19, MW03 and MW-6.

## 7.6 ADDITIONAL AREAS

- PAHs in surface soils on the east side of TRACT 1A exceed screening levels.
- EPH fractions exceed screening levels in subsurface soils near grids 80 to 81.
- TRACT 5 - Screening level exceedances in shallow soils are present in the CHS tank farm. These include lead, EPH fractions and PAHs. These screening level exceedances are primarily on the south side of the tank farm in a topographical low spot, which has historically been flooded.
- Screening levels were not exceeded in soils in Tract 2B, and the west and southwest portions of Tract 1A.
- Surface soils along the Yegen Ditch did not appear to have significant impacts from COPCs, with only PAHs in surface soils exceeding screening levels.
- Asbestos was confirmed in surface debris on the MDT property and railroad ROW south and east of the MDT building.

## 7.7 RECOMMENDATIONS

Based on the results of this RI, the following recommendations are proposed:

- The LNAPL impacted area is generally defined to the west and the east; however, the northern extent and southern extents are less defined. Installation of two additional wells in these areas (west and southeast of the meat packing plant) and two wells north of the highway in the fairgrounds area are recommended to provide delineation.
- LNAPL thickness varied greatly. Presently, monthly water level/LNAPL monitoring is being conducted. It is recommended that this practice continue to gain a better understanding of the mechanism(s) driving these fluctuations laterally and vertically. Continued monthly product recovery is also recommended from wells containing LNAPL.
- Hydrocarbon concentrations in groundwater from wells in or near the impacted area include both lighter and heavier hydrocarbons with higher concentrations of benzene, particularly in wells YMW-12, YMW-14, YMW-15 and YMW-20. While it is possible that some entrained LNAPL was contained in these samples, fingerprinting of the LNAPL is recommended to further understand the type or types of LNAPL present and if there is a possibility of multiple sources and a co-mingled plume.
- Hydrocarbons in surface and subsurface soils exist throughout the Former Refining Area and TEL/Former Pond Areas. Additional soil sampling for VPH and EPH is recommended to better delineate the extent of impacts to the north and east (near YMW-23) of the Facility.
- The extent of metals contamination in surface soils west and south of the PS is not well defined. Additional surface soil sampling is recommended west of grids 20 and 36 for arsenic, barium, and lead.
- Although the area of impacts near Tract 5 appeared to be limited to low lying areas, additional soil sampling to the south of grids 99, 100 and 109 is recommended to confirm that VPH, EPH, and metals contamination does not extend further south.
- Additional investigation and abatement of SAM in surface soils in the vicinity of MDT is necessary.

# 8.0 REFERENCES


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**TABLE 1-1**
**POTENTIAL SOURCES AND KNOWN RELEASES**
**Yale Oil of South Dakota CECRA Facility**
**700 First Avenue North, Billings, Montana**

| Date | Designation | Location | Product or Contaminants of Concern | Analytical Results | Investigation | Description | Source |
|---|---|---|---|---|---|---|---|
| 10/19/29 | Gas AST Leak | Yale Oil Refinery: Gas AST | 5,055 gallons of gasoline | None | None | Hole drilled in gasoline AST to steal gas; tank leaked gasoline onto ground until it was empty. | *Billings Gazette*, October 20, 1929 |
| 1934 | Overturned Vat | Yale Oil Refinery: Vat | Unknown | None | None | | Conoco, 2000 |
| 07/27/35 | Tank 59 Fire | Yale Oil Refinery: Tank 59 | <1,200 barrels of road oil | None | None | Tank 59 exploded during welding. Adjacent oil and grease warehouses also burned. | *Billings Gazette*, July 28, 1935. |
| April1944 | Midland Seepage | Midland Empire Packing Company | Crude oil | None | None | Midland filed a lawsuit claiming crude oil was seeping through the floors and walls of its property. | *Midland* v. *Yale*, 1936 |
| 1946 - 1949 | WasteOil Recovery System | Yale Oil Refinery & Midland Empire Packing Company | Crude oil (<30,000 barrels of oil) | None | None | A waste-oil recovery system operated from 1946 to 1949 at the Yale Oil Refinery. Four seepage wells were located at the Yale Oil Refinery and 2 seepage wells were located at the Midland Empire Packing Company. | ExxonMobil, 2001 |
| 03/10/55 | YPL Pump Station | Yellowstone Pipeline: Leak | 5 barrels premium gasoline | None | None | Gasket failure caused a release from a pump station manifold. | Conoco, 2000 |
| 1973 | DMA UST Leak | Department of Military Affairs | <1,000 gallons gasoline | None | None | DMA removed a gasoline UST due to structural failure indicated by water intrusion. | Ecology, 1989b |
| 06/10/91 | Tank 282 Leak | CHS Inc. Tank Farm: Tank 282 | Gasoline and diesel | Maximum Concentrations<br>Benzene: 17,000 ug/L TPH: 1,090,000 ug/L | Trenches were excavated to determine the extent of contamination. Groundwater monitoring wells and sumps were installed. | An underground 10-inch diameter suction line from Tank 282, near the YPL booster pump leaked gasoline and diesel into groundwater and the Yegen Ditch. | Cenex, 2000; DEQ, 2005; LSE, |
| 11/15/91 | MDU Trench | MTDT: MDU pipeline relocation | Petroleum material | None | COP pressure tested a nearby pipeline. No leaks were found. | MDU excavated a trench on MTDT property to relocate a natural gas pipeline and observed oil staining and oily water seeping into the excavation. | DEQ, 1991 |
| 02/03/92 | SPL Pump Station | Seminoe Pipeline: Leak | 1 barrel of #2 diesel | None | None | A drain line was left open during maintenance of the pump station unit | Conoco, 2000 |
| 03/27/92 | HWY 87 Trenches | MTDT: HWY 87 North of MTDT | Hydrocarbons and lead | Maximum Concentrations<br>TPH :1,270 mg/kg<br>Barium: 310 mg/kg<br>Chromium: 28 mg/kg | Text pits were excavated to a maximum depth of 5 feet bgs. | Braun Intertec conducted a subsurface investigation of Highway 87 for the MTDT, consisting of the excavation of five test pits . | Braun, 1992 |
| 02/01/93 | Seminoe Pipeline | CHS Inc. Tank Farm: SPL | 200 barrels of product (diesel and gasoline) | Maximum Concentrations<br>TPH: 56,000 ug/L<br>Benzene: 140 ug/L | Trenches were excavated to determine the extent of contamination. Groundwater monitoring wells were installed. | An underground 8-inch diameter Seminoe pipeline leaked gasoline and diesel on the western portion of the CHS Inc. tank farm | Conoco, 2007<br>DEQ, 2008 |
| 12/28/93 | YPL Pump Station | Yellowstone Pipeline: Leak | 1 barrel of #2 diesel | None | None | Seal drain backed up and caused a release from a pump station yard booster. | Conoco, 2000 |
| 2102194 | YPL Pump Station | Yellowstone Pipeline: Leak | 2 gallons of regular unleaded gasoline | None | None | Seal drain backed up and caused a release from a pump station sample shack. | Conoco, 2000 |
| 05/13/94 | YPL Pump Station | Yellowstone Pipeline: Leak | 2 gallons of regular unleaded gasoline | None | None | Pressure gauge failed and caused a release from a pump station manifold. | Conoco, 2000 |
| 71069 | COP Trenches | BNSF: Seminoe Pipeline | Crude oil | Maximum Concentrations<br>Benzene: 30.8 ug/L | DEQ sampled water from one of the trenches. | COP excavated two trenches on BNSF property to perform routine maintenance and replace valves on a Seminoe Pipeline. Oil was | DEQ, 1994 |
| 07/29/94 | BNSF Illegal Dumping Investigation | BNSF: Olympus Investigation | Crude oil, used oil, tar, enamel, lacquer reducer, jet seal, and xylenes | None | Tana Industries claimed and removed the buckets. The trench and sump appear to be remnants of the Yale Oil Refinery. | Olympus Environmental, Inc. investigated illegal dumping on BNSF property and found 40 abandoned 55-gallon drums (12 had used oil or oily water), an AST with tar beneath it and portable tar distributor, an oil filled trench and sump and fifty 5-gallon bucketsiabeled enamel, lacquer reducer, jet seal, and xylenes; 15 buckets appeared to be set | Olympus, 1994 |
| 01/05/95 | SPL Pump Station | Seminoe Pipeline: Leak | 5 gallons of #2 diesel | None | None | A drain line backed up and caused a release from a pump station unit | Conoco, 2000 |
| 03/29/95 | DEQ Test Pit | Tract A: DEQ Investigation | Petroleum material | Maximum Concentrations<br>GRO: 3,500 mg/kg<br>DRO: 11,000 mg/kg | DEQ dug a test pit using a backhoe and collected soil samples at 8 feet bgs. | NAPL was observed in the excavation and the DEQ noted "the product is highly weathered gasoline, [and] probably contains jet fuel, | DEQ, 1995 |
| 12/04/97 | YPL Pump Station | Yellowstone Pipeline: Leak | 2 barrels of #2 diesel | None | None | Overflow protection failed and caused a release from a pump station sump. | Conoco, 2000 |
| 8/4/98 | YPL Pump Station | Yellowstone Pipeline: Leak | 5 gallons of regular unleaded gasoline | None | None | Employee left a bleeder open on a four-way valve and caused a release from a pump station meter prover four-way valve. | Conoco, 2000 |
| 10/29/98 | YPL Pump Station | Yellowstone Pipeline: Leak | 1 barrel of #2 diesel | None | None | Overflow protection failed and caused a release from a pump station sump. | Conoco,2000 |
| December 1998 | MPC Transformer | BNSF: Transformer Oil Leak | 160 gallons 90 ppm PCB transformer oil | Maximum Concentrations PCB in soil: 533 mg/kg<br>PCB in groundwater: 110 ug/L | Soil with petroleum hydrocarbons was excavated and removed. Hydropunch borings were drilled. A groundwater monitoring well was installed. | An MPC transformer on BNSF property was vandalized and released PCB transformer oil. | MPC, 1999; MPC, 2000; Olympus, 1999 |

**TABLE 1-1**
**POTENTIAL SOURCES AND KNOWN RELEASES**
**Yale Oil of South Dakota CECRA Facility**
**700 First Avenue North, Billings, Montana**

| Date | Designation | Location | Product or Contaminants of Concern | Analytical Results | Investigation | Description | Source |
|---|---|---|---|---|---|---|---|
| 4/6/99 | YPL Pump Station | Yellowstone Pipeline: Leak | 3 gallons of#2 diesel | None | None | Drain line was mistakenly cut during maintenance and caused a release from a pump station manifold area. | Conoco. 2000 |
| December 1999 | Yale Oil Refinery TEL Plant | BNSF: TEL Plant Investigation | Organic and inorganic lead | Maximum Concentrations<br>Inorganic lead: 7,000 mg/kg<br>Organic lead: 2.9 mg/kg<br>Inorganic lead: 170 (ug/L)<br>Organic lead: 96 (ug/L) | DEQ collected surface water and soil samples from the vicinity of the former TEL Plant. | DEQ investigation found lead concentrations at levels exceeding both federal and state standards in soil and water samples. | DEQ, 2000a |
| 2000 | COP Trench | BNSF: pipeline trench | Petroleum material | None | None | COP excavated a trench for replacement of a pipeline segment on BNSF property and observed soil containing petroleum. | DEQ, 2011 |
| 6/14/00 | Goldstar | Tract C: Goldstar Investigation | Waste oil, motor oil | None | Sump and drums were left behind by former tenant Tana Industries | DEQ found a sump full of an oil/water mixture, two drums of the oil/water mixture, and two drums of used-oil that burst and leaked after freezing and thawing, impacting soil around the drums with used oil. | DEQ, 2000b; EDR, 2011a |
| 6/26/00 | YPL Pump Station | Yellowstone Pipeline: Leak | 2 gallons of gasoline | **None** | **None** | Gasket on tapping saddle failed and caused a release from a pump station manifold area | Conoco, 2000 |
| 6/29/00 | Drinking Water | Tract 1-A: Tap Water | Petroleum material | No VOCs associated with petroleum products were detected. | DEQ collected water samples from tap water. | A resident of a home on Tract 1-A complained of tap water smelling of petroleum; the PVC water line supplying the house ran through an area known to contain petroleum-impacted soil in the area of a COP pipeline | DEQ, 2000c; DEQ, 2011 |
| 2004 | COP Trenches | BNSF: pipeline trenches | Lead and hydrocarbons | Lead concentrations between 935 mg/kg and 2,890 mg/kg and TPH concentrations between 13,000 mg/kg and 47,000 | Soil samples collected from trenches. | COP dug trenches in the vicinity of the former TEL plant as part of pipeline maintenance work. | DEQ, 2011 |
| 11/25/13 | Phillips 66 Pipeline | Seminoe Pipeline Pump Station | 77 gallons of #2 gasoline | Maximum Concentrations<br>C9-C10 Aromatics: 412 mg/kg<br>C5-C8 Aliphatics: 263 mg/kg<br>Benzene: 6.6 mg/kg<br>Naphthalene 38.8 mg/kg | Soil with petroleum hydrocarbons was excavated and removed on two occasions (11/13 and 12/13). Soil removal terminated on the top of historical impacted soils. 46 cubic yards were removed. | Following pump maintenance, a valve was inadvertently left open and gasoine was discharged to the ground when the pump was started. | Tetra Tech, 2014b |

**Notes:**

ug/g = Micrograms per gram.
ug/L = Micrograms per liter.
AST = Aboveground storage tank.
BNSF = Burlington Northern Santa Fe.
COP = ConocoPhillips.
DEQ = Montana Department of Environmental Quality.
DMA = Department of Military Affairs.
feet bgs = Feet below ground surface.
HWY = Highway.
MDU = Montana-Dakota Utilities Company.
mg/kg = Milligrams per kilogram.
MPC = Montana Power Company.
MTDT = Montana Department of Transportation.
NAPL = Non-aqueous phase liquid.
PCB = Polychlorinated biphenyls.
ppm = Parts per million.
PVC = Polyvinyl chloride.
SPL = Seminoe Pipeline.
TEL = Tetra ethyl lead.
TPH = Total petroleum hydrocarbons.
TPHd = Total petroleum hydrocarbons as diesel.
TPHg = Total petroleum hydrocarbons as gasoline.
GRO = Gasoline-range organics.
DRO = Diesel-range organics.
UST = Underground storage tank.
VOCs = Volatile organic compounds.
YPL = Yellowstone Pipeline.

## Table 3-1. Groundwater Monitoring Well Construction Details

RI Groundwater Monitoring Network Wells
Yale Oil of South Dakota CECRA Facility
Billings, Montana

| Well I.D. | Tract | Date Installed | Surveyed Coordinates* | | Ground Surface* | M.P.* Elevation | Protective Seal ^ | | Filter Sand ^ | | | Well Screen ^ | | | | Cased Well ^ | | Drilled Depth ^ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northing | Easting | Elevation | (Top of PVC) | Top | Bottom | Elevation | < Top | Bottom | Elevation | < Top | Bottom > | Elevation | Bottom > | Elevation | Bottom |
| **Pre-Existing Monitoring Wells:** | | | | | | | | | | | | | | | | | | |
| MW01 # | 1A | 09/08/11 | 563771.58 | 2228413.18 | 3104.18 | 3106.65 | 0.00 | 5.50 | 3101.10 | 5.55 | 15.55 | 3101.10 | 5.55 | 15.55 | 3091.10 | 15.55 | 3091.10 | 15.55 |
| MW02 # | 1A | 09/09/11 | 563952.66 | 2229654.60 | 3099.80 | 3101.82 | 0.00 | 9.38 | 3092.44 | 9.38 | 19.38 | 3092.44 | 9.38 | 19.38 | 3082.44 | 19.38 | 3082.44 | 19.38 |
| MW03 # | 1A | 09/09/11 | 564431.61 | 2229312.72 | 3101.94 | 3103.64 | 0.00 | 6.03 | 3097.61 | 6.03 | 16.03 | 3097.61 | 6.03 | 16.03 | 3087.61 | 16.03 | 3087.61 | 16.03 |
| MW-4 + | 5 | 09/05/91 | 565167.43 | 2230586.99 | 3099.56 | 3102.41 | 0.00 | 2.30 | 3097.26 | 2.30 | 17.50 | 3097.06 | 2.50 | 17.50 | 3082.06 | n/a | | 19.48 |
| MW-6 + | 5 | 09/05/91 | 564957.41 | 2230488.89 | 3098.35 | 3100.47 | 0.00 | 4.00 | 3094.35 | 4.00 | 22.25 | 3093.35 | 5.00 | 22.25 | 3076.10 | n/a | | 22.21 |
| **Recent Monitoring Wells:** | | | | | | | | | | | | | | | | | | |
| YMW-10 | A | 04/24/13 | 564497.82 | 2228208.09 | 3,106.53 | 3106.26 | 0.50 | 3.30 | 3103.23 | 3.30 | 15.00 | 3101.53 | 5.00 | 15.00 | 3091.53 | 15.00 | 3091.53 | 15.00 |
| YMW-11 | RR ROW | 04/24/13 | 564140.37 | 2228283.70 | 3,106.15 | 3108.40 | 1.00 | 4.50 | 3103.90 | 4.50 | 15.00 | 3103.40 | 5.00 | 15.00 | 3093.40 | 15.00 | 3093.40 | 15.00 |
| YMW-12 | B | 04/30/13 | 564421.07 | 2228516.25 | 3,105.31 | 3104.89 | 1.00 | 3.00 | 3101.89 | 3.00 | 10.00 | 3100.39 | 4.50 | 14.50 | 3090.39 | 15.00 | 3089.89 | 15.00 |
| YMW-13 | RR ROW | 04/26/13 | 564350.00 | 2228667.67 | 3,105.81 | 3108.05 | 1.00 | 4.00 | 3104.05 | 4.00 | 15.00 | 3103.05 | 5.00 | 15.00 | 3093.05 | 15.00 | 3093.05 | 15.00 |
| YMW-14 | C | 04/29/13 | 564579.65 | 2228679.36 | 3,104.71 | 3107.12 | 1.00 | 3.00 | 3104.12 | 3.00 | 11.00 | 3102.12 | 5.00 | 15.00 | 3092.12 | 10.00 | 3097.12 | 15.00 |
| YMW-15 | D | 05/02/13 | 564856.41 | 2228764.99 | 3,105.40 | 3105.07 | 1.00 | 3.00 | 3102.07 | 3.00 | 13.00 | 3100.24 | 4.83 | 14.83 | 3090.24 | 14.83 | 3090.24 | 15.00 |
| YMW-16 | RR ROW | 04/30/13 | 564705.43 | 2229031.26 | 3,102.00 | 3104.28 | 1.00 | 2.20 | 3101.78 | 2.50 | 8.00 | 3100.78 | 3.50 | 13.50 | 3090.78 | 13.50 | 3090.78 | 15.00 |
| YMW-17 | RR ROW | 04/30/13 | 564657.09 | 2229159.07 | 3,102.59 | 3104.81 | 1.20 | 2.60 | 3102.21 | 2.60 | 7.00 | 3100.81 | 4.00 | 14.00 | 3090.81 | 14.00 | 3090.81 | 14.00 |
| YMW-18 | RR ROW | 05/02/13 | 564364.89 | 2229058.01 | 3,101.26 | 3103.56 | 1.00 | 2.50 | 3101.06 | 2.50 | 13.00 | 3099.36 | 4.20 | 14.20 | 3089.36 | 14.20 | 3089.36 | 15.00 |
| YMW-19 | 1A | 04/26/13 | 564872.17 | 2229466.39 | 3,101.50 | 3103.74 | 1.00 | 2.50 | 3101.24 | 2.50 | 12.00 | 3098.74 | 5.00 | 15.00 | 3088.74 | 15.00 | 3088.74 | 15.00 |
| YMW-20 | MDT | 04/25/13 | 565050.28 | 2229305.65 | 3,101.81 | 3101.56 | 1.00 | 3.50 | 3098.06 | 3.50 | 14.40 | 3097.16 | 4.40 | 14.40 | 3087.16 | 14.40 | 3087.16 | 15.00 |
| YMW-21 | RR ROW | 04/29/13 | 564811.77 | 2229198.95 | 3,102.10 | 3104.32 | 1.00 | 3.00 | 3101.32 | 3.00 | 9.00 | 3099.62 | 4.70 | 14.75 | 3089.57 | 14.75 | 3089.57 | 15.00 |
| YMW-22 | RR ROW | 04/25/13 | 564968.33 | 2229552.07 | 3,102.11 | 3104.89 | 1.00 | 3.00 | 3101.89 | 3.00 | 10.50 | 3100.89 | 4.00 | 14.00 | 3090.89 | 14.00 | 3090.89 | 15.00 |
| YMW-23 | RR ROW | 04/25/13 | 565367.71 | 2230184.35 | 3,099.42 | 3102.12 | 1.00 | 4.00 | 3098.12 | 4.00 | 5.50 | 3097.12 | 5.00 | 15.00 | 3087.12 | 15.00 | 3087.12 | 15.00 |

| | | |
|---|---|---|
| * | = | State Plane Coordinate system (survey by Hydrometrics, Inc. 2013) |
| # | = | Installed for Agri-Systems, Inc. - Abbreviated Data Summary Report for 600 Minnesota Ave (Portage Inc., 2011) |
| ^ | = | feet below Ground Surface elevation. |
| + | = | Installed for CHS (Cenex Tank Farm) |
| M.P. | = | Measuring Point at top of PVC casing |

## TABLE 4-1. YEGEN DITCH FLOW MEASUREMENTS

| SUMMARY OF SURFACE WATER FLOW (CFS) | | |
|---|---|---|
| **SITE** | **DATE** | |
| | **7/16/2013** | **9/4/2013** |
| YD-1 | 7.6 | 4.4 |
| YD-2 | N/A | N/A |
| YD-3 | 7.3 | 4.6 |
| YD-4 | 6.8 | 4.3 |
| YD-5 | 6.9 | 4.7 |

TABLE 4-2. YELLOWSTONE RIVER DISCHARGE

USGS Home
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USGS Surface-Water Monthly Statistics for Montana

**The statistics generated from this site are based on approved daily-mean data and may not match those published by the USGS in official publications. The user is responsible for assessment and use of statistics from this site. For more details on why the statistics may not match, click here.**

## USGS 06214500 Yellowstone River at Billings MT

**Available data for this site** Time-series: Monthly statistics GO

Yellowstone County, Montana
Hydrologic Unit Code 10070007
Latitude 45°48'00.43", Longitude 108°28'04.91" NAD83
Drainage area 11,805 square miles
Contributing drainage area 11,414.30 square miles
Gage datum 3,081.36 feet above NGVD29

**Output formats**
HTML table of all data
Tab-separated data
Reselect output format

**00060, Discharge, cubic feet per second,**
**Monthly mean in ft3/s (Calculation Period: 1928-10-01 -> 2012-09-30)**
**Calculation period restricted by USGS staff due to special conditions at/near site**

| YEAR | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1928 | | | | | | | | | | 4,811 | 4,167 | 3,367 |
| 1929 | 2,921 | 2,750 | 4,270 | 4,152 | 9,665 | 22,140 | 13,720 | 4,688 | 3,773 | 3,386 | 2,800 | 2,000 |
| 1930 | 2,200 | 3,500 | 3,000 | 5,311 | 8,763 | 15,360 | 8,203 | 6,708 | 4,107 | 4,746 | 2,956 | 2,304 |
| 1931 | 2,377 | 2,534 | 2,468 | 2,894 | 7,276 | 16,100 | 3,774 | 2,811 | 2,517 | 3,042 | 2,283 | 2,214 |
| 1932 | 1,887 | 1,559 | 3,471 | 2,683 | 11,740 | 25,180 | 13,210 | 4,087 | 3,282 | 3,193 | 2,947 | 1,579 |
| 1933 | 1,520 | 1,654 | 2,608 | 2,912 | 7,772 | 26,280 | 7,570 | 3,810 | 4,020 | 2,944 | 3,146 | 2,500 |
| 1934 | 3,000 | 2,346 | 2,489 | 4,709 | 10,300 | 9,849 | 3,410 | 1,705 | 1,880 | 2,516 | 2,344 | 2,061 |
| 1935 | 2,111 | 2,449 | 2,043 | 2,595 | 7,023 | 22,310 | 12,450 | 3,804 | 2,616 | 2,483 | 3,013 | 2,287 |



| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1996 | 2,690 | 3,740 | 3,623 | 6,006 | 15,800 | 43,280 | 19,550 | 5,821 | 4,001 | 4,531 | 4,200 | 3,438 |
| 1997 | 3,398 | 4,382 | 4,396 | 5,725 | 24,070 | 53,910 | 21,130 | 9,776 | 6,248 | 5,714 | 4,549 | 3,476 |
| 1998 | 3,038 | 2,971 | 2,997 | 3,962 | 11,330 | 19,140 | 17,300 | 6,531 | 3,980 | 4,197 | 3,664 | 2,755 |
| 1999 | 2,877 | 2,599 | 2,635 | 3,227 | 12,440 | 27,410 | 14,180 | 6,064 | 4,665 | 3,685 | 3,115 | 2,723 |
| 2000 | 2,412 | 2,273 | 2,341 | 3,719 | 12,850 | 18,660 | 7,565 | 2,667 | 2,455 | 3,450 | 2,609 | 2,092 |
| 2001 | 1,896 | 1,790 | 2,055 | 2,232 | 9,783 | 11,210 | 4,936 | 1,462 | 1,527 | 2,128 | 2,345 | 1,777 |
| 2002 | 1,608 | 1,654 | 1,767 | 2,547 | 9,352 | 22,950 | 8,308 | 2,827 | 2,395 | 2,918 | 2,598 | 2,383 |
| 2003 | 2,193 | 2,263 | 3,155 | 3,912 | 12,310 | 22,410 | 8,034 | 2,678 | 2,350 | 2,627 | 2,617 | 2,287 |
| 2004 | 1,997 | 1,990 | 2,075 | 3,381 | 6,781 | 14,140 | 8,823 | 2,659 | 3,126 | 3,905 | 3,302 | 2,540 |
| 2005 | 2,423 | 2,098 | 2,132 | 3,280 | 16,210 | 19,390 | 9,034 | 3,311 | 2,498 | 3,836 | 3,675 | 3,082 |
| 2006 | 2,778 | 2,445 | 2,488 | 4,275 | 16,500 | 18,930 | 6,896 | 2,386 | 2,356 | 3,921 | 3,539 | 2,723 |
| 2007 | 2,251 | 2,404 | 2,859 | 4,292 | 15,190 | 14,910 | 4,098 | 2,150 | 2,132 | 3,275 | 3,031 | 2,425 |
| 2008 | 2,136 | 2,290 | 2,191 | 2,397 | 12,920 | 30,710 | 22,290 | 5,649 | 4,388 | 4,131 | 3,687 | 2,497 |
| 2009 | 2,552 | 2,626 | 2,727 | 5,413 | 18,020 | 29,720 | 15,400 | 5,964 | 3,208 | 4,219 | 3,707 | 2,285 |
| 2010 | 2,324 | 2,298 | 2,553 | 3,588 | 7,246 | 27,930 | 13,750 | 4,920 | 4,563 | 3,743 | 3,412 | 3,145 |
| 2011 | 2,626 | 2,349 | 3,033 | 3,877 | 19,540 | 40,190 | 38,150 | 9,894 | 4,962 | 4,484 | 4,116 | 3,099 |
| 2012 | 2,904 | 2,854 | 3,008 | 5,942 | 12,880 | 22,970 | 9,076 | 3,171 | 2,258 | | | |
| Mean of monthly Discharge | 2,470 | 2,620 | 2,970 | 4,120 | 12,800 | 25,200 | 13,600 | 5,070 | 3,950 | 3,980 | 3,540 | 2,780 |

**Table 4-3. Monthly Groundwater Levels and LNAPL Thickness**
**Groundwater Monitoring Network Wells, Yale Oil of South Dakota CECRA Facility**

| | Well I.D. | M.P. * Elevation | Monitoring Date | 5/16/2013 | 6/ 3-7 /13 | 7/ 16-26 /13 | 8/ 14-21 /13 | 09/09/13 | 10/02/13 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Thickness in ft. Depth in ft. below M.P. at top of PVC casing. | | | | | |
| Pre-Existing Monitoring Wells | MW01 | 3106.65 | Product Thickness | | | | | | |
| | | | Groundwater Depth | | 8.36 | | 9.04 | 8.65 | 8.22 |
| | | | Groundwater Elevation | | 3098.29 | | 3097.61 | 3098 | 3098.43 |
| | MW02 | 3101.82 | Product Thickness | | | | | | |
| | | | Groundwater Depth | | 4.23 | | 7.91 | 5.25 | 6.64 |
| | | | Groundwater Elevation | | 3097.59 | | 3093.91 | 3096.57 | 3095.18 |
| | MW03 | 3103.64 | Product Thickness | | | | | | |
| | | | Groundwater Depth | | 6.63 | | 7.97 | 5.88 | 6.98 |
| | | | Groundwater Elevation | | 3097.01 | | 3095.67 | 3097.76 | 3096.66 |
| | MW-4 | 3102.41 | Product Thickness | | | | | | |
| | | | Groundwater Depth | | 11.73 | | 15.03 | 14.68 | 13.99 |
| | | | Groundwater Elevation | | 3090.68 | | 3087.38 | 3087.73 | 3088.42 |
| | MW-6 | 3100.47 | Product Thickness | | | | | | |
| | | | Groundwater Depth | | 8.58 | | 12.07 | 11.56 | 11.04 |
| | | | Groundwater Elevation | | 3091.89 | | 3088.4 | 3088.91 | 3089.43 |
| Recent Monitoring Wells (Installed 2013) | YMW-10 | 3106.26 | Product Thickness | | | | | | |
| | | | Groundwater Depth | 10.81 | 8.85 | | 9.51 | 8.96 | 8.78 |
| | | | Groundwater Elevation | 3095.45 | 3097.41 | | 3096.75 | 3097.3 | 3097.48 |
| | YMW-11 | 3108.4 | Product Thickness | | | | | | |
| | | | Groundwater Depth | 11.75 | 10.41 | 10.91 | 11.14 | 10.66 | 10.41 |
| | | | Groundwater Elevation | 3096.65 | 3097.99 | 3097.49 | 3097.26 | 3097.74 | 3097.99 |
| | YMW-12 | 3104.89 | Product Thickness | 0.01 | | | 1.6 | | sheen |
| | | | Groundwater Depth | 8.44 | | 7.5 | 9.4 | 7.55 | 7.24 |
| | | | Groundwater Elevation | 3096.45 | | 3097.39 | 3096.84 | 3097.34 | 3097.65 |
| | YMW-13 | 3108.05 | Product Thickness | 0.81 | | 0.22 | 1.1 | 2.8 | 1.13 |
| | | | Groundwater Depth | 12.36 | | 10.68 | 12 | 13 | 11.34 |
| | | | Groundwater Elevation | 3096.38 | | 3097.56 | 3096.99 | 3097.43 | 3097.67 |
| | YMW-14 | 3107.12 | Product Thickness | 0.03 | | | 0.9 | | sheen |
| | | | Groundwater Depth | 10.81 | | 9.76 | 10.9 | 9.9 | 9.54 |
| | | | Groundwater Elevation | 3096.33 | | 3097.36 | 3096.98 | 3097.22 | 3097.58 |
| | YMW-15 | 3105.07 | Product Thickness | | | | 0.2 | 0.04 | |
| | | | Groundwater Depth | 8.94 | 7.86 | 8.15 | 8.5 | 8.28 | 7.87 |
| | | | Groundwater Elevation | 3096.13 | 3097.21 | 3096.92 | 3096.74 | 3096.83 | 3097.2 |
| | YMW-16 | 3104.28 | Product Thickness | sheen | sheen | 1.39 | 0.75 | 0.71 | 5.46 |
| | | | Groundwater Depth | 8.48 | 7.79 | 8.54 | 8.55 | 8.13 | 12.07 |
| | | | Groundwater Elevation | 3095.8 | 3096.49 | 3096.92 | 3096.37 | 3096.75 | 3096.84 |
| | YMW-17 | 3104.81 | Product Thickness | | sheen | 0.62 | 2.15 | 0.02 | 0.74 |
| | | | Groundwater Depth | 9.25 | 8.1 | 8.46 | 10.6 | 8.1 | 8.72 |
| | | | Groundwater Elevation | 3095.56 | 3096.71 | 3096.87 | 3096.03 | 3096.72 | 3096.71 |
| | YMW-18 | 3103.56 | Product Thickness | 0.08 | | | 0.02 | | |
| | | | Groundwater Depth | 7.8 | | 9.43 | 7.08 | 6.69 | 6.31 |
| | | | Groundwater Elevation | 3095.83 | | 3094.13 | 3096.50 | 3096.87 | 3097.25 |
| | YMW-19 | 3103.74 | Product Thickness | | | | | | sheen |
| | | | Groundwater Depth | 9.68 | 6.32 | 7.51 | 8.7 | 7.27 | 7.3 |
| | | | Groundwater Elevation | 3094.06 | 3097.42 | 3096.23 | 3095.04 | 3096.47 | 3096.44 |
| | YMW-20 | 3101.56 | Product Thickness | | | | | | |
| | | | Groundwater Depth | 6.74 | 5.55 | | 6.2 | 5.79 | 5.73 |
| | | | Groundwater Elevation | 3094.82 | 3096.01 | | 3095.36 | 3095.77 | 3095.83 |
| | YMW-21 | 3104.32 | Product Thickness | | | | 0.04 | | |
| | | | Groundwater Depth | 9.04 | 7.82 | | 8.6 | 8.09 | 7.96 |
| | | | Groundwater Elevation | 3095.28 | 3096.5 | | 3095.76 | 3096.23 | 3096.36 |
| | YMW-22 | 3104.89 | Product Thickness | | | | | | |
| | | | Groundwater Depth | 10.82 | 9.67 | | 10.42 | 10.17 | 9.98 |
| | | | Groundwater Elevation | 3094.07 | 3095.22 | | 3094.47 | 3094.72 | 3094.91 |
| | YMW-23 | 3102.12 | Product Thickness | | | | | | |
| | | | Groundwater Depth | 11.02 | 9.19 | | 11.01 | 10.03 | 10.18 |
| | | | Groundwater Elevation | 3091.1 | 3092.93 | | 3091.11 | 3092.09 | 3091.94 |

* US SP MT 2500 Coordinate system (survey by Hydrometrics, Inc. 2013)

# Table 4-4. Aquifer Testing Results in Groundwater Monitoring Wells

| Monitoring Well ID | Test Date | Test Type | Test Duration (min.) | Pumping Rate (gpm) | Analytical Solution | Wells Observed | Trans-missivity ($ft^2$/day) | Hydraulic Conductivity (ft/day) | Saturated Thickness (ft) | Storativity |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | *t* | *Q* | | | *T* | *K* | *b* | *S* |
| YMW-19 | 7/26/2013 | Pumping | 107 | 3.45 | Theis (Un-Confined) | YMW-19 | 107.0 | 5.4 | 20 | -- |
| YMW-11 | 7/26/2013 | Pumping | 73 | 0.58 | Cooper Jacob (Un-Confined) | YMW-11 | 13.0 | 0.6 | 20 | -- |
| YMW-11 | 10/4/2013 | Slug Out | 20 | N/A | Bouwer-Rice (Un-Confined) | YMW-11 | 10.6 | 0.5 | 20 | -- |
| YMW-11 | 10/4/2013 | Slug In | 10 | N/A | Bouwer-Rice (Un-Confined) | YMW-11 | 14.9 | 0.7 | 20 | -- |

# Total Groundwater Flux Calculation

| Monitoring Well ID | Separation Distance (ft.) | Ground-water Elevation | Head Loss (ft.) | Hydraulic Gradient ft./ft. ($H_L$ / $L$) | Aquifer Width | | Transmissivity | | Total Groundwater Flux ($Q=I \times W \times T$) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | YMW-11 | YMW-19 | YMW-11 | YMW-19 | YMW-11 | YMW-19 |
| | | | | | *feet perpendicular to I* | | $ft^2$/day | | $ft^3$/day | | gpm | |
| | | June | | | YMW-15 | YMW-19 | Slug * | Pumping | Slug | Pumping | Slug | Pumping |
| | $L$ | $h$ | $h_L$ | $I$ | $W$ | | $T^s$ | $T^p$ | $Q^s$ | $Q^p$ | $Q^s$ | $Q^p$ |
| YMW-11 | 2,517.00 | 3,097.99 | 7.31 | 0.00290 | 1,354.00 | | 12.83 | 107.00 | 50.45213 | 420.76209 | 0.26230 | 2.18754 |
| MW-4 | | 3,090.68 | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | August | | | | | Slug * | Pumping | Slug | Pumping | Slug | Pumping |
| | $L$ | $h$ | $h_L$ | $I$ | $W$ | | $T^s$ | $T^p$ | $Q^s$ | $Q^p$ | $Q^s$ | $Q^p$ |
| YMW-11 | 2,517.00 | 3,097.26 | 9.88 | 0.00393 | 1,354.00 | | 12.83 | 107.00 | 68.18974 | 568.69076 | 0.35452 | 2.95662 |
| MW-4 | | 3,087.38 | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | **Average Q :** | 59.32093 | 494.72642 | 0.30841 | 2.57208 |

*Average T = (13.0 + 10.6 + 14.9) / 3 = 12.83

ft3/day = 7.48052 g/day = 0.005199 gpm

# TABLE 5-1. SURFACE SOILS ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| ANALYTE | METHOD | TOTAL [1] ANALYSES | # Detected Analyses | % Detected Analyses | # Detected Exceedances | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| ***PHYSICAL PARAMETERS*** | | | | | | | | | | |
| MOISTURE % BY WT. | SW3550A | 316 | 316 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| pH OF SOIL & WASTE | SW9045D | 237 | 237 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| ***METALS*** | | | | | | | | | | |
| **ARSENIC (AS)** | SW6010B/SW6020 | 283 | 283 | 100% | 15 | **5%** | 0 | 0% | 0 | 0% |
| **BARIUM (BA)** | SW6010B/SW6020 | 257 | 257 | 100% | 47 | **18%** | 0 | 0% | 0 | 0% |
| CADMIUM (CD) | SW6010B/SW6020 | 257 | 16 | 6% | 0 | 0% | 241 | 94% | 1 | **0.4%** |
| CHROMIUM (CR) | SW6010B/SW6020 | 257 | 257 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| **LEAD (PB)** | SW6010B/SW6020 | 171 | 171 | 100% | 98 | **57%** | 0 | 0% | 0 | 0% |
| **LEAD (PB)-Sieved** | SW6010B/SW6020 | 316 | 316 | 100% | 148 | **47%** | 0 | 0% | 0 | 0% |
| LEAD (PB) | TCLP/SW6020 | 33 | 6 | 18% | 0 | 0% | 27 | 82% | 0 | 0% |
| **MERCURY (HG)** | SW7471A | 257 | 7 | 3% | 7 | **3%** | 250 | 97% | 0 | 0% |
| SELENIUM (SE) | SW6010B/SW6020 | 283 | 0 | 0% | 0 | 0% | 283 | 100% | 0 | 0% |
| SILVER (AG) | SW6010B/SW6020 | 257 | 0 | 0% | 0 | 0% | 257 | 100% | 0 | 0% |
| TETRAETHYL LEAD | SW8270C | 99 | 0 | 0% | 0 | 0% | 99 | 100% | 99 | **100%** |
| ***VOLATILE PETROLEUM HYDROCARBONS (VPH)*** | | | | | | | | | | |
| METHYL TERT-BUTYL ETHER | MA-VPH | 237 | 0 | 0% | 0 | 0% | 237 | 100% | 237 | **100%** |
| **BENZENE** | MA-VPH | 237 | 16 | 7% | 16 | **7%** | 221 | 93% | 221 | **93%** |
| **TOLUENE** | MA-VPH | 237 | 15 | 6% | 1 | **0.4%** | 222 | 94% | 0 | 0% |
| **ETHYLBENZENE** | MA-VPH | 237 | 16 | 7% | 5 | **2%** | 221 | 93% | 7 | **3%** |
| M-P XYLENE | MA-VPH | 237 | 39 | 16% | 0 | 0% | 198 | 84% | 0 | 0% |
| O-XYLENE | MA-VPH | 237 | 32 | 14% | 0 | 0% | 205 | 86% | 0 | 0% |
| TOTAL XYLENE | MA-VPH | 237 | 45 | 19% | 0 | 0% | 192 | 81% | 0 | 0% |
| **NAPHTHALENE** | MA-VPH | 237 | 34 | 14% | 10 | **4%** | 203 | 86% | 5 | **2%** |
| **C9-C10 AROMATICS** | MA-VPH | 237 | 47 | 20% | 18 | **8%** | 190 | 80% | 0 | 0% |
| **C5-C8 ALIPHATICS** | MA-VPH | 237 | 35 | 15% | 18 | **8%** | 202 | 85% | 1 | **0.4%** |
| **C9-C12 ALIPHATICS** | MA-VPH | 237 | 54 | 23% | 21 | **9%** | 183 | 77% | 0 | 0% |
| TOTAL PURGEABLE HYDROCARBONS | MA-VPH | 237 | 70 | 30% | 0 | 0% | 167 | 70% | 0 | 0% |
| ***EXTRACTABLE PETROLEUM HYDROCARBONS (EPH)*** | | | | | | | | | | |
| TOT EXTRACTABLE HYDROCARBON (EPH Screen) [3] | SW8015M | 204 | 201 | 99% | 120 | 59% | 3 | 1% | 0 | 0% |
| **C9-C18 ALIPHATICS** | MA-EPH | 153 | 88 | 58% | 39 | **25%** | 65 | 42% | 0 | 0% |
| C19-C36 ALIPHATICS | MA-EPH | 153 | 146 | 95% | 0 | 0% | 7 | 5% | 0 | 0% |
| **C11-C22 AROMATICS** | MA-EPH | 153 | 139 | 91% | 45 | **29%** | 14 | 9% | 0 | 0% |
| TOT EXTRACTABLE HYDROCARBON (EPH) [3] | MA-EPH | 153 | 149 | 97% | 0 | 0% | 4 | 3% | 0 | 0% |

## TABLE 5-1. SURFACE SOILS ANALYSIS SUMMARY

| ANALYTE | METHOD | TOTAL [1] ANALYSES | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | # Detected Analyses | % Detected Analyses | # Detected Exceedances | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| ***POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)*** | | | | | | | | | | |
| **2-METHYLNAPHTHALENE** | SW8270C | 200 | 76 | 38% | 16 | **8%** | 124 | 62% | 0 | 0% |
| ACENAPHTHENE | SW8270C | 200 | 36 | 18% | 0 | 0% | 164 | 82% | 0 | 0% |
| ACENAPHTHYLENE | SW8270C | 200 | 45 | 23% | 0 | 0% | 155 | 78% | 0 | 0% |
| ANTHRACENE | SW8270C | 200 | 88 | 44% | 0 | 0% | 112 | 56% | 0 | 0% |
| **BENZO (A) ANTHRACENE** | SW8270C | 200 | 116 | 58% | 40 | **20%** | 84 | 42% | 20 | **10%** |
| **BENZO (A) PYRENE** | SW8270C | 200 | 134 | 67% | 123 | **62%** | 66 | 33% | 44 | **22%** |
| **BENZO (B) FLUORANTHENE** | SW8270C | 200 | 136 | 68% | 57 | **29%** | 64 | 32% | 19 | **10%** |
| BENZO (GHI) PERYLENE | SW8270C | 200 | 138 | 69% | 0 | 0% | 62 | 31% | 0 | 0% |
| **BENZO (K) FLUORANTHENE** | SW8270C | 200 | 125 | 63% | 4 | **2%** | 75 | 38% | 0 | 0% |
| **CHRYSENE** | SW8270C | 200 | 137 | 69% | 3 | **2%** | 63 | 32% | 0 | 0% |
| **DIBENZ (A,H) ANTHRACENE** | SW8270C | 200 | 39 | 20% | 35 | **18%** | 161 | 81% | 80 | **40%** |
| **FLUORANTHENE** | SW8270C | 200 | 148 | 74% | 1 | **1%** | 52 | 26% | 0 | 0% |
| FLUORENE | SW8270C | 200 | 74 | 37% | 0 | 0% | 126 | 63% | 0 | 0% |
| **INDENO (1,2,3-C,D) PYRENE** | SW8270C | 200 | 137 | 69% | 59 | **30%** | 63 | 32% | 21 | **11%** |
| **NAPHTHALENE** | SW8270C | 200 | 70 | 35% | 3 | **2%** | 130 | 65% | 0 | 0% |
| PHENANTHRENE | SW8270C | 200 | 139 | 70% | 0 | 0% | 61 | 31% | 0 | 0% |
| **PYRENE** | SW8270C | 200 | 162 | 81% | 1 | **1%** | 38 | 19% | 0 | 0% |
| ***VOLATILE ORGANIC COMPOUNDS (VOCs)*** | | | | | | | | | | |
| **BENZENE** | SW8260B | 89 | 8 | 9% | 5 | **6%** | 81 | 91% | 81 | **91%** |
| BROMOBENZENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 3 | **3%** |
| BROMOCHLOROMETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 3 | **3%** |
| BROMODICHLOROMETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| BROMOFORM | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 3 | **3%** |
| BROMOMETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| CARBON TETRACHLORIDE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| CHLOROBENZENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 3 | **3%** |
| CHLOROETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 0 | 0% |
| 2-CHLOROETHYL VINYL ETHER | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 0 | 0% |
| CHLOROFORM | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| CHLOROMETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| 2-CHLOROTOLUENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 0 | 0% |
| 4-CHLOROTOLUENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 0 | 0% |
| CHLORODIBROMOMETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| 1,2-DIBROMOETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| DIBROMOMETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| 1,2-DICHLOROBENZENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 73 | **82%** |
| 1,3-DICHLOROBENZENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 0 | 0% |
| 1,4-DICHLOROBENZENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 3 | **3%** |
| DICHLORODIFLUOROMETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 0 | 0% |

## TABLE 5-1. SURFACE SOILS ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| ANALYTE | METHOD | TOTAL (1) ANALYSES | # Detected Analyses | % Detected Analyses | # Detected Exceedances | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| 1,1-DICHLOROETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| 1,2-DICHLOROETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| CIS-1,2-DICHLOROETHENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 3 | **3%** |
| 1,1-DICHLOROETHENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| TRANS-1,2-DICHLOROETHENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 3 | **3%** |
| 1,2-DICHLOROPROPANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| 1,3-DICHLOROPROPANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 0 | 0% |
| 2,2-DICHLOROPROPANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 0 | 0% |
| 1,1-DICHLOROPROPENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 0 | 0% |
| CIS-1,3-DICHLOROPROPENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 0 | 0% |
| TRANS-1,3-DICHLOROPROPENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 0 | 0% |
| **ETHYLBENZENE** | SW8260B | 89 | 10 | 11% | 2 | **2%** | 79 | 89% | 0 | 0% |
| METHYL TERT-BUTYL ETHER | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| **METHYLENE CHLORIDE (2)** | SW8260B | 89 | 1 | 1% | 1 | **1%** | 88 | 99% | 88 | **99%** |
| 2-BUTANONE (METHYL-ETHYL-KETONE) | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 3 | **3%** |
| STYRENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 2 | **2%** |
| 1,1,1,2-TETRACHLOROETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| 1,1,2,2-TETRACHLOROETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| TETRACHLOROETHENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| **TOLUENE** | SW8260B | 89 | 9 | 10% | 2 | **2%** | 80 | 90% | 0 | 0% |
| 1,1,1-TRICHLOROETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 3 | **3%** |
| 1,1,2-TRICHLOROETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| TRICHLOROETHENE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| TRICHLOROFLUOROMETHANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 0 | 0% |
| 1,2,3-TRICHLOROPROPANE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| VINYL CHLORIDE | SW8260B | 89 | 0 | 0% | 0 | 0% | 89 | 100% | 89 | **100%** |
| M-P XYLENE | SW8260B | 89 | 9 | 10% | 0 | 0% | 80 | 90% | 0 | 0% |
| O-XYLENE | SW8260B | 89 | 8 | 9% | 0 | 0% | 81 | 91% | 0 | 0% |
| TOTAL XYLENE | SW8260B | 89 | 9 | 10% | 0 | 0% | 80 | 90% | 2 | **2%** |

(1) Includes all surface soil analyses (Grids, Monitoring Wells, Paint Shop, TEL), all intervals (A,B,C), all methods.

(2) Common laboratory contaminant. Associated detection may be a false positive.

(3) EPH Screen values exceeding 200 mg/kg are used only to determine the need for fraction analysis. RBSL criteria for Total Extractable Hydrocarbons are evaluated for individual fractions.

Red - Indicates constituent detected at concentrations greater than the screening level/standard.

Blue - Indicates analyses for which detection limit was greater than the screening level/standard.

# TABLE 5-2. SURFACE SOIL SUMMARY STATISTICS

| Analyte | Method | Unit | Direct Contact Industrial RSL | Direct Contact Residential RSL | MDEQ Leaching to Groundwater Screening Level | MDEQ - RBSLs Commercial Surface | MDEQ - RBSLs Residential Surface | TCLP | Background Surface Soil Values† | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Interval | Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***PHYSICAL PARAMETERS*** | | | | | | | | | | | | | | | | | |
| MOISTURE % BY WT. | SW3550A | % | | | | | | | | 316 | 316 | 1.5 | 36 | 0 | | | |
| pH OF SOIL & WASTE | SW9045D | s.u. | | | | | | | | 237 | 237 | 6.32 | 9.45 | 0 | | | |
| ***METALS*** | | | | | | | | | | | | | | | | | |
| **ARSENIC (AS)** | SW6010B/SW6020 | mg/kg | **22.5[4]** | **22.5[4]** | **22.5[4]** | | | | **7** | 283 | 283 | 1 | 90 | **15** | PS33 | A | 0-6" |
| **BARIUM (BA)** | SW6010B/SW6020 | mg/kg | **22000** | **1500** | **421** | | | | **150** | 257 | 257 | 103 | 3610 | **47** | YMW-22 | B | 6-12" |
| CADMIUM (CD) | SW6010B/SW6020 | mg/kg | **98** | **7** | | | | | **<1** | 257 | 16 | 1 | 6 | 0 | | | |
| CHROMIUM (CR) | SW6010B/SW6020 | mg/kg | **180000** | **12000** | **1800000** | | | | **20** | 257 | 257 | 7 | 93 | 0 | | | |
| **LEAD (PB)** | SW6010B/SW6020 | mg/kg | **800** | **400** | **140** | | | | **20** | 171 | 171 | 8 | 26700 | **98** | YMW-21 | A | 0-6" |
| **LEAD (PB)-Sieved** | SW6010B/SW6020 | mg/kg | **800** | **400** | **140** | | | | **18** | 316 | 316 | 8 | 22400 | **148** | YMW-21 | B | 6-12" |
| LEAD (PB) TCLP | TCLP/SW6020 | mg/L | | | | | | **5** | -- | 33 | 6 | 0.2 | 1.5 | 0 | | | |
| **MERCURY (HG)** | SW7471A | mg/kg | **4** | **0.94** | **1** | | | | **<1** | 257 | 7 | 1 | 5 | **7** | PS10 | A | 0-6" |
| SELENIUM (SE) | SW6010B/SW6020 | mg/kg | **580** | **39** | **2.6** | | | | **<1** | 283 | 0 | | | 0 | | | |
| SILVER (AG) | SW6010B/SW6020 | mg/kg | **580** | **39** | **8.51** | | | | **<1** | 257 | 0 | | | 0 | | | |
| TETRAETHYL LEAD | SW8270C | mg/kg | **0.0082** | **0.00062** | **0.000047** | | | | -- | 99 | 0 | | | 0 | | | |
| ***VOLATILE PETROLEUM HYDROCARBONS (VPH)*** | | | | | | | | | | | | | | | | | |
| METHYL TERT-BUTYL ETHER | MA-VPH | mg/kg | | | | **0.08** | **0.08** | | | 237 | 0 | | | 0 | | | |
| **BENZENE** | MA-VPH | mg/kg | | | | **0.04** | **0.04** | | | 237 | 16 | 0.049 | 39 | **16** | YMW-14 | C | 12-24" |
| **TOLUENE** | MA-VPH | mg/kg | | | | **10** | **10** | | | 237 | 15 | 0.043 | 37 | **1** | YMW-14 | C | 12-24" |
| **ETHYLBENZENE** | MA-VPH | mg/kg | | | | **10** | **6** | | | 237 | 16 | 0.041 | 35 | **5** | YMW-14 | C | 12-24" |
| M-P XYLENE | MA-VPH | mg/kg | **240** | **56** | **100** | | | | | 237 | 39 | 0.045 | 52 | 0 | | | |
| O-XYLENE | MA-VPH | mg/kg | **280** | **65** | **100** | | | | | 237 | 32 | 0.041 | 14 | 0 | | | |
| TOTAL XYLENE | MA-VPH | mg/kg | | | | **200** | **70** | | | 237 | 45 | 0.049 | 67 | 0 | | | |
| **NAPHTHALENE** | MA-VPH | mg/kg | | | | **9** | **4** | | | 237 | 34 | 0.053 | 45 | **10** | 5 | A | 0-6" |
| **C9-C10 AROMATICS** | MA-VPH | mg/kg | | | | **100** | **100** | | | 237 | 47 | 2 | 4010 | **18** | YMW-18 | C | 12-24" |
| **C5-C8 ALIPHATICS** | MA-VPH | mg/kg | | | | **200** | **60** | | | 237 | 35 | 2 | 3950 | **18** | YMW-14 | C | 12-24" |
| **C9-C12 ALIPHATICS** | MA-VPH | mg/kg | | | | **700** | **100** | | | 237 | 54 | 1.3 | 4240 | **21** | YMW-18 | C | 12-24" |
| TOTAL PURGEABLE HYDROCARBONS | MA-VPH | mg/kg | | | | | | | | 237 | 70 | 1.8 | 15100 | 0 | | | |
| ***EXTRACTABLE PETROLEUM HYDROCARBONS (EPH)*** | | | | | | | | | | | | | | | | | |
| TOT EXTRACTABLE HYDROCARBON (EPHscr) [3] | SW8015M | mg/kg | | | | **200[2]** | **200[2]** | | | 204 | 201 | 16 | 38500 | 120 | 45 | B | 6-12" |
| **C9-C18 ALIPHATICS** | MA-EPH | mg/kg | | | | **1000** | **200** | | | 153 | 88 | 10 | 14600 | **39** | YMW-18 | C | 12-24" |
| C19-C36 ALIPHATICS | MA-EPH | mg/kg | | | | **100000** | **20000** | | | 153 | 146 | 16 | 12500 | 0 | | | |
| **C11-C22 AROMATICS** | MA-EPH | mg/kg | | | | **400** | **400** | | | 153 | 139 | 12 | 11700 | **45** | 45 | B | 6-12" |
| TOT EXTRACTABLE HYDROCARBON (EPH) [3] | MA-EPH | mg/kg | | | | | | | | 153 | 149 | 11 | 37200 | 0 | | | |
| ***POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)*** | | | | | | | | | | | | | | | | | |
| **2-METHYLNAPHTHALENE** | SW8270C | mg/kg | **300** | **23** | **1.9** | | | | -- | 200 | 76 | 0.004 | 44 | **16** | 45 | C | 12-24" |
| ACENAPHTHENE | SW8270C | mg/kg | | | | **200** | **200** | | **<0.0042** | 200 | 36 | 0.0065 | 46 | 0 | | | |
| ACENAPHTHYLENE | SW8270C | mg/kg | | | | | | | -- | 200 | 45 | 0.005 | 1.3 | 0 | | | |
| ANTHRACENE | SW8270C | mg/kg | | | | **4000** | **2000** | | **<0.0042** | 200 | 88 | 0.0046 | 137 | 0 | | | |
| **BENZO (A) ANTHRACENE** | SW8270C | mg/kg | | | | **2** | **0.2** | | **0.019** | 200 | 116 | 0.0074 | 187 | **40** | 36 | A | 0-6" |
| **BENZO (A) PYRENE** | SW8270C | mg/kg | | | | **0.2** | **0.02** | | **0.027** | 200 | 134 | 0.0068 | 147 | **123** | 36 | A | 0-6" |
| **BENZO (B) FLUORANTHENE** | SW8270C | mg/kg | | | | **2** | **0.2** | | **0.025** | 200 | 136 | 0.0081 | 127 | **57** | 36 | A | 0-6" |
| BENZO (GHI) PERYLENE | SW8270C | mg/kg | | | | | | | -- | 200 | 138 | 0.0038 | 74 | 0 | | | |
| **BENZO (K) FLUORANTHENE** | SW8270C | mg/kg | | | | **20** | **2** | | **0.012** | 200 | 125 | 0.0039 | 91 | **4** | 36 | A | 0-6" |
| **CHRYSENE** | SW8270C | mg/kg | | | | **200** | **20** | | **0.013** | 200 | 137 | 0.0062 | 164 | **3** | 36 | A | 0-6" |
| **DIBENZ (A,H) ANTHRACENE** | SW8270C | mg/kg | | | | **0.2** | **0.02** | | **<0.0042** | 200 | 39 | 0.0093 | 49 | **35** | 36 | A | 0-6" |
| **FLUORANTHENE** | SW8270C | mg/kg | | | | **500** | **300** | | **0.035** | 200 | 148 | 0.0048 | 407 | **1** | 36 | A | 0-6" |

# TABLE 5-2. SURFACE SOIL SUMMARY STATISTICS

| Analyte | Method | Unit | Direct Contact Industrial RSL | Direct Contact Residential RSL | MDEQ Leaching to Groundwater Screening Level | MDEQ - RBSLs Commercial Surface | MDEQ - RBSLs Residential Surface | TCLP | Background Surface Soil Values† | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Interval | Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FLUORENE | SW8270C | mg/kg | | | | 600 | 300 | | <0.0042 | 200 | 74 | 0.0041 | 50 | 0 | | | |
| INDENO (1,2,3-C,D) PYRENE | SW8270C | mg/kg | | | | 2 | 0.2 | | 0.023 | 200 | 137 | 0.0093 | 102 | 59 | 36 | A | 0-6" |
| NAPHTHALENE | SW8270C | mg/kg | | | | 9 | 4 | | <0.0042 | 200 | 70 | 0.0048 | 9.2 | 3 | 45 | C | 12-24" |
| PHENANTHRENE | SW8270C | mg/kg | | | | | | | -- | 200 | 139 | 0.0038 | 392 | 0 | | | |
| PYRENE | SW8270C | mg/kg | | | | 2000 | 200 | | 0.037 | 200 | 162 | 0.0059 | 320 | 1 | 36 | A | 0-6" |
| *VOLATILE ORGANIC COMPOUNDS (VOCs)* | | | | | | | | | | | | | | | | | |
| BENZENE | SW8260B | mg/kg | | | | 0.04 | 0.04 | | | 89 | 8 | 0.026 | 14 | 5 | YMW-14 | C | 12-24" |
| BROMOBENZENE | SW8260B | mg/kg | 180 | 29 | 0.42 | | | | | 89 | 0 | | | 0 | | | |
| BROMOCHLOROMETHANE | SW8260B | mg/kg | 63 | 15 | 0.21 | | | | | 89 | 0 | | | 0 | | | |
| BROMODICHLOROMETHANE | SW8260B | mg/kg | 1.3 | 0.29 | 0.028 | | | | | 89 | 0 | | | 0 | | | |
| BROMOFORM | SW8260B | mg/kg | 290 | 67 | 0.21 | | | | | 89 | 0 | | | 0 | | | |
| BROMOMETHANE | SW8260B | mg/kg | 3 | 0.68 | 0.025 | | | | | 89 | 0 | | | 0 | | | |
| CARBON TETRACHLORIDE | SW8260B | mg/kg | 2.9 | 0.65 | 0.012 | | | | | 89 | 0 | | | 0 | | | |
| CHLOROBENZENE | SW8260B | mg/kg | 130 | 28 | 0.68 | | | | | 89 | 0 | | | 0 | | | |
| CHLOROETHANE | SW8260B | mg/kg | 5700 | 1400 | 59 | | | | | 89 | 0 | | | 0 | | | |
| 2-CHLOROETHYL VINYL ETHER | SW8260B | mg/kg | | | | | | | | 89 | 0 | | | 0 | | | |
| CHLOROFORM | SW8260B | mg/kg | 1.4 | 0.32 | 0.195 | | | | | 89 | 0 | | | 0 | | | |
| CHLOROMETHANE | SW8260B | mg/kg | 46 | 11 | 0.077 | | | | | 89 | 0 | | | 0 | | | |
| 2-CHLOROTOLUENE | SW8260B | mg/kg | 2300 | 160 | 2.3 | | | | | 89 | 0 | | | 0 | | | |
| 4-CHLOROTOLUENE | SW8260B | mg/kg | 2300 | 160 | 2.4 | | | | | 89 | 0 | | | 0 | | | |
| CHLORODIBROMOMETHANE | SW8260B | mg/kg | 3.2 | 0.73 | 0.01 | | | | | 89 | 0 | | | 0 | | | |
| 1,2-DIBROMOETHANE | SW8260B | mg/kg | | | | 0.00002 | 0.00002 | | | 89 | 0 | | | 0 | | | |
| DIBROMOMETHANE | SW8260B | mg/kg | 9.8 | 2.3 | 0.02 | | | | | 89 | 0 | | | 0 | | | |
| 1,2-DICHLOROBENZENE | SW8260B | mg/kg | 930 | 180 | 5.8 | | | | | 89 | 0 | | | 0 | | | |
| 1,3-DICHLOROBENZENE | SW8260B | mg/kg | | | | | | | | 89 | 0 | | | 0 | | | |
| 1,4-DICHLOROBENZENE | SW8260B | mg/kg | 11 | 2.6 | 0.72 | | | | | 89 | 0 | | | 0 | | | |
| DICHLORODIFLUOROMETHANE | SW8260B | mg/kg | 37 | 8.7 | 15 | | | | | 89 | 0 | | | 0 | | | |
| 1,1-DICHLOROETHANE | SW8260B | mg/kg | 16 | 3.6 | 0.0078 | | | | | 89 | 0 | | | 0 | | | |
| 1,2-DICHLOROETHANE | SW8260B | mg/kg | | | | 0.01 | 0.01 | | | 89 | 0 | | | 0 | | | |
| CIS-1,2-DICHLOROETHENE | SW8260B | mg/kg | 230 | 16 | 0.21 | | | | | 89 | 0 | | | 0 | | | |
| 1,1-DICHLOROETHENE | SW8260B | mg/kg | 100 | 23 | 0.0025 | | | | | 89 | 0 | | | 0 | | | |
| TRANS-1,2-DICHLOROETHENE | SW8260B | mg/kg | 2300 | 160 | 0.29 | | | | | 89 | 0 | | | 0 | | | |
| 1,2-DICHLOROPROPANE | SW8260B | mg/kg | 4.4 | 1 | 0.017 | | | | | 89 | 0 | | | 0 | | | |
| 1,3-DICHLOROPROPANE | SW8260B | mg/kg | 2300 | 160 | 1.3 | | | | | 89 | 0 | | | 0 | | | |
| 2,2-DICHLOROPROPANE | SW8260B | mg/kg | | | | | | | | 89 | 0 | | | 0 | | | |
| 1,1-DICHLOROPROPENE | SW8260B | mg/kg | | | | | | | | 89 | 0 | | | 0 | | | |
| CIS-1,3-DICHLOROPROPENE | SW8260B | mg/kg | | | | | | | | 89 | 0 | | | 0 | | | |
| TRANS-1,3-DICHLOROPROPENE | SW8260B | mg/kg | | | | | | | | 89 | 0 | | | 0 | | | |
| ETHYLBENZENE | SW8260B | mg/kg | | | | 10 | 6 | | | 89 | 10 | 0.046 | 12 | 2 | 25 | C | 12-24" |
| METHYL TERT-BUTYL ETHER | SW8260B | mg/kg | | | | 0.08 | 0.08 | | | 89 | 0 | | | 0 | | | |
| METHYLENE CHLORIDE [2] | SW8260B | mg/kg | 1000 | 57 | 0.013 | | | | | 89 | 1 | 0.2 | 0.2 | 1 | 44 | B | 6-12" |
| 2-BUTANONE (METHYL-ETHYL-KETONE) | SW8260B | mg/kg | 19000 | 2700 | 12 | | | | | 89 | 0 | | | 0 | | | |
| STYRENE | SW8260B | mg/kg | 3500 | 600 | 1.1 | | | | | 89 | 0 | | | 0 | | | |
| 1,1,1,2-TETRACHLOROETHANE | SW8260B | mg/kg | 8.8 | 2 | 0.0022 | | | | | 89 | 0 | | | 0 | | | |
| 1,1,2,2-TETRACHLOROETHANE | SW8260B | mg/kg | 2.7 | 0.6 | 0.0078 | | | | | 89 | 0 | | | 0 | | | |
| TETRACHLOROETHENE | SW8260B | mg/kg | 100 | 24 | 0.023 | | | | | 89 | 0 | | | 0 | | | |
| TOLUENE | SW8260B | mg/kg | | | | 10 | 10 | | | 89 | 9 | 0.031 | 13 | 2 | YMW-14 | C | 12-24" |
| 1,1,1-TRICHLOROETHANE | SW8260B | mg/kg | 3600 | 810 | 0.7 | | | | | 89 | 0 | | | 0 | | | |
| 1,1,2-TRICHLOROETHANE | SW8260B | mg/kg | 5 | 1.1 | 0.0096 | | | | | 89 | 0 | | | 0 | | | |
| TRICHLOROETHENE | SW8260B | mg/kg | 6 | 0.94 | 0.018 | | | | | 89 | 0 | | | 0 | | | |

## TABLE 5-2. SURFACE SOIL SUMMARY STATISTICS

| Analyte | Method | Unit | Direct Contact Industrial RSL | Direct Contact Residential RSL | MDEQ Leaching to Groundwater Screening Level | MDEQ - RBSLs Commercial Surface | MDEQ - RBSLs Residential Surface | TCLP | Background Surface Soil Values† | Total (1) Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Interval | Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TRICHLOROFLUOROMETHANE | SW8260B | mg/kg | **310** | **73** | **66.4** | | | | | 89 | 0 | | | 0 | | | |
| 1,2,3-TRICHLOROPROPANE | SW8260B | mg/kg | **0.11** | **0.0051** | **0.0000032** | | | | | 89 | 0 | | | 0 | | | |
| VINYL CHLORIDE | SW8260B | mg/kg | **1.7** | **0.059** | **0.0007** | | | | | 89 | 0 | | | 0 | | | |
| M-P XYLENE | SW8260B | mg/kg | **240** | **56** | **100** | | | | | 89 | 9 | 0.13 | 21 | 0 | | | |
| O-XYLENE | SW8260B | mg/kg | **280** | **65** | **100** | | | | | 89 | 8 | 0.16 | 5 | 0 | | | |
| TOTAL XYLENE | SW8260B | mg/kg | | | | **200** | **70** | | | 89 | 9 | 0.13 | 25 | 0 | | | |

# - DEQ Direct Contact Screening levels.

†- Determined by the January 29, 2014 Background Soils Data Submittal, lowest value of SP-SS-A or NP-SS-A.

(1) Includes all surface soil analyses (Grids, Monitoring Wells, Paint Shop, TEL), all intervals (A,B,C), all methods.

(2) Common laboratory contaminant. Associated detection may be a false positive.

(3) EPH Screen values exceeding 200 mg/kg are used only to determine the need for fraction analysis. RBSL criteria for Total Extractable Hydrocarbons are evaluated for individual fractions.

(4) Compared to Background Concentrations of Inorganic Constituents in Montana Surface Soils Report: http://deq.mt.gov/StateSuperfund/background.mcpx.

Red - Indicates constituent detected at concentrations greater than the screening level/standard.

## TABLE 5-3. SURFACE SOIL CONSTITUENT EXCEEDANCES

| | | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **UNITS** | **TOTAL [1] ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedance | % Detected Exceedances |
| ***METALS*** | | | | | | | |
| ARSENIC (AS) | SW6010B/SW6020 | mg/kg | 283 | 283 | 100% | 15 | 5% |
| BARIUM (BA) | SW6010B/SW6020 | mg/kg | 257 | 257 | 100% | 47 | 18% |
| LEAD (PB) | SW6010B/SW6020 | mg/kg | 171 | 171 | 100% | 98 | 57% |
| LEAD (PB)-Sieved | SW6010B/SW6020 | mg/kg | 316 | 316 | 100% | 148 | 47% |
| MERCURY (HG) | SW7471A | mg/kg | 257 | 7 | 3% | 7 | 3% |
| ***VOLATILE PETROLEUM HYDROCARBONS (VPH)*** | | | | | | | |
| BENZENE | MA-VPH | mg/kg | 237 | 16 | 7% | 16 | 7% |
| TOLUENE | MA-VPH | mg/kg | 237 | 15 | 6% | 1 | 0.4% |
| ETHYLBENZENE | MA-VPH | mg/kg | 237 | 16 | 7% | 5 | 2% |
| NAPHTHALENE | MA-VPH | mg/kg | 237 | 34 | 14% | 10 | 4% |
| C9-C10 AROMATICS | MA-VPH | mg/kg | 237 | 47 | 20% | 18 | 8% |
| C5-C8 ALIPHATICS | MA-VPH | mg/kg | 237 | 35 | 15% | 18 | 8% |
| C9-C12 ALIPHATICS | MA-VPH | mg/kg | 237 | 54 | 23% | 21 | 9% |
| ***EXTRACTABLE PETROLEUM HYDROCARBONS (EPH)*** | | | | | | | |
| C9-C18 ALIPHATICS | MA-EPH | mg/kg | 153 | 88 | 58% | 39 | 25% |
| C11-C22 AROMATICS | MA-EPH | mg/kg | 153 | 139 | 91% | 45 | 29% |
| ***POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)*** | | | | | | | |
| 2-METHYLNAPHTHALENE | SW8270C | mg/kg | 200 | 76 | 38% | 16 | 8% |
| BENZO (A) ANTHRACENE | SW8270C | mg/kg | 200 | 116 | 58% | 40 | 20% |
| BENZO (A) PYRENE | SW8270C | mg/kg | 200 | 134 | 67% | 123 | 62% |
| BENZO (B) FLUORANTHENE | SW8270C | mg/kg | 200 | 136 | 68% | 57 | 29% |
| BENZO (K) FLUORANTHENE | SW8270C | mg/kg | 200 | 125 | 63% | 4 | 2% |
| CHRYSENE | SW8270C | mg/kg | 200 | 137 | 69% | 3 | 2% |
| DIBENZ (A,H) ANTHRACENE | SW8270C | mg/kg | 200 | 39 | 20% | 35 | 18% |
| FLUORANTHENE | SW8270C | mg/kg | 200 | 148 | 74% | 1 | 1% |
| INDENO (1,2,3-C,D) PYRENE | SW8270C | mg/kg | 200 | 137 | 69% | 59 | 30% |
| NAPHTHALENE | SW8270C | mg/kg | 200 | 70 | 35% | 3 | 2% |
| PYRENE | SW8270C | mg/kg | 200 | 162 | 81% | 1 | 1% |
| ***VOLATILE ORGANIC COMPOUNDS (VOCs)*** | | | | | | | |
| BENZENE | SW8260B | mg/kg | 89 | 8 | 9% | 5 | 6% |
| ETHYLBENZENE | SW8260B | mg/kg | 89 | 10 | 11% | 2 | 2% |
| METHYLENE CHLORIDE [2] | SW8260B | mg/kg | 89 | 1 | 1% | 1 | 1% |
| TOLUENE | SW8260B | mg/kg | 89 | 9 | 10% | 2 | 2% |

(1) Includes all surface soil analyses (Grids, Monitoring Wells, Paint Shop, TEL), all intervals (A,B,C), all methods.

(2) Common laboratory contaminant. Associated detection may be a false positive.

## TABLE 5-4. SUBSURFACE SOILS ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| ANALYTE | METHOD | TOTAL [1] ANALYSES | # Detected Analyses | % Detected Analyses | # Detected Exceedance | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| ***PHYSICAL PARAMETERS*** | | | | | | | | | | |
| MOISTURE % BY WT. | SW3550A | 392 | 392 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| pH OF SOIL & WASTE | SW9045D | 392 | 392 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| ***METALS*** | | | | | | | | | | |
| **ARSENIC (AS)** | SW6020 | 392 | 392 | 100% | 4 | **1%** | 0 | 0% | 0 | 0% |
| **BARIUM (BA)** | SW6010B/SW6020 | 332 | 332 | 100% | 5 | **2%** | 0 | 0% | 0 | 0% |
| CADMIUM (CD) | SW6010B/SW6020 | 332 | 2 | 1% | 0 | 0% | 330 | 99% | 0 | 0% |
| CHROMIUM (CR) | SW6010B/SW6020 | 332 | 332 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| **LEAD (PB)** | SW6010B/SW6020 | 392 | 390 | 99% | 31 | **8%** | 2 | 1% | 0 | 0% |
| **MERCURY (HG)** | SW7471A/B | 332 | 2 | 1% | 2 | **1%** | 330 | 99% | 0 | 0% |
| SELENIUM (SE) | SW6020 | 392 | 3 | 1% | 0 | 0% | 389 | 99% | 0 | 0% |
| SILVER (AG) | SW6010B/SW6020 | 332 | 1 | 0.3% | 0 | 0% | 331 | 100% | 0 | 0% |
| **TETRAETHYL LEAD** | SW8270C/SW8270C-H | 23 | 3 | 13% | 3 | **13%** | 20 | 87% | 18 | **78%** |
| ***VOLATILE PETROLEUM HYDROCARBONS (VPH)*** | | | | | | | | | | |
| METHYL TERT-BUTYL ETHER | MA-VPH | 392 | 0 | 0% | 0 | 0% | 392 | 100% | 392 | **100%** |
| **BENZENE** | MA-VPH | 392 | 58 | 15% | 58 | **15%** | 334 | 85% | 334 | **85%** |
| **TOLUENE** | MA-VPH | 392 | 29 | 7% | 3 | **1%** | 363 | 93% | 0 | 0% |
| **ETHYLBENZENE** | MA-VPH | 392 | 69 | 18% | 54 | **14%** | 323 | 82% | 50 | **13%** |
| **M-P XYLENE** | MA-VPH | 392 | 86 | 22% | 9 | **2%** | 306 | 78% | 0 | 0% |
| **O-XYLENE** | MA-VPH | 392 | 84 | 21% | 1 | **0.3%** | 308 | 79% | 0 | 0% |
| **TOTAL XYLENE** | MA-VPH | 392 | 102 | 26% | 3 | **1%** | 290 | 74% | 0 | 0% |
| **NAPHTHALENE** | MA-VPH | 392 | 66 | 17% | 48 | **12%** | 326 | 83% | 63 | **16%** |
| **C9-C10 AROMATICS** | MA-VPH | 392 | 230 | 59% | 187 | **48%** | 162 | 41% | 0 | 0% |
| **C5-C8 ALIPHATICS** | MA-VPH | 392 | 189 | 48% | 123 | **31%** | 203 | 52% | 5 | **1%** |
| **C9-C12 ALIPHATICS** | MA-VPH | 392 | 232 | 59% | 121 | **31%** | 160 | 41% | 0 | 0% |
| TOTAL PURGEABLE HYDROCARBONS | MA-VPH | 392 | 249 | 64% | 0 | 0% | 143 | 36% | 0 | 0% |
| ***EXTRACTABLE PETROLEUM HYDROCARBONS (EPH)*** | | | | | | | | | | |
| TOT EXTRACTABLE HYDROCARBON (EPH Screen) [3] | SW8015M | 103 | 53 | 51% | 30 | 29% | 50 | 49% | 0 | 0% |
| **C11-C22 AROMATICS** | MA-EPH | 319 | 238 | 75% | 165 | **52%** | 81 | 25% | 0 | 0% |
| **C9-C18 ALIPHATICS** | MA-EPH | 319 | 229 | 72% | 98 | **31%** | 90 | 28% | 0 | 0% |
| C19-C36 ALIPHATICS | MA-EPH | 319 | 252 | 79% | 0 | 0% | 67 | 21% | 0 | 0% |
| TOT EXTRACTABLE HYDROCARBON (EPH) [3] | MA-EPH | 319 | 270 | 85% | 0 | 0% | 49 | 15% | 6 | **2%** |

## TABLE 5-4. SUBSURFACE SOILS ANALYSIS SUMMARY

| ANALYTE | METHOD | TOTAL [1] ANALYSES | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | # Detected Analyses | % Detected Analyses | # Detected Exceedance | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| ***POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)*** | | | | | | | | | | |
| **2-METHYLNAPHTHALENE** | SW8270C | 319 | 213 | 67% | 118 | **37%** | 106 | 33% | 0 | 0% |
| ACENAPHTHENE | SW8270C | 319 | 157 | 49% | 0 | 0% | 162 | 51% | 0 | 0% |
| ACENAPHTHYLENE | SW8270C | 319 | 16 | 5% | 0 | 0% | 303 | 95% | 0 | 0% |
| ANTHRACENE | SW8270C | 319 | 181 | 57% | 0 | 0% | 138 | 43% | 0 | 0% |
| BENZO (A) ANTHRACENE | SW8270C | 319 | 161 | 50% | 0 | 0% | 158 | 50% | 0 | 0% |
| **BENZO (A) PYRENE [2]** | SW8270C | 319 | 121 | 38% | 1 | **0.3%** | 198 | 62% | 6 | **2%** |
| BENZO (B) FLUORANTHENE | SW8270C | 319 | 122 | 38% | 0 | 0% | 197 | 62% | 0 | 0% |
| BENZO (GHI) PERYLENE | SW8270C | 319 | 108 | 34% | 0 | 0% | 211 | 66% | 0 | 0% |
| BENZO (K) FLUORANTHENE | SW8270C | 319 | 100 | 31% | 0 | 0% | 219 | 69% | 0 | 0% |
| CHRYSENE | SW8270C | 319 | 163 | 51% | 0 | 0% | 156 | 49% | 0 | 0% |
| DIBENZ (A,H) ANTHRACENE | SW8270C | 319 | 31 | 10% | 0 | 0% | 288 | 90% | 7 | **2%** |
| FLUORANTHENE | SW8270C | 319 | 170 | 53% | 0 | 0% | 149 | 47% | 0 | 0% |
| FLUORENE | SW8270C | 319 | 215 | 67% | 0 | 0% | 104 | 33% | 0 | 0% |
| INDENO (1,2,3-C,D) PYRENE | SW8270C | 319 | 119 | 37% | 0 | 0% | 200 | 63% | 0 | 0% |
| **NAPHTHALENE** | SW8270C | 319 | 203 | 64% | 32 | **10%** | 116 | 36% | 0 | 0% |
| PHENANTHRENE | SW8270C | 319 | 247 | 77% | 0 | 0% | 72 | 23% | 0 | 0% |
| PYRENE | SW8270C | 319 | 249 | 78% | 0 | 0% | 70 | 22% | 0 | 0% |
| ***VOLATILE ORGANIC COMPOUNDS (VOCs)*** | | | | | | | | | | |
| **BENZENE** | SW8260B | 70 | 30 | 43% | 27 | **39%** | 40 | 57% | 40 | **57%** |
| BROMOBENZENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 3 | **4%** |
| BROMOCHLOROMETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 6 | **9%** |
| BROMODICHLOROMETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| BROMOFORM | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 6 | **9%** |
| BROMOMETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| CARBON TETRACHLORIDE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| **CHLOROBENZENE** | SW8260B | 70 | 1 | 1% | 1 | **1%** | 69 | 99% | 3 | **4%** |
| CHLOROETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 0 | 0% |
| 2-CHLOROETHYL VINYL ETHER | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 0 | 0% |
| CHLOROFORM | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| CHLOROMETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| 2-CHLOROTOLUENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 0 | 0% |
| 4-CHLOROTOLUENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 0 | 0% |
| CHLORODIBROMOMETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| 1,2-DIBROMOETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| DIBROMOMETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| 1,2-DICHLOROBENZENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 0 | 0% |
| 1,3-DICHLOROBENZENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 0 | 0% |
| 1,4-DICHLOROBENZENE | SW8260B | 70 | 1 | 1% | 0 | 0% | 69 | 99% | 3 | **4%** |
| DICHLORODIFLUOROMETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 0 | 0% |

## TABLE 5-4. SUBSURFACE SOILS ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **TOTAL [1] ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedance | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| 1,1-DICHLOROETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| 1,2-DICHLOROETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| CIS-1,2-DICHLOROETHENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 6 | **9%** |
| 1,1-DICHLOROETHENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| TRANS-1,2-DICHLOROETHENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 3 | **4%** |
| 1,2-DICHLOROPROPANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| 1,3-DICHLOROPROPANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 2 | **3%** |
| 2,2-DICHLOROPROPANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 0 | 0% |
| 1,1-DICHLOROPROPENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 0 | 0% |
| CIS-1,3-DICHLOROPROPENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 0 | 0% |
| TRANS-1,3-DICHLOROPROPENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 0 | 0% |
| **ETHYLBENZENE** | SW8260B | 70 | 36 | 51% | 9 | **13%** | 34 | 49% | 0 | 0% |
| METHYL TERT-BUTYL ETHER | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| METHYLENE CHLORIDE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| 2-BUTANONE (METHYL-ETHYL-KETONE) | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 3 | **4%** |
| STYRENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 2 | **3%** |
| 1,1,1,2-TETRACHLOROETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| 1,1,2,2-TETRACHLOROETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| TETRACHLOROETHENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| TOLUENE | SW8260B | 70 | 26 | 37% | 0 | 0% | 44 | 63% | 0 | 0% |
| 1,1,1-TRICHLOROETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 3 | **4%** |
| 1,1,2-TRICHLOROETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| TRICHLOROETHENE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| TRICHLOROFLUOROMETHANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 0 | 0% |
| 1,2,3-TRICHLOROPROPANE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| VINYL CHLORIDE | SW8260B | 70 | 0 | 0% | 0 | 0% | 70 | 100% | 70 | **100%** |
| M-P XYLENE | SW8260B | 70 | 34 | 49% | 0 | 0% | 36 | 51% | 0 | 0% |
| O-XYLENE | SW8260B | 70 | 34 | 49% | 0 | 0% | 36 | 51% | 0 | 0% |
| TOTAL XYLENE | SW8260B | 70 | 36 | 51% | 0 | 0% | 34 | 49% | 0 | 0% |
| ***WASTE CHARACTERISTICS*** | | | | | | | | | | |
| FLASH POINT,PMCC (F) | SW1010M | 1 | 1 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| CYANIDE (CN) | SW846CH7 | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| SULFIDE AS S | SW846CH7 | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| ***TCLP*** | | | | | | | | | | |
| ARSENIC (AS) | SW6020 | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| BARIUM (BA) | SW6020 | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| CADMIUM (CD) | SW6020 | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| CHROMIUM (CR) | SW6020 | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| LEAD (PB) | SW6020 | 1 | 1 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| MERCURY (HG) | SW7470A | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |

## TABLE 5-4. SUBSURFACE SOILS ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| ANALYTE | METHOD | TOTAL [1] ANALYSES | # Detected Analyses | % Detected Analyses | # Detected Exceedance | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| SELENIUM (SE) | SW6020 | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| SILVER (AG) | SW6020 | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| BENZENE | SW8260B | 1 | 1 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| CARBON TETRACHLORIDE | SW8260B | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| CHLOROBENZENE | SW8260B | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| CHLOROFORM | SW8260B | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| 1,1-DICHLOROETHENE | SW8260B | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| 1,2-DICHLOROETHANE | SW8260B | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| 1,4-DICHLOROBENZENE | SW8260B | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| 2-BUTANONE (METHYL-ETHYL-KETONE) | SW8260B | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| TETRACHLOROETHENE | SW8260B | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| TRICHLOROETHENE | SW8260B | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| VINYL CHLORIDE | SW8260B | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| TOTAL CRESOLS | SW8270C | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| CRESOLS (M,P) | SW8270C | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| CRESOLS (O) | SW8270C | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| PENTACHLOROPHENOL | SW8270C | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| 2,4,5-TRICHLOROPHENOL | SW8270C | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| 2,4,6-TRICHLOROPHENOL | SW8270C | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| 2,4-DINITROTOLUENE | SW8270C | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| HEXACHLOROBUTADIENE | SW8270C | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| HEXACHLOROBENZENE | SW8270C | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| HEXACHLOROETHANE | SW8270C | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| NITROBENZENE | SW8270C | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| PYRIDINE | SW8270C | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| CHLORDANE | SW8081A | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| HEPTACHLOR | SW8081A | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| HEPTACHLOR EPOXIDE | SW8081A | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| ENDRIN | SW8081A | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| GAMMA-BHC(LINDANE) | SW8081A | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| METHOXYCHLOR | SW8081A | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| TOXAPHENE | SW8081A | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| 2,4-D | SW8151A | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| 2,4,5-TP (SILVEX) | SW8151A | 1 | 0 | 0% | 0 | 0% | 1 | 100% | 0 | 0% |
| ***SEMIVOLATILES*** | | | | | | | | | | |
| 1,2,4-TRICHLOROBENZENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| 1,2-DICHLOROBENZENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 1 | 50% |
| 1,3-DICHLOROBENZENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| 1,4-DICHLOROBENZENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| **1-METHYLNAPHTHALENE** | SW8270C-H | 2 | 2 | 100% | 2 | **100%** | 0 | 0% | 0 | 0% |
| 2,4,5-TRICHLOROPHENOL | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |

## TABLE 5-4. SUBSURFACE SOILS ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| ANALYTE | METHOD | TOTAL [1] ANALYSES | # Detected Analyses | % Detected Analyses | # Detected Exceedance | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| 2,4,6-TRICHLOROPHENOL | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| 2,4-DICHLOROPHENOL | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| 2,4-DIMETHYLPHENOL | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 1 | 50% |
| 2,4-DINITROPHENOL | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| 2,4-DINITROTOLUENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| 2,6-DINITROTOLUENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| 2-CHLORONAPHTHALENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| 2-CHLOROPHENOL | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| **2-METHYLNAPHTHALENE** | SW8270C-H | 2 | 2 | 100% | 2 | **100%** | 0 | 0% | 0 | 0% |
| 2-NITROPHENOL | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| 3,3-DICHLOROBENZIDINE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| 4,6-DINITRO-2-METHYLPHENOL | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| 4-BROMOPHENYL PHENYL ETHER | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| 4-CHLORO-3-METHYLPHENOL | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| 4-CHLOROPHENOL | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| 4-CHLOROPHENYL PHENYL ETHER | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| 4-NITROPHENOL | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| ACENAPHTHENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| ACENAPHTHYLENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| ANTHRACENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| 1,2-DIPHENYLHYDRAZINE (AZOBENZENE) | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| BENZIDINE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| BENZO (A) ANTHRACENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| BENZO (A) PYRENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 1 | 50% |
| BENZO (B) FLUORANTHENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| BENZO (GHI) PERYLENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| BENZO (K) FLUORANTHENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| BIS (2-CHLOROETHOXY) METHANE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| BIS (2-CHLOROETHYL) ETHER | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |
| BIS (2-CHLOROISOPROPYL) ETHER | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 1 | 50% |
| BIS (2-ETHYLHEXYL) PHTHALATE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| BUTYL BENZYL PHTHALATE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| CHRYSENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| DIBENZ (A,H) ANTHRACENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 1 | 50% |
| DIETHYL- PHTHALATE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| DIMETHYL- PHTHALATE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| DI-N-BUTYLPHTHALATE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| DI-N-OCTYLPHTHALATE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| FLUORANTHENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| FLUORENE | SW8270C-H | 2 | 1 | 50% | 0 | 0% | 1 | 50% | 0 | 0% |
| HEXACHLORO- BENZENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | 100% |

## TABLE 5-4. SUBSURFACE SOILS ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **TOTAL (1) ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedance | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| HEXACHLORO- BUTADIENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | **100%** |
| DIENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | **100%** |
| HEXACHLORO- ETHANE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | **100%** |
| INDENO (1,2,3-C,D) PYRENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| ISOPHORONE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | **100%** |
| CRESOLS (M,P) | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| **NAPHTHALENE** | SW8270C-H | 2 | 2 | 100% | 1 | **50%** | 0 | 0% | 0 | 0% |
| NITROBENZENE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | **100%** |
| N-NITROSODIMETHYLAMINE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | **100%** |
| N-NITROSO-DI-N-PROPYLAMINE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | **100%** |
| N-NITROSODI- PHENYLAMINE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | **100%** |
| CRESOLS (O) | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 1 | **50%** |
| PENTACHLO- ROPHENOL | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | **100%** |
| PHENANTHRENE | SW8270C-H | 2 | 2 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| PHENOL | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 0 | 0% |
| PYRENE | SW8270C-H | 2 | 1 | 50% | 0 | 0% | 1 | 50% | 0 | 0% |
| PYRIDINE | SW8270C-H | 2 | 0 | 0% | 0 | 0% | 2 | 100% | 2 | **100%** |

(1) Inclusive of all subsurface soil analyses (Grid, MW, Opportunity), all intervals (A,B,C).
(2) Detected value is qualified as non-detect "U" due to contamination in associated blank.
(3) EPH Screen values exceeding 200 mg/kg are used only to determine the need for fraction analysis. RBSL criteria for Total Extractable Hydrocarbons are evaluated for individual fractions.
Red - Indicates constituent detected at concentrations greater than the screening level/standard.
Blue - Indicates analyses for which detection limit was greater than the screening level/standard.

# TABLE 5-5. SUBSURFACE SOIL SUMMARY STATISTICS

| Analyte | Method | Unit | Direct Contact Industrial RSL | MDEQ Leaching to Groundwater Screening Level | MDEQ - RBSLs Commercial Surface | TCLP | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Interval | Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***PHYSICAL PARAMETERS*** | | | | | | | | | | | | | | |
| MOISTURE % BY WT. | SW3550A | % | | | | | 392 | 392 | 2.6 | 41 | 0 | | | |
| pH OF SOIL & WASTE | SW9045D | s.u. | | | | | 392 | 392 | 7 | 10.4 | 0 | | | |
| ***METALS*** | | | | | | | | | | | | | | |
| **ARSENIC (AS)** | SW6020 | mg/kg | **22.5 [4]** | **22.5 [4]** | | | 392 | 392 | 1 | 39 | **4** | 1-ST-A | A | 2-4 |
| **BARIUM (BA)** | SW6010B/SW6020 | mg/kg | **22000** | **421** | | | 332 | 332 | 34 | 806 | **5** | 1-ST-A | A | 2-4 |
| CADMIUM (CD) | SW6010B/SW6020 | mg/kg | **98** | | | | 332 | 2 | 2 | 10 | 0 | | | |
| CHROMIUM (CR) | SW6010B/SW6020 | mg/kg | **180000** | **1800000** | | | 332 | 332 | 8 | 63 | 0 | | | |
| **LEAD (PB)** | SW6010B/SW6020 | mg/kg | **800** | **140** | | | 392 | 390 | 2 | 38400 | **31** | 30 | A | 4-6 |
| **MERCURY (HG)** | SW7471A/B | mg/kg | **4** | **1** | | | 332 | 2 | 1 | 1 | **2** | 1-ST-A / YMW-22 | A/B | 2-4/8-10' |
| SELENIUM (SE) | SW6020 | mg/kg | **580** | **2.6** | | | 392 | 3 | 1 | 2 | 0 | | | |
| SILVER (AG) | SW6010B/SW6020 | mg/kg | **580** | **8.51** | | | 332 | 1 | 2 | 2 | 0 | | | |
| **TETRAETHYL LEAD** | SW8270C | mg/kg | **0.0082** | **0.000047** | | | 23 | 3 | 0.091 | 0.51 | **3** | 28 | A | 6-7.3 |
| ***VOLATILE PETROLEUM HYDROCARBONS (VPH)*** | | | | | | | | | | | | | | |
| METHYL TERT-BUTYL ETHER | MA-VPH | mg/kg | | | **0.08** | | 392 | 0 | | | 0 | | | |
| **BENZENE** | MA-VPH | mg/kg | | | **0.04** | | 392 | 58 | 0.071 | 50 | **58** | 16 | C | 8-13 |
| **TOLUENE** | MA-VPH | mg/kg | | | **10** | | 392 | 29 | 0.076 | 16 | **3** | 17 | C | 8-9.2 |
| **ETHYLBENZENE** | MA-VPH | mg/kg | | | **10** | | 392 | 69 | 0.064 | 205 | **54** | YMW-15 | A | 2-4 |
| **M-P XYLENE** | MA-VPH | mg/kg | **240** | **100** | | | 392 | 86 | 0.066 | 406 | **9** | YMW-15 | A | 2-4 |
| **O-XYLENE** | MA-VPH | mg/kg | **280** | **100** | | | 392 | 84 | 0.062 | 215 | **1** | 39 | B | 8-11.5' |
| **TOTAL XYLENE** | MA-VPH | mg/kg | | | **200** | | 392 | 102 | 0.066 | 406 | **3** | YMW-15 | A | 2-4 |
| **NAPHTHALENE** | MA-VPH | mg/kg | | | **9** | | 392 | 66 | 0.66 | 259 | **48** | 39 | B | 8-11.5 |
| **C9-C10 AROMATICS** | MA-VPH | mg/kg | | | **100** | | 392 | 230 | 1.9 | 23600 | **187** | 39 | B | 8-11.5 |
| **C5-C8 ALIPHATICS** | MA-VPH | mg/kg | | | **200** | | 392 | 189 | 2.3 | 8110 | **123** | YMW-15 | A | 2-4 |
| **C9-C12 ALIPHATICS** | MA-VPH | mg/kg | | | **1000** | | 392 | 232 | 0.76 | 33900 | **121** | 39 | B | 8-11.5 |
| TOTAL PURGEABLE HYDROCARBONS | MA-VPH | mg/kg | | | | | 392 | 249 | 2.1 | 57400 | 0 | | | |
| ***EXTRACTABLE PETROLEUM HYDROCARBONS (EPH)*** | | | | | | | | | | | | | | |
| TOT EXTRACTABLE HYDROCARBON (EPHscr) [3] | SW8015M | mg/kg | | | **200** | | 103 | 53 | 12 | 23400 | 30 | 49 | A | 6-7.2 |
| **C11-C22 AROMATICS** | MA-EPH | mg/kg | | | **400** | | 319 | 238 | 13 | 21200 | **165** | 4-ST-A/45 | A/B | 3-4/4-4.9 |
| **C9-C18 ALIPHATICS** | MA-EPH | mg/kg | | | **2000** | | 319 | 229 | 12 | 35000 | **98** | 39 | B | 8-11.5 |
| C19-C36 ALIPHATICS | MA-EPH | mg/kg | | | **100000** | | 319 | 252 | 12 | 18800 | 0 | | | |
| TOT EXTRACTABLE HYDROCARBON (EPH) [3] | MA-EPH | mg/kg | | | | | 319 | 270 | 11 | 85900 | 0 | | | |
| ***POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)*** | | | | | | | | | | | | | | |
| **2-METHYLNAPHTHALENE** | SW8270C | mg/kg | **300** | **1.9** | | | 319 | 213 | 0.0034 | 182 | **118** | 39 | B | 8-11.5 |
| ACENAPHTHENE | SW8270C | mg/kg | | | **200** | | 319 | 157 | 0.0053 | 7.6 | 0 | | | |
| ACENAPHTHYLENE | SW8270C | mg/kg | | | | | 319 | 16 | 0.0054 | 0.96 | 0 | | | |
| ANTHRACENE | SW8270C | mg/kg | | | **4000** | | 319 | 181 | 0.0038 | 5.9 | 0 | | | |
| BENZO (A) ANTHRACENE | SW8270C | mg/kg | | | **10** | | 319 | 161 | 0.0041 | 5.5 | 0 | | | |

# TABLE 5-5. SUBSURFACE SOIL SUMMARY STATISTICS

| Analyte | Method | Unit | Direct Contact Industrial RSL | MDEQ Leaching to Groundwater Screening Level | MDEQ - RBSLs Commercial Surface | TCLP | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Interval | Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BENZO (A) PYRENE [2] | SW8270C | mg/kg | | | 4 | | 319 | 121 | 0.004 | 5.9 | 1 | 77 | A | 2-4 |
| BENZO (B) FLUORANTHENE | SW8270C | mg/kg | | | 50 | | 319 | 122 | 0.005 | 5.6 | 0 | | | |
| BENZO (GHI) PERYLENE | SW8270C | mg/kg | | | | | 319 | 108 | 0.0041 | 3.6 | 0 | | | |
| BENZO (K) FLUORANTHENE | SW8270C | mg/kg | | | 500 | | 319 | 100 | 0.0038 | 2.7 | 0 | | | |
| CHRYSENE | SW8270C | mg/kg | | | 2000 | | 319 | 163 | 0.0041 | 6.3 | 0 | | | |
| DIBENZ (A,H) ANTHRACENE | SW8270C | mg/kg | | | 5 | | 319 | 31 | 0.0051 | 1.3 | 0 | | | |
| FLUORANTHENE | SW8270C | mg/kg | | | 500 | | 319 | 170 | 0.004 | 15 | 0 | | | |
| FLUORENE | SW8270C | mg/kg | | | 600 | | 319 | 215 | 0.0045 | 18 | 0 | | | |
| INDENO (1,2,3-C,D) PYRENE | SW8270C | mg/kg | | | 50 | | 319 | 119 | 0.0038 | 6.2 | 0 | | | |
| NAPHTHALENE | SW8270C | mg/kg | | | 9 | | 319 | 203 | 0.0042 | 72 | 32 | 39 | B | 8-11.5 |
| PHENANTHRENE | SW8270C | mg/kg | | | | | 319 | 247 | 0.0042 | 26 | 0 | | | |
| PYRENE | SW8270C | mg/kg | | | 2000 | | 319 | 249 | 0.0039 | 14 | 0 | | | |
| ***VOLATILE ORGANIC COMPOUNDS (VOCs)*** | | | | | | | | | | | | | | |
| BENZENE | SW8260B | mg/kg | | | 0.04 | | 70 | 30 | 0.027 | 11 | 27 | 26 | C | 11-14.5 |
| BROMOBENZENE | SW8260B | mg/kg | 180 | 0.42 | | | 70 | 0 | | | 0 | | | |
| BROMOCHLOROMETHANE | SW8260B | mg/kg | 63 | 0.21 | | | 70 | 0 | | | 0 | | | |
| BROMODICHLOROMETHANE | SW8260B | mg/kg | 1.3 | 0.028 | | | 70 | 0 | | | 0 | | | |
| BROMOFORM | SW8260B | mg/kg | 290 | 0.21 | | | 70 | 0 | | | 0 | | | |
| BROMOMETHANE | SW8260B | mg/kg | 3 | 0.025 | | | 70 | 0 | | | 0 | | | |
| CARBON TETRACHLORIDE | SW8260B | mg/kg | 2.9 | 0.012 | | | 70 | 0 | | | 0 | | | |
| CHLOROBENZENE | SW8260B | mg/kg | 130 | 0.68 | | | 70 | 1 | 0.36 | 0.75 | 1 | YMW-13 | D | 8-10 |
| CHLOROETHANE | SW8260B | mg/kg | 5700 | 59 | | | 70 | 0 | | | 0 | | | |
| 2-CHLOROETHYL VINYL ETHER | SW8260B | mg/kg | | | | | 70 | 0 | | | 0 | | | |
| CHLOROFORM | SW8260B | mg/kg | 1.4 | 0.195 | | | 70 | 0 | | | 0 | | | |
| CHLOROMETHANE | SW8260B | mg/kg | 46 | 0.077 | | | 70 | 0 | | | 0 | | | |
| 2-CHLOROTOLUENE | SW8260B | mg/kg | 2300 | 2.3 | | | 70 | 0 | | | 0 | | | |
| 4-CHLOROTOLUENE | SW8260B | mg/kg | 2300 | 2.4 | | | 70 | 0 | | | 0 | | | |
| CHLORODIBROMOMETHANE | SW8260B | mg/kg | 3.2 | 0.01 | | | 70 | 0 | | | 0 | | | |
| 1,2-DIBROMOETHANE | SW8260B | mg/kg | | | 0.00002 | | 70 | 0 | | | 0 | | | |
| DIBROMOMETHANE | SW8260B | mg/kg | 9.8 | 0.02 | | | 70 | 0 | | | 0 | | | |
| 1,2-DICHLOROBENZENE | SW8260B | mg/kg | 930 | 5.8 | | | 70 | 0 | 0.1 | 0.1 | 0 | | | |
| 1,3-DICHLOROBENZENE | SW8260B | mg/kg | | | | | 70 | 0 | | | 0 | | | |
| 1,4-DICHLOROBENZENE | SW8260B | mg/kg | 11 | 0.72 | | | 70 | 1 | 0.052 | 0.052 | 0 | | | |
| DICHLORODIFLUOROMETHANE | SW8260B | mg/kg | 37 | 15 | | | 70 | 0 | | | 0 | | | |
| 1,1-DICHLOROETHANE | SW8260B | mg/kg | 16 | 0.0078 | | | 70 | 0 | | | 0 | | | |
| 1,2-DICHLOROETHANE | SW8260B | mg/kg | | | 0.01 | | 70 | 0 | | | 0 | | | |
| CIS-1,2-DICHLOROETHENE | SW8260B | mg/kg | 230 | 0.21 | | | 70 | 0 | | | 0 | | | |
| 1,1-DICHLOROETHENE | SW8260B | mg/kg | 100 | 0.0025 | | | 70 | 0 | | | 0 | | | |
| TRANS-1,2-DICHLOROETHENE | SW8260B | mg/kg | 2300 | 0.29 | | | 70 | 0 | | | 0 | | | |
| 1,2-DICHLOROPROPANE | SW8260B | mg/kg | 4.4 | 0.017 | | | 70 | 0 | | | 0 | | | |
| 1,3-DICHLOROPROPANE | SW8260B | mg/kg | 2300 | 1.3 | | | 70 | 0 | | | 0 | | | |
| 2,2-DICHLOROPROPANE | SW8260B | mg/kg | | | | | 70 | 0 | | | 0 | | | |
| 1,1-DICHLOROPROPENE | SW8260B | mg/kg | | | | | 70 | 0 | | | 0 | | | |

# TABLE 5-5. SUBSURFACE SOIL SUMMARY STATISTICS

| Analyte | Method | Unit | Direct Contact Industrial RSL | MDEQ Leaching to Groundwater Screening Level | MDEQ - RBSLs Commercial Surface | TCLP | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Interval | Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CIS-1,3-DICHLOROPROPENE | SW8260B | mg/kg | | | | | 70 | 0 | | | 0 | | | |
| TRANS-1,3-DICHLOROPROPENE | SW8260B | mg/kg | | | | | 70 | 0 | | | 0 | | | |
| ETHYLBENZENE | SW8260B | mg/kg | | | 10 | | 70 | 36 | 0.045 | 48 | 9 | 26 | B | 8.1-11 |
| METHYL TERT-BUTYL ETHER | SW8260B | mg/kg | | | 0.08 | | 70 | 0 | | | 0 | | | |
| METHYLENE CHLORIDE | SW8260B | mg/kg | 1000 | 0.013 | | | 70 | 0 | | | 0 | | | |
| 2-BUTANONE (METHYL-ETHYL-KETONE) | SW8260B | mg/kg | 19000 | 12 | | | 70 | 0 | | | 0 | | | |
| STYRENE | SW8260B | mg/kg | 3500 | 1.1 | | | 70 | 0 | | | 0 | | | |
| 1,1,1,2-TETRACHLOROETHANE | SW8260B | mg/kg | 8.8 | 0.0022 | | | 70 | 0 | | | 0 | | | |
| 1,1,2,2-TETRACHLOROETHANE | SW8260B | mg/kg | 2.7 | 0.0078 | | | 70 | 0 | | | 0 | | | |
| TETRACHLOROETHENE | SW8260B | mg/kg | 100 | 0.023 | | | 70 | 0 | | | 0 | | | |
| TOLUENE | SW8260B | mg/kg | | | 10 | | 70 | 26 | 0.025 | 3 | 0 | | | |
| 1,1,1-TRICHLOROETHANE | SW8260B | mg/kg | 3600 | 0.7 | | | 70 | 0 | | | 0 | | | |
| 1,1,2-TRICHLOROETHANE | SW8260B | mg/kg | 5 | 0.0096 | | | 70 | 0 | | | 0 | | | |
| TRICHLOROETHENE | SW8260B | mg/kg | 6 | 0.018 | | | 70 | 0 | | | 0 | | | |
| TRICHLOROFLUOROMETHANE | SW8260B | mg/kg | 310 | 66.4 | | | 70 | 0 | | | 0 | | | |
| 1,2,3-TRICHLOROPROPANE | SW8260B | mg/kg | 0.11 | 0.0000032 | | | 70 | 0 | | | 0 | | | |
| VINYL CHLORIDE | SW8260B | mg/kg | 1.7 | 0.0007 | | | 70 | 0 | | | 0 | | | |
| M-P XYLENE | SW8260B | mg/kg | 240 | 100 | | | 70 | 34 | 0.055 | 93 | 0 | | | |
| O-XYLENE | SW8260B | mg/kg | 280 | 100 | | | 70 | 34 | 0.042 | 10 | 0 | | | |
| TOTAL XYLENE | SW8260B | mg/kg | | | 200 | | 70 | 36 | 0.11 | 97 | 0 | | | |
| ***WASTE CHARACTERISTICS*** | | | | | | | | | | | | | | |
| FLASH POINT,PMCC (F) | SW1010M | F | | | | >140 | 1 | 1 | >200 | >200 | 0 | | | |
| CYANIDE (CN) | SW846CH7 | mg/kg | | | | (5) | 1 | 0 | | | 0 | | | |
| SULFIDE AS S | SW846CH7 | mg/kg | | | | | 1 | 0 | | | 0 | | | |
| ***TCLP*** | | | | | | | | | | | | | | |
| ARSENIC (AS) | SW6020 | mg/L | | | | 5 | 1 | 0 | | | 0 | | | |
| BARIUM (BA) | SW6020 | mg/L | | | | 100 | 1 | 0 | | | 0 | | | |
| CADMIUM (CD) | SW6020 | mg/L | | | | 1 | 1 | 0 | | | 0 | | | |
| CHROMIUM (CR) | SW6020 | mg/L | | | | 5 | 1 | 0 | | | 0 | | | |
| LEAD (PB) | SW6020 | mg/L | | | | 5 | 1 | 1 | 3.7 | 3.7 | 0 | | | |
| MERCURY (HG) | SW7470A | mg/L | | | | 0.2 | 1 | 0 | | | 0 | | | |
| SELENIUM (SE) | SW6020 | mg/L | | | | 1 | 1 | 0 | | | 0 | | | |
| SILVER (AG) | SW6020 | mg/L | | | | 5 | 1 | 0 | | | 0 | | | |
| BENZENE | SW8260B | mg/L | | | | 0.5 | 1 | 1 | 0.034 | 0.034 | 0 | | | |
| CARBON TETRACHLORIDE | SW8260B | mg/L | | | | 0.5 | 1 | 0 | | | 0 | | | |
| CHLOROBENZENE | SW8260B | mg/L | | | | 100 | 1 | 0 | | | 0 | | | |
| CHLOROFORM | SW8260B | mg/L | | | | 6 | 1 | 0 | | | 0 | | | |
| 1,1-DICHLOROETHENE | SW8260B | mg/L | | | | 0.7 | 1 | 0 | | | 0 | | | |
| 1,2-DICHLOROETHANE | SW8260B | mg/L | | | | 0.5 | 1 | 0 | | | 0 | | | |
| 1,4-DICHLOROBENZENE | SW8260B | mg/L | | | | 7.5 | 1 | 0 | | | 0 | | | |
| 2-BUTANONE (METHYL-ETHYL-KETONE) | SW8260B | mg/L | | | | 200 | 1 | 0 | | | 0 | | | |
| TETRACHLOROETHENE | SW8260B | mg/L | | | | 0.7 | 1 | 0 | | | 0 | | | |
| TRICHLOROETHENE | SW8260B | mg/L | | | | 0.5 | 1 | 0 | | | 0 | | | |
| VINYL CHLORIDE | SW8260B | mg/L | | | | 0.2 | 1 | 0 | | | 0 | | | |
| TOTAL CRESOLS | SW8270C | mg/L | | | | 200 | 1 | 0 | | | 0 | | | |

# TABLE 5-5. SUBSURFACE SOIL SUMMARY STATISTICS

| Analyte | Method | Unit | Direct Contact Industrial RSL | MDEQ Leaching to Groundwater Screening Level | MDEQ - RBSLs Commercial Surface | TCLP | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Interval | Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CRESOLS (M,P) | SW8270C | mg/L | | | | 200 | 1 | 0 | | | 0 | | | |
| CRESOLS (O) | SW8270C | mg/L | | | | 200 | 1 | 0 | | | 0 | | | |
| PENTACHLOROPHENOL | SW8270C | mg/L | | | | 100 | 1 | 0 | | | 0 | | | |
| 2,4,5-TRICHLOROPHENOL | SW8270C | mg/L | | | | 400 | 1 | 0 | | | 0 | | | |
| 2,4,6-TRICHLOROPHENOL | SW8270C | mg/L | | | | 2 | 1 | 0 | | | 0 | | | |
| 2,4-DINITROTOLUENE | SW8270C | mg/L | | | | 0.13 | 1 | 0 | | | 0 | | | |
| HEXACHLOROBUTADIENE | SW8270C | mg/L | | | | 0.5 | 1 | 0 | | | 0 | | | |
| HEXACHLOROBENZENE | SW8270C | mg/L | | | | 0.13 | 1 | 0 | | | 0 | | | |
| HEXACHLOROETHANE | SW8270C | mg/L | | | | 3 | 1 | 0 | | | 0 | | | |
| NITROBENZENE | SW8270C | mg/L | | | | 2 | 1 | 0 | | | 0 | | | |
| PYRIDINE | SW8270C | mg/L | | | | 5 | 1 | 0 | | | 0 | | | |
| CHLORDANE | SW8081A | mg/L | | | | 0.03 | 1 | 0 | | | 0 | | | |
| HEPTACHLOR | SW8081A | mg/L | | | | 0.008 | 1 | 0 | | | 0 | | | |
| HEPTACHLOR EPOXIDE | SW8081A | mg/L | | | | 0.008 | 1 | 0 | | | 0 | | | |
| ENDRIN | SW8081A | mg/L | | | | 0.02 | 1 | 0 | | | 0 | | | |
| GAMMA-BHC(LINDANE) | SW8081A | mg/L | | | | 0.4 | 1 | 0 | | | 0 | | | |
| METHOXYCHLOR | SW8081A | mg/L | | | | 10 | 1 | 0 | | | 0 | | | |
| TOXAPHENE | SW8081A | mg/L | | | | 0.5 | 1 | 0 | | | 0 | | | |
| 2,4-D | SW8151A | mg/L | | | | 10 | 1 | 0 | | | 0 | | | |
| 2,4,5-TP (SILVEX) | SW8151A | mg/L | | | | 1 | 1 | 0 | | | 0 | | | |
| ***SEMIVOLATILES*** | | | | | | | | | | | | | | |
| 1,2,4-TRICHLOROBENZENE | SW8270C-H | mg/kg | 26 | 2 | | | 2 | 0 | | | 0 | | | |
| 1,2-DICHLOROBENZENE | SW8270C-H | mg/kg | 930 | 5.8 | | | 2 | 0 | | | 0 | | | |
| 1,3-DICHLOROBENZENE | SW8270C-H | mg/kg | | | | | 2 | 0 | | | 0 | | | |
| 1,4-DICHLOROBENZENE | SW8270C-H | mg/kg | 11 | 0.72 | | | 2 | 0 | | | 0 | | | |
| **1-METHYLNAPHTHALENE** | SW8270C-H | mg/kg | 73 | 0.058 | | | 2 | 2 | 2.5 | 38 | **2** | 45 | A | 2-4' |
| 2,4,5-TRICHLOROPHENOL | SW8270C-H | mg/kg | 8200 | 66 | | | 2 | 0 | | | 0 | | | |
| 2,4,6-TRICHLOROPHENOL | SW8270C-H | mg/kg | 82 | 1.13 | | | 2 | 0 | | | 0 | | | |
| 2,4-DICHLOROPHENOL | SW8270C-H | mg/kg | 250 | 0.9 | | | 2 | 0 | | | 0 | | | |
| 2,4-DIMETHYLPHENOL | SW8270C-H | mg/kg | 1600 | 4.4 | | | 2 | 0 | | | 0 | | | |
| 2,4-DINITROPHENOL | SW8270C-H | mg/kg | 160 | 0.78 | | | 2 | 0 | | | 0 | | | |
| 2,4-DINITROTOLUENE | SW8270C-H | mg/kg | 7.4 | 0.015 | | | 2 | 0 | | | 0 | | | |
| 2,6-DINITROTOLUENE | SW8270C-H | mg/kg | 1.5 | 0.007 | | | 2 | 0 | | | 0 | | | |
| 2-CHLORONAPHTHALENE | SW8270C-H | mg/kg | 9300 | 51 | | | 2 | 0 | | | 0 | | | |
| 2-CHLOROPHENOL | SW8270C-H | mg/kg | 580 | 0.65 | | | 2 | 0 | | | 0 | | | |
| **2-METHYLNAPHTHALENE** | SW8270C-H | mg/kg | 300 | 1.9 | | | 2 | 2 | 2.9 | 49 | **2** | 45 | A | 2-4' |
| 2-NITROPHENOL | SW8270C-H | mg/kg | | | | | 2 | 0 | | | 0 | | | |
| 3,3-DICHLOROBENZIDINE | SW8270C-H | mg/kg | 5.1 | 0.014 | | | 2 | 0 | | | 0 | | | |
| 4,6-DINITRO-2-METHYLPHENOL | SW8270C-H | mg/kg | 6.6 | 0.22 | | | 2 | 0 | | | 0 | | | |
| 4-BROMOPHENYL PHENYL ETHER | SW8270C-H | mg/kg | | | | | 2 | 0 | | | 0 | | | |
| 4-CHLORO-3-METHYLPHENOL | SW8270C-H | mg/kg | 8200 | 36 | | | 2 | 0 | | | 0 | | | |

# TABLE 5-5. SUBSURFACE SOIL SUMMARY STATISTICS

| Analyte | Method | Unit | Direct Contact Industrial RSL | MDEQ Leaching to Groundwater Screening Level | MDEQ - RBSLs Commercial Surface | TCLP | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Interval | Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4-CHLOROPHENOL | SW8270C-H | mg/kg | | | | | 2 | 0 | | | 0 | | | |
| 4-CHLOROPHENYL PHENYL ETHER | SW8270C-H | mg/kg | | | | | 2 | 0 | | | 0 | | | |
| 4-NITROPHENOL | SW8270C-H | mg/kg | | | | | 2 | 0 | | | 0 | | | |
| ACENAPHTHENE | SW8270C-H | mg/kg | | | 200 | | 2 | 0 | | | 0 | | | |
| ACENAPHTHYLENE | SW8270C-H | mg/kg | | | | | 2 | 0 | | | 0 | | | |
| ANTHRACENE | SW8270C-H | mg/kg | | | 4000 | | 2 | 0 | | | 0 | | | |
| 1,2-DIPHENYLHYDRAZINE (AZOBENZENE) | SW8270C-H | mg/kg | 26 | 0.028 | | | 2 | 0 | | | 0 | | | |
| BENZIDINE | SW8270C-H | mg/kg | 0.01 | 0.000021 | | | 2 | 0 | | | 0 | | | |
| BENZO (A) ANTHRACENE | SW8270C-H | mg/kg | | | 10 | | 2 | 0 | | | 0 | | | |
| BENZO (A) PYRENE | SW8270C-H | mg/kg | | | 4 | | 2 | 0 | | | 0 | | | |
| BENZO (B) FLUORANTHENE | SW8270C-H | mg/kg | | | 50 | | 2 | 0 | | | 0 | | | |
| BENZO (GHI) PERYLENE | SW8270C-H | mg/kg | | | | | 2 | 0 | | | 0 | | | |
| BENZO (K) FLUORANTHENE | SW8270C-H | mg/kg | | | 500 | | 2 | 0 | | | 0 | | | |
| BIS (2-CHLOROETHOXY) METHANE | SW8270C-H | mg/kg | 250 | 0.13 | | | 2 | 0 | | | 0 | | | |
| BIS (2-CHLOROETHYL) ETHER | SW8270C-H | mg/kg | 1 | 0.00077 | | | 2 | 0 | | | 0 | | | |
| BIS (2-CHLOROISOPROPYL) ETHER | SW8270C-H | mg/kg | 22 | 5.1 | | | 2 | 0 | | | 0 | | | |
| BIS (2-ETHYLHEXYL) PHTHALATE | SW8270C-H | mg/kg | 160 | 14 | | | 2 | 0 | | | 0 | | | |
| BUTYL BENZYL PHTHALATE | SW8270C-H | mg/kg | 1200 | 216 | | | 2 | 0 | | | 0 | | | |
| CHRYSENE | SW8270C-H | mg/kg | | | 2000 | | 2 | 0 | | | 0 | | | |
| DIBENZ (A,H) ANTHRACENE | SW8270C-H | mg/kg | | | 5 | | 2 | 0 | | | 0 | | | |
| DIETHYL- PHTHALATE | SW8270C-H | mg/kg | 66000 | 69 | | | 2 | 0 | | | 0 | | | |
| DIMETHYL- PHTHALATE | SW8270C-H | mg/kg | | | | | 2 | 0 | | | 0 | | | |
| DI-N-BUTYLPHTHALATE | SW8270C-H | mg/kg | 8200 | 51 | | | 2 | 0 | | | 0 | | | |
| DI-N-OCTYLPHTHALATE | SW8270C-H | mg/kg | | | | | 2 | 0 | | | 0 | | | |
| FLUORANTHENE | SW8270C-H | mg/kg | | | 500 | | 2 | 0 | | | 0 | | | |
| FLUORENE | SW8270C-H | mg/kg | | | 600 | | 2 | 1 | 5.2 | 5.2 | 0 | | | |
| HEXACHLORO- BENZENE | SW8270C-H | mg/kg | 1.4 | 0.025 | | | 2 | 0 | | | 0 | | | |
| HEXACHLORO- BUTADIENE | SW8270C-H | mg/kg | 30 | 0.095 | | | 2 | 0 | | | 0 | | | |
| HEXACHLORO- CYCLOPENTA-DIENE | SW8270C-H | mg/kg | 490 | 0.96 | | | 2 | 0 | | | 0 | | | |
| HEXACHLORO- ETHANE | SW8270C-H | mg/kg | 58 | 0.18 | | | 2 | 0 | | | 0 | | | |
| INDENO (1,2,3-C,D) PYRENE | SW8270C-H | mg/kg | | | 50 | | 2 | 0 | | | 0 | | | |
| ISOPHORONE | SW8270C-H | mg/kg | 2400 | 1.33 | | | 2 | 0 | | | 0 | | | |
| CRESOLS (M,P) | SW8270C-H | mg/kg | | | | | 2 | 0 | | | 0 | | | |
| **NAPHTHALENE** | SW8270C-H | mg/kg | | | 9 | | 2 | 2 | 0.65 | 12 | **1** | 45 | A | 2-4' |
| NITROBENZENE | SW8270C-H | mg/kg | 22 | 0.11 | | | 2 | 0 | | | 0 | | | |
| N-NITROSODIMETHYLAMINE | SW8270C-H | mg/kg | 0.045 | 0.000012 | | | 2 | 0 | | | 0 | | | |
| N-NITROSO-DI-N-PROPYLAMINE | SW8270C-H | mg/kg | 0.33 | 0.000081 | | | 2 | 0 | | | 0 | | | |
| N-NITROSODI- PHENYLAMINE | SW8270C-H | mg/kg | 470 | 1.8 | | | 2 | 0 | | | 0 | | | |
| CRESOLS (O) | SW8270C-H | mg/kg | 4100 | 7.5 | | | 2 | 0 | | | 0 | | | |

# TABLE 5-5. SUBSURFACE SOIL SUMMARY STATISTICS

| Analyte | Method | Unit | Direct Contact Industrial RSL | MDEQ Leaching to Groundwater Screening Level | MDEQ - RBSLs Commercial Surface | TCLP | Total [(1)] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Interval | Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PENTACHLO- ROPHENOL | SW8270C-H | mg/kg | 4 | 0.1 | | | 2 | 0 | | | 0 | | | |
| PHENANTHRENE | SW8270C-H | mg/kg | | | | | 2 | 2 | 1 | 12 | 0 | | | |
| PHENOL | SW8270C-H | mg/kg | 25000 | 1.71 | | | 2 | 0 | | | 0 | | | |
| PYRENE | SW8270C-H | mg/kg | | | 2000 | | 2 | 1 | 2.3 | 2.3 | 0 | | | |
| PYRIDINE | SW8270C-H | mg/kg | 120 | 0.068 | | | 2 | 0 | | | 0 | | | |

[#] - DEQ Direct Contact Screening levels

(1) Includes all surface soil analyses (Grids, Monitoring Wells, Paint Shop, TEL), all intervals (A,B,C), all methods.
(2) Detected value is qualified as non-detect "U" due to contamination in associated blank.
(3) EPH Screen values exceeding 200 mg/kg are used only to determine the need for fraction analysis. RBSL criteria for Total Extractable Hydrocarbons are evaluated for individual fractions.
(4) Compared to http://deq.mt.gov/StateSuperfund/background.mcpx.
(5) Any of the 8 narrative properties listed in 40 CFR 261.23.
Red - Indicates constituent detected at concentrations greater than the screening level/standard.

## TABLE 5-6. SUBSURFACE SOIL CONSTITUENT EXCEEDANCES

| | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **TOTAL [1] ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedance | % Detected Exceedances |
| ***METALS*** | | | | | | |
| ARSENIC (AS) | SW6020 | 392 | 392 | 100% | 4 | 1% |
| BARIUM (BA) | SW6010B/SW6020 | 332 | 332 | 100% | 5 | 2% |
| LEAD (PB) | SW6010B/SW6020 | 392 | 390 | 99% | 31 | 8% |
| MERCURY (HG) | SW7471A/B | 332 | 2 | 1% | 2 | 1% |
| TETRAETHYL LEAD | SW8270C/SW8270C-H | 23 | 3 | 13% | 3 | 13% |
| ***VOLATILE PETROLEUM HYDROCARBONS (VPH)*** | | | | | | |
| BENZENE | MA-VPH | 392 | 58 | 15% | 58 | 15% |
| TOLUENE | MA-VPH | 392 | 29 | 7% | 3 | 1% |
| ETHYLBENZENE | MA-VPH | 392 | 69 | 18% | 54 | 14% |
| M-P XYLENE | MA-VPH | 392 | 86 | 22% | 9 | 2% |
| O-XYLENE | MA-VPH | 392 | 84 | 21% | 1 | 0.3% |
| TOTAL XYLENE | MA-VPH | 392 | 102 | 26% | 3 | 1% |
| NAPHTHALENE | MA-VPH | 392 | 66 | 17% | 48 | 12% |
| C9-C10 AROMATICS | MA-VPH | 392 | 230 | 59% | 187 | 48% |
| C5-C8 ALIPHATICS | MA-VPH | 392 | 189 | 48% | 123 | 31% |
| C9-C12 ALIPHATICS | MA-VPH | 392 | 232 | 59% | 121 | 31% |
| ***EXTRACTABLE PETROLEUM HYDROCARBONS (EPH)*** | | | | | | |
| C11-C22 AROMATICS | MA-EPH | 319 | 238 | 75% | 165 | 52% |
| C9-C18 ALIPHATICS | MA-EPH | 319 | 229 | 72% | 98 | 31% |
| ***POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)*** | | | | | | |
| 2-METHYLNAPHTHALENE | SW8270C | 319 | 213 | 67% | 118 | 37% |
| BENZO (A) PYRENE [2] | SW8270C | 319 | 121 | 38% | 1 | 0.3% |
| NAPHTHALENE | SW8270C | 319 | 203 | 64% | 32 | 10% |
| ***VOLATILE ORGANIC COMPOUNDS (VOCs)*** | | | | | | |
| BENZENE | SW8260B | 70 | 30 | 43% | 27 | 39% |
| CHLOROBENZENE | SW8260B | 70 | 1 | 1% | 1 | 1% |
| ETHYLBENZENE | SW8260B | 70 | 36 | 51% | 9 | 13% |
| ***SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs)*** | | | | | | |
| 1-METHYLNAPHTHALENE | SW8270C-H | 2 | 2 | 100% | 2 | 100% |
| 2-METHYLNAPHTHALENE | SW8270C-H | 2 | 2 | 100% | 2 | 100% |
| NAPHTHALENE | SW8270C-H | 2 | 2 | 100% | 1 | 50% |

(1) Inclusive of all subsurface soil analyses (Grid, MW, Opportunity), all intervals (A,B,C).
(2) Detected value is qualified as non-detect "U" due to contamination in associated blank.

## TABLE 5-7. GROUNDWATER ANALYSIS SUMMARY

| | | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ANALYTE | METHOD | FRACTION | TOTAL [1] ANALYSES | # Detected Analyses | % Detected Analyses | # Detected Exceedance [2] | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedance | % Detection Limit Exceedances |
| ***PHYSICAL PARAMETERS*** | | | | | | | | | | | |
| PH - FLD | FIELD | PHYS | 30 | 30 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| pH - LAB | A4500-HB | PHYS | 32 | 32 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| SC (UMHOS/CM AT 25 C) | A2510B | PHYS | 32 | 32 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| SC (UMHOS/CM AT 25 C) (FLD) | FIELD | PHYS | 30 | 30 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| WATER TEMPERATURE (FLD) | FIELD | PHYS | 30 | 30 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| OXIDATION REDUCTION POTENTIAL | FIELD | PHYS | 30 | 30 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| DISSOLVED OXYGEN | FIELD | PHYS | 30 | 30 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| TURBIDITY (NTU) - LAB | A2130B | PHYS | 16 | 16 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| **TDS (MEASURED AT 180 C)** | A2540C | PHYS | 32 | 32 | 100% | 31 | **97%** | 0 | 0% | 0 | 0% |
| ***COMMON IONS*** | | | | | | | | | | | |
| TOTAL ALKALINITY AS CACO3 | A2320B | IONS | 32 | 32 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| BICARBONATE ALKALINITY AS HCO3 | A2320B | IONS | 32 | 32 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| **CHLORIDE (CL)** | E300.0 | IONS | 32 | 32 | 100% | 8 | **25%** | 0 | 0% | 0 | 0% |
| **SULFATE (SO4)** | E300.0 | IONS | 32 | 30 | 94% | 24 | **75%** | 2 | 6% | 0 | 0% |
| ***MONITORED NATURAL ATTENUATION*** | | | | | | | | | | | |
| NITRITE (NO2-N) | E353.2 | MNA | 32 | 7 | 22% | 0 | 0% | 25 | 78% | 0 | 0% |
| **NITRATE (NO3-N)** | CALCULATION | MNA | 32 | 17 | 53% | 12 | **38%** | 15 | 47% | 0 | 0% |
| **NITRATE + NITRITE AS N** | E353.2 | MNA | 32 | 29 | 91% | 12 | **38%** | 3 | 9% | 0 | 0% |
| **FERROUS IRON** | E200.7 | MNA | 16 | 12 | 75% | 12 | **75%** | 4 | 25% | 0 | 0% |
| METHANE | SW8015M | MNA | 32 | 29 | 91% | 0 | 0% | 3 | 9% | 0 | 0% |
| ***TRACE CONSTITUENTS*** | | | | | | | | | | | |
| **ARSENIC (AS)** | E200.8 | DIS | 16 | 16 | 100% | 2 | **13%** | 0 | 0% | 0 | 0% |
| **ARSENIC (AS)** | E200.8 | TRC | 16 | 16 | 100% | 6 | **38%** | 0 | 0% | 0 | 0% |
| BARIUM (BA) | E200.7/E200.8 | DIS | 16 | 13 | 81% | 0 | 0% | 3 | 19% | 0 | 0% |
| BARIUM (BA) | E200.7/E200.8 | TRC | 16 | 14 | 88% | 0 | 0% | 2 | 13% | 0 | 0% |
| CADMIUM (CD) | E200.8 | DIS | 16 | 1 | 6% | 0 | 0% | 15 | 94% | 0 | 0% |
| CADMIUM (CD) | E200.8 | TRC | 16 | 0 | 0% | 0 | 0% | 16 | 100% | 0 | 0% |
| CALCIUM (CA) | E200.7 | DIS | 16 | 16 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| CALCIUM (CA) | E200.7 | TRC | 16 | 16 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| CHROMIUM (CR) | E200.8 | DIS | 16 | 1 | 6% | 0 | 0% | 15 | 94% | 0 | 0% |
| CHROMIUM (CR) | E200.8 | TRC | 16 | 0 | 0% | 0 | 0% | 16 | 100% | 0 | 0% |
| **LEAD (PB)** | E200.8 | DIS | 16 | 3 | 19% | 1 | **6%** | 13 | 81% | 0 | 0% |
| **LEAD (PB)** | E200.8 | TRC | 16 | 9 | 56% | 2 | **13%** | 7 | 44% | 0 | 0% |
| MAGNESIUM (MG) | E200.7 | DIS | 16 | 16 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| MAGNESIUM (MG) | E200.7 | TRC | 16 | 16 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| MERCURY (HG) | E200.8 | DIS | 16 | 0 | 0% | 0 | 0% | 16 | 100% | 0 | 0% |
| MERCURY (HG) | E200.8 | TRC | 16 | 1 | 6% | 0 | 0% | 15 | 94% | 0 | 0% |

## TABLE 5-7. GROUNDWATER ANALYSIS SUMMARY

| | | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **FRACTION** | **TOTAL [1] ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedance [2] | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedance | % Detection Limit Exceedances |
| POTASSIUM (K) | E200.7 | DIS | 16 | 16 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| POTASSIUM (K) | E200.7 | TRC | 16 | 16 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| **SELENIUM (SE)** | E200.8 | DIS | 16 | 8 | 50% | 1 | **6%** | 8 | 50% | 0 | 0% |
| SELENIUM (SE) | E200.8 | TRC | 16 | 6 | 38% | 0 | 0% | 10 | 63% | 0 | 0% |
| SILVER (AG) | E200.8 | DIS | 16 | 0 | 0% | 0 | 0% | 16 | 100% | 0 | 0% |
| SILVER (AG) | E200.8 | TRC | 16 | 0 | 0% | 0 | 0% | 16 | 100% | 0 | 0% |
| SODIUM (NA) | E200.7 | DIS | 16 | 16 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| SODIUM (NA) | E200.7 | TRC | 16 | 16 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| TETRAETHYL LEAD | SW8270C | TOT | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| ***VOLATILE PETROLEUM HYDROCARBONS*** | | | | | | | | | | | |
| METHYL TERT-BUTYL ETHER | MA-VPH | VPH | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 2 | **6%** |
| **BENZENE** | MA-VPH | VPH | 32 | 12 | 38% | 7 | **22%** | 20 | 63% | 0 | 0% |
| TOLUENE | MA-VPH | VPH | 32 | 5 | 16% | 0 | 0% | 27 | 84% | 0 | 0% |
| **ETHYLBENZENE** | MA-VPH | VPH | 32 | 12 | 38% | 1 | **3%** | 20 | 63% | 0 | 0% |
| M-P XYLENE | MA-VPH | VPH | 32 | 11 | 34% | 0 | 0% | 21 | 66% | 0 | 0% |
| O-XYLENE | MA-VPH | VPH | 32 | 7 | 22% | 0 | 0% | 25 | 78% | 0 | 0% |
| TOTAL XYLENE | MA-VPH | VPH | 32 | 12 | 38% | 0 | 0% | 20 | 63% | 0 | 0% |
| **NAPHTHALENE** | MA-VPH | VPH | 32 | 11 | 34% | 2 | **6%** | 21 | 66% | 0 | 0% |
| **C9-C10 AROMATICS** | MA-VPH | VPH | 32 | 19 | 59% | 3 | **9%** | 13 | 41% | 0 | 0% |
| **C5-C8 ALIPHATICS** | MA-VPH | VPH | 32 | 15 | 47% | 5 | **16%** | 17 | 53% | 0 | 0% |
| **C9-C12 ALIPHATICS** | MA-VPH | VPH | 32 | 20 | 63% | 3 | **9%** | 12 | 38% | 0 | 0% |
| **TOTAL PURGEABLE HYDROCARBONS** | MA-VPH | VPH | 32 | 22 | 69% | 6 | **19%** | 10 | 31% | 0 | 0% |
| ***EXTRACTABLE PETROLEUM HYDROCARBONS*** | | | | | | | | | | | |
| **C9-C18 ALIPHATICS** | MA-EPH | EPH | 32 | 7 | 22% | 2 | **6%** | 25 | 78% | 0 | 0% |
| **C19-C36 ALIPHATICS** | MA-EPH | EPH | 32 | 3 | 9% | 2 | **6%** | 29 | 91% | 0 | 0% |
| **C11-C22 AROMATICS** | MA-EPH | EPH | 32 | 7 | 22% | 2 | **6%** | 25 | 78% | 0 | 0% |
| **TOT EXTRACTABLE HYDROCARBON (EPH)** | MA-EPH | EPH | 32 | 10 | 31% | 8 | **25%** | 22 | 69% | 0 | 0% |
| ***POLYNUCLEAR AROMATIC HYDROCARBONS*** | | | | | | | | | | | |
| 2-METHYLNAPHTHALENE | SW8270C | PAH | 32 | 12 | 38% | 0 | 0% | 20 | 63% | 0 | 0% |
| ACENAPHTHENE | SW8270C | PAH | 32 | 8 | 25% | 0 | 0% | 24 | 75% | 0 | 0% |
| ACENAPHTHYLENE | SW8270C | PAH | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| ANTHRACENE | SW8270C | PAH | 32 | 2 | 6% | 0 | 0% | 30 | 94% | 0 | 0% |
| BENZO (A) ANTHRACENE | SW8270C | PAH | 32 | 2 | 6% | 0 | 0% | 30 | 94% | 0 | 0% |
| **BENZO (A) PYRENE** | SW8270C | PAH | 32 | 1 | 3% | 1 | **3%** | 31 | 97% | 31 | **97%** |
| **BENZO (B) FLUORANTHENE** | SW8270C | PAH | 32 | 1 | 3% | 1 | **3%** | 31 | 97% | 0 | 0% |
| BENZO (GHI) PERYLENE | SW8270C | PAH | 32 | 1 | 3% | 0 | 0% | 31 | 97% | 0 | 0% |

## TABLE 5-7. GROUNDWATER ANALYSIS SUMMARY

| | | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **FRACTION** | **TOTAL [1] ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedance [2] | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedance | % Detection Limit Exceedances |
| BENZO (K) FLUORANTHENE | SW8270C | PAH | 32 | 1 | 3% | 0 | 0% | 31 | 97% | 0 | 0% |
| CHRYSENE | SW8270C | PAH | 32 | 4 | 13% | 0 | 0% | 28 | 88% | 0 | 0% |
| **DIBENZ (A,H) ANTHRACENE** | SW8270C | PAH | 32 | 1 | 3% | 1 | **3%** | 31 | 97% | 31 | **97%** |
| FLUORANTHENE | SW8270C | PAH | 32 | 6 | 19% | 0 | 0% | 26 | 81% | 0 | 0% |
| FLUORENE | SW8270C | PAH | 32 | 7 | 22% | 0 | 0% | 25 | 78% | 0 | 0% |
| **INDENO (1,2,3-C,D) PYRENE** | SW8270C | PAH | 32 | 1 | 3% | 1 | **3%** | 31 | 97% | 0 | 0% |
| **NAPHTHALENE** | SW8270C | PAH | 32 | 16 | 50% | 2 | **6%** | 16 | 50% | 0 | 0% |
| PHENANTHRENE | SW8270C | PAH | 32 | 8 | 25% | 0 | 0% | 24 | 75% | 0 | 0% |
| PYRENE | SW8270C | PAH | 32 | 6 | 19% | 0 | 0% | 26 | 81% | 0 | 0% |
| ***VOLATILE ORGANIC COMPOUNDS*** | | | | | | | | | | | |
| **BENZENE** | SW8260B | VOC | 32 | 12 | 38% | 7 | **22%** | 20 | 63% | 0 | 0% |
| BROMOBENZENE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| BROMOCHLOROMETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| BROMODICHLOROMETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| BROMOFORM | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| BROMOMETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| CARBON TETRACHLORIDE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| CHLOROBENZENE | SW8260B | VOC | 32 | 1 | 3% | 0 | 0% | 31 | 97% | 0 | 0% |
| CHLORODIBROMOMETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| CHLOROETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 2-CHLOROETHYL VINYL ETHER | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| CHLOROFORM | SW8260B | VOC | 32 | 2 | 6% | 0 | 0% | 30 | 94% | 0 | 0% |
| CHLOROMETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 1,2-DIBROMOETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 32 | **100%** |
| 2-CHLOROTOLUENE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 4-CHLOROTOLUENE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| DIBROMOMETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 32 | **100%** |
| 1,2-DICHLOROBENZENE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 1,3-DICHLOROBENZENE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 1,4-DICHLOROBENZENE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| DICHLORODIFLUOROMETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 1,1-DICHLOROETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 1,2-DICHLOROETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 1,1-DICHLOROETHENE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| CIS-1,2-DICHLOROETHENE | SW8260B | VOC | 32 | 2 | 6% | 0 | 0% | 30 | 94% | 0 | 0% |
| TRANS-1,2-DICHLOROETHENE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 1,2-DICHLOROPROPANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 1,3-DICHLOROPROPANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |

## TABLE 5-7. GROUNDWATER ANALYSIS SUMMARY

| | | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **FRACTION** | **TOTAL (1) ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedance (2) | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedance | % Detection Limit Exceedances |
| 2,2-DICHLOROPROPANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 1,1-DICHLOROPROPENE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| CIS-1,3-DICHLOROPROPENE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| TRANS-1,3-DICHLOROPROPENE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 1 | **3%** |
| **ETHYLBENZENE** | SW8260B | VOC | 32 | 14 | 44% | 1 | **3%** | 18 | 56% | 0 | 0% |
| 2-BUTANONE (METHYL-ETHYL-KETONE) | SW8260B | VOC | 32 | 1 | 3% | 0 | 0% | 31 | 97% | 0 | 0% |
| METHYL TERT-BUTYL ETHER | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| METHYLENE CHLORIDE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| STYRENE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 1,1,1,2-TETRACHLOROETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 1,1,2,2-TETRACHLOROETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 1 | **3%** |
| TETRACHLOROETHENE | SW8260B | VOC | 32 | 3 | 9% | 0 | 0% | 29 | 91% | 0 | 0% |
| TOLUENE | SW8260B | VOC | 32 | 9 | 28% | 0 | 0% | 23 | 72% | 0 | 0% |
| 1,1,1-TRICHLOROETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| 1,1,2-TRICHLOROETHANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| TRICHLOROETHENE | SW8260B | VOC | 32 | 2 | 6% | 0 | 0% | 30 | 94% | 0 | 0% |
| TRICHLOROFLUOROMETHANE | SW8260B | VOC | 32 | 2 | 6% | 0 | 0% | 30 | 94% | 0 | 0% |
| 1,2,3-TRICHLOROPROPANE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 0 | 0% |
| VINYL CHLORIDE | SW8260B | VOC | 32 | 0 | 0% | 0 | 0% | 32 | 100% | 32 | **100%** |
| M-P XYLENE | SW8260B | VOC | 32 | 11 | 34% | 0 | 0% | 21 | 66% | 0 | 0% |
| O-XYLENE | SW8260B | VOC | 32 | 11 | 34% | 0 | 0% | 21 | 66% | 0 | 0% |
| TOTAL XYLENE | SW8260B | VOC | 32 | 13 | 41% | 0 | 0% | 19 | 59% | 0 | 0% |

(1) Inclusive of all groundwater samples for June and September sampling events.

Red - Indicates constituent detected at concentrations greater than the screening level/standard.

Blue - Indicates analyses for which detection limit was greater than the screening level/standard.

## TABLE 5-8. GROUNDWATER SUMMARY STATISTICS

| Analyte | Method | Fraction | Unit | Yale DEQ-7 - GW Human Health Standards | Yale MDEQ GW RBSL | EPA Drinking Water Regional Secondary MCL | Region 9 Tapwater Screening Level | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedance | Location of Maximum Exceedance | Event |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***PHYSICAL PARAMETERS*** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| pH - FLD | FIELD | PHYS | s.u. | | | | | 30 | 30 | 6.15 | 7.72 | 0 | | |
| pH - LAB | A4500-HB | PHYS | s.u. | | | | | 32 | 32 | 6.6 | 8.1 | 0 | | |
| SC (UMHOS/CM AT 25 C) | A2510B | PHYS | umhos/cm | | | | | 32 | 32 | 778 | 22700 | 0 | | |
| SC (UMHOS/CM AT 25 C) (FLD) | FIELD | PHYS | umhos/cm | | | | | 30 | 30 | 35.3 | 22649 | 0 | | |
| WATER TEMPERATURE (FLD) | FIELD | PHYS | C | | | | | 30 | 30 | 10.83 | 20.8 | 0 | | |
| OXIDATION REDUCTION POTENTIAL | FIELD | PHYS | mV | | | | | 30 | 30 | -261.1 | 226.1 | 0 | | |
| DISSOLVED OXYGEN | FIELD | PHYS | mg/L | | | | | 30 | 30 | 0.11 | 57.1 | 0 | | |
| TURBIDITY (NTU) - LAB | A2130B | PHYS | NTU | | | | | 16 | 16 | 0.3 | 78.4 | 0 | | |
| **TDS (MEASURED AT 180 C)** | A2540C | PHYS | mg/L | | | **500** | | 32 | 32 | 456 | 14800 | **31** | YMW-22 | June |
| ***COMMON IONS*** | | | | | | | | | | | | | | |
| TOTAL ALKALINITY AS CACO3 | A2320B | IONS | mg/L | | | | | 32 | 32 | 208 | 1350 | 0 | | |
| BICARBONATE ALKALINITY AS HCO3 | A2320B | IONS | mg/L | | | | | 32 | 32 | 253 | 1650 | 0 | | |
| **CHLORIDE (CL)** | E300.0 | IONS | mg/L | | | **250** | | 32 | 32 | 14 | 7890 | **8** | YMW-22 | June |
| **SULFATE (SO4)** | E300.0 | IONS | mg/L | | | **250** | | 32 | 30 | 19 | 2520 | **24** | MW03 | June |
| ***MONITORED NATURAL ATTENUATION*** | | | | | | | | | | | | | | |
| NITRITE (NO2-N) | E353.2 | MNA | mg/L | **1** | | | | 32 | 7 | 0.05 | 0.98 | 0 | | |
| **NITRATE (NO3-N)** | CALCULATION | MNA | mg/L | **10** | | | **25** | 32 | 17 | 0.09 | 66.9 | **12** | MW03 | June |
| **NITRATE + NITRITE AS N** | E353.2 | MNA | mg/L | **10** | | | **25** | 32 | 29 | 0.01 | 67.6 | **12** | MW03 | June |
| **FERROUS IRON** | E200.7 | MNA | mg/L | | | **0.3** | | 16 | 12 | 0.3 | 4.93 | **12** | YMW-17 | June |
| METHANE | SW8015M | MNA | mg/L | | | | | 32 | 29 | 0.0011 | 23 | 0 | | |
| ***TRACE CONSTITUENTS*** | | | | | | | | | | | | | | |
| **ARSENIC (AS)** | E200.8 | DIS | mg/L | **0.01** | | | **0.000045** | 16 | 16 | 0.001 | 0.024 | **2** | YMW-22 | June |
| **ARSENIC (AS)** | E200.8 | TRC | mg/L | **0.01** | | | **0.000045** | 16 | 16 | 0.002 | 0.036 | **6** | YMW-23 | September |
| BARIUM (BA) | E200.7/E200.8 | DIS | mg/L | **1** | | | **2.9** | 16 | 13 | 0.05 | 0.34 | 0 | | |
| BARIUM (BA) | E200.7/E200.8 | TRC | mg/L | **1** | | | **2.9** | 16 | 14 | 0.05 | 0.79 | 0 | | |
| CADMIUM (CD) | E200.8 | DIS | mg/L | **0.005** | | | **0.0069** | 16 | 1 | 0.002 | 0.002 | 0 | | |
| CADMIUM (CD) | E200.8 | TRC | mg/L | **0.005** | | | **0.0069** | 16 | 0 | | | 0 | | |
| CALCIUM (CA) | E200.7 | DIS | mg/L | | | | | 16 | 16 | 55 | 898 | 0 | | |
| CALCIUM (CA) | E200.7 | TRC | mg/L | | | | | 16 | 16 | 54 | 462 | 0 | | |
| CHROMIUM (CR) | E200.8 | DIS | mg/L | **0.1** | | | | 16 | 1 | 0.007 | 0.007 | 0 | | |
| CHROMIUM (CR) | E200.8 | TRC | mg/L | **0.1** | | | | 16 | 0 | | | 0 | | |
| **LEAD (PB)** | E200.8 | DIS | mg/L | **0.015** | | | | 16 | 3 | 0.002 | 0.037 | **1** | YMW-22 | June |
| **LEAD (PB)** | E200.8 | TRC | mg/L | **0.015** | | | | 16 | 9 | 0.001 | 0.045 | **2** | YMW-22 | September |
| MAGNESIUM (MG) | E200.7 | DIS | mg/L | | | | | 16 | 16 | 25 | 650 | 0 | | |
| MAGNESIUM (MG) | E200.7 | TRC | mg/L | | | | | 16 | 16 | 24 | 210 | 0 | | |
| MERCURY (HG) | E200.8 | DIS | mg/L | **0.002** | | | **0.00063** | 16 | 0 | | | 0 | | |
| MERCURY (HG) | E200.8 | TRC | mg/L | **0.002** | | | **0.00063** | 16 | 1 | 0.0001 | 0.0001 | 0 | | |
| POTASSIUM (K) | E200.7 | DIS | mg/L | | | | | 16 | 16 | 6 | 664 | 0 | | ` |
| POTASSIUM (K) | E200.7 | TRC | mg/L | | | | | 16 | 16 | 5 | 505 | 0 | | |
| **SELENIUM (SE)** | E200.8 | DIS | mg/L | **0.05** | | | **0.078** | 16 | 8 | 0.001 | 0.191 | **1** | MW-03 | June |
| SELENIUM (SE) | E200.8 | TRC | mg/L | **0.05** | | | **0.078** | 16 | 6 | 0.001 | 0.008 | 0 | | |
| SILVER (AG) | E200.8 | DIS | mg/L | **0.1** | | | **0.071** | 16 | 0 | | | 0 | | |
| SILVER (AG) | E200.8 | TRC | mg/L | **0.1** | | | **0.071** | 16 | 0 | | | 0 | | |

## TABLE 5-8. GROUNDWATER SUMMARY STATISTICS

| Analyte | Method | Fraction | Unit | Yale DEQ-7 - GW Human Health Standards | Yale MDEQ GW RBSL | EPA Drinking Water Regional Secondary MCL | Region 9 Tapwater Screening Level | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedance | Location of Maximum Exceedance | Event |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SODIUM (NA) | E200.7 | DIS | mg/L | | | | | 16 | 16 | 52 | 3390 | 0 | | |
| SODIUM (NA) | E200.7 | TRC | mg/L | | | | | 16 | 16 | 48 | 482 | 0 | | |
| TETRAETHYL LEAD | SW8270C | TOT | ug/L | | | | | 32 | 0 | | | 0 | | |
| ***VOLATILE PETROLEUM HYDROCARBONS*** | | | | | | | | | | | | | | |
| METHYL TERT-BUTYL ETHER | MA-VPH | VPH | ug/L | **30** | | | **14** | 32 | 0 | | | 0 | | |
| **BENZENE** | MA-VPH | VPH | ug/L | **5** | | | **0.45** | 32 | 12 | 1.1 | 6380 | **7** | YMW-15 | June |
| TOLUENE | MA-VPH | VPH | ug/L | **1000** | | | **1100** | 32 | 5 | 8.9 | 249 | 0 | | |
| **ETHYLBENZENE** | MA-VPH | VPH | ug/L | **700** | | | **1.5** | 32 | 12 | 0.66 | 1580 | **1** | YMW-15 | June |
| M-P XYLENE | MA-VPH | VPH | ug/L | **10000** | | | **190** | 32 | 11 | 0.44 | 935 | 0 | | |
| O-XYLENE | MA-VPH | VPH | ug/L | **10000** | | | **190** | 32 | 7 | 0.48 | 110 | 0 | | |
| TOTAL XYLENE | MA-VPH | VPH | ug/L | **10000** | | | **190** | 32 | 12 | 0.44 | 1050 | 0 | | |
| **NAPHTHALENE** | MA-VPH | VPH | ug/L | **100** | | | **0.17** | 32 | 11 | 0.66 | 336 | **2** | YMW-15 | June |
| **C9-C10 AROMATICS** | MA-VPH | VPH | ug/L | **1000** | | | | 32 | 19 | 24 | 2780 | **3** | YMW-15 | June |
| **C5-C8 ALIPHATICS** | MA-VPH | VPH | ug/L | **700** | | | | 32 | 15 | 17 | 13500 | **5** | YMW-15 | June |
| **C9-C12 ALIPHATICS** | MA-VPH | VPH | ug/L | **1000** | | | | 32 | 20 | 1.7 | 5460 | **3** | YMW-15 | June |
| **TOTAL PURGEABLE HYDROCARBONS** | MA-VPH | VPH | ug/L | **1000** | | | | 32 | 22 | 21 | 22900 | **6** | YMW-15 | June |
| ***EXTRACTABLE PETROLEUM HYDROCARBONS*** | | | | | | | | | | | | | | |
| **C9-C18 ALIPHATICS** | MA-EPH | EPH | ug/L | | **1000** | | | 32 | 7 | 308 | 6270 | **2** | YMW-15 | June |
| **C19-C36 ALIPHATICS** | MA-EPH | EPH | ug/L | | **1000** | | | 32 | 3 | 379 | 4330 | **2** | YMW-16 | June |
| **C11-C22 AROMATICS** | MA-EPH | EPH | ug/L | | **1000** | | | 32 | 7 | 367 | 5540 | **2** | YMW-16 | June |
| **TOT EXTRACTABLE HYDROCARBON (EPH)** | MA-EPH | EPH | ug/L | | **1000** | | | 32 | 10 | 662 | 16800 | **8** | YMW-16 | June |
| ***POLYNUCLEAR AROMATIC HYDROCARBONS*** | | | | | | | | | | | | | | |
| 2-METHYLNAPHTHALENE | SW8270C | PAH | ug/L | | | | **36** | 32 | 12 | 0.31 | 168 | 0 | | |
| ACENAPHTHENE | SW8270C | PAH | ug/L | **670** | | | **530** | 32 | 8 | 0.21 | 3.4 | 0 | | |
| ACENAPHTHYLENE | SW8270C | PAH | ug/L | | | | | 32 | 0 | | | 0 | | |
| ANTHRACENE | SW8270C | PAH | ug/L | **2100** | | | **1800** | 32 | 2 | 0.88 | 1.1 | 0 | | |
| BENZO (A) ANTHRACENE | SW8270C | PAH | ug/L | **0.5** | | | **0.034** | 32 | 2 | 0.21 | 0.33 | 0 | | |
| **BENZO (A) PYRENE** | SW8270C | PAH | ug/L | **0.05** | | | **0.0034** | 32 | 1 | 0.41 | 0.41 | **1** | YMW-21 | September |
| **BENZO (B) FLUORANTHENE** | SW8270C | PAH | ug/L | **0.5** | | | **0.034** | 32 | 1 | 0.62 | 0.62 | **1** | YMW-21 | September |
| BENZO (GHI) PERYLENE | SW8270C | PAH | ug/L | | | | | 32 | 1 | 0.42 | 0.42 | 0 | | |
| BENZO (K) FLUORANTHENE | SW8270C | PAH | ug/L | **5** | | | **0.34** | 32 | 1 | 0.52 | 0.52 | 0 | | |
| CHRYSENE | SW8270C | PAH | ug/L | **50** | | | **3.4** | 32 | 4 | 0.2 | 0.43 | 0 | | |
| **DIBENZ (A,H) ANTHRACENE** | SW8270C | PAH | ug/L | **0.05** | | | **0.0034** | 32 | 1 | 0.43 | 0.43 | **1** | YMW-21 | September |
| FLUORANTHENE | SW8270C | PAH | ug/L | **130** | | | **800** | 32 | 6 | 0.21 | 0.44 | 0 | | |
| FLUORENE | SW8270C | PAH | ug/L | **1100** | | | **290** | 32 | 7 | 0.26 | 7.3 | 0 | | |
| **INDENO (1,2,3-C,D) PYRENE** | SW8270C | PAH | ug/L | **0.5** | | | **0.034** | 32 | 1 | 0.58 | 0.58 | **1** | YMW-21 | September |
| **NAPHTHALENE** | SW8270C | PAH | ug/L | **100** | | | **0.17** | 32 | 16 | 0.2 | 187 | **2** | YMW-15 | June |
| PHENANTHRENE | SW8270C | PAH | ug/L | | | | | 32 | 8 | 0.22 | 14 | 0 | | |
| PYRENE | SW8270C | PAH | ug/L | **830** | | | **120** | 32 | 6 | 0.2 | 0.84 | 0 | | |

## TABLE 5-8. GROUNDWATER SUMMARY STATISTICS

| Analyte | Method | Fraction | Unit | Yale DEQ-7 - GW Human Health Standards | Yale MDEQ GW RBSL | EPA Drinking Water Regional Secondary MCL | Region 9 Tapwater Screening Level | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedance | Location of Maximum Exceedance | Event |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***VOLATILE ORGANIC COMPOUNDS*** | | | | | | | | | | | | | | |
| **BENZENE** | SW8260B | VOC | ug/L | **5** | | | **0.45** | 32 | 12 | 0.49 | 7860 | **7** | YMW-15 | June |
| BROMOBENZENE | SW8260B | VOC | ug/L | | | | **62** | 32 | 0 | | | 0 | | |
| BROMOCHLOROMETHANE | SW8260B | VOC | ug/L | | | | **83** | 32 | 0 | | | 0 | | |
| BROMODICHLOROMETHANE | SW8260B | VOC | ug/L | **10** | | | **0.13** | 32 | 0 | | | 0 | | |
| BROMOFORM | SW8260B | VOC | ug/L | **80** | | | **9.2** | 32 | 0 | | | 0 | | |
| BROMOMETHANE | SW8260B | VOC | ug/L | **10** | | | **7.5** | 32 | 0 | | | 0 | | |
| CARBON TETRACHLORIDE | SW8260B | VOC | ug/L | **3** | | | **0.45** | 32 | 0 | | | 0 | | |
| CHLOROBENZENE | SW8260B | VOC | ug/L | **100** | | | **78** | 32 | 1 | 10 | 10 | 0 | | |
| CHLORODIBROMOMETHANE | SW8260B | VOC | ug/L | **4** | | | | 32 | 0 | | | 0 | | |
| CHLOROETHANE | SW8260B | VOC | ug/L | | | | **21000** | 32 | 0 | | | 0 | | |
| 2-CHLOROETHYL VINYL ETHER | SW8260B | VOC | ug/L | | | | | 32 | 0 | | | 0 | | |
| CHLOROFORM | SW8260B | VOC | ug/L | **70** | | | **0.22** | 32 | 2 | 0.21 | 0.32 | 0 | | |
| CHLOROMETHANE | SW8260B | VOC | ug/L | **30** | | | **190** | 32 | 0 | | | 0 | | |
| 1,2-DIBROMOETHANE | SW8260B | VOC | ug/L | **0.004** | | | **0.0075** | 32 | 0 | | | 0 | | |
| 2-CHLOROTOLUENE | SW8260B | VOC | ug/L | | | | **240** | 32 | 0 | | | 0 | | |
| 4-CHLOROTOLUENE | SW8260B | VOC | ug/L | | | | **250** | 32 | 0 | | | 0 | | |
| DIBROMOMETHANE | SW8260B | VOC | ug/L | **0.004** | | | **8** | 32 | 0 | | | 0 | | |
| 1,2-DICHLOROBENZENE | SW8260B | VOC | ug/L | **600** | | | **300** | 32 | 0 | | | 0 | | |
| 1,3-DICHLOROBENZENE | SW8260B | VOC | ug/L | **600** | | | | 32 | 0 | | | 0 | | |
| 1,4-DICHLOROBENZENE | SW8260B | VOC | ug/L | **75** | | | **0.48** | 32 | 0 | | | 0 | | |
| DICHLORODIFLUOROMETHANE | SW8260B | VOC | ug/L | **1000** | | | **200** | 32 | 0 | | | 0 | | |
| 1,1-DICHLOROETHANE | SW8260B | VOC | ug/L | | | | **2.7** | 32 | 0 | | | 0 | | |
| 1,2-DICHLOROETHANE | SW8260B | VOC | ug/L | **4** | | | **0.17** | 32 | 0 | | | 0 | | |
| 1,1-DICHLOROETHENE | SW8260B | VOC | ug/L | **7** | | | **280** | 32 | 0 | | | 0 | | |
| CIS-1,2-DICHLOROETHENE | SW8260B | VOC | ug/L | **70** | | | **36** | 32 | 2 | 0.26 | 0.91 | 0 | | |
| TRANS-1,2-DICHLOROETHENE | SW8260B | VOC | ug/L | **100** | | | **360** | 32 | 0 | | | 0 | | |
| 1,2-DICHLOROPROPANE | SW8260B | VOC | ug/L | **5** | | | **0.44** | 32 | 0 | | | 0 | | |
| 1,3-DICHLOROPROPANE | SW8260B | VOC | ug/L | | | | **370** | 32 | 0 | | | 0 | | |
| 2,2-DICHLOROPROPANE | SW8260B | VOC | ug/L | | | | | 32 | 0 | | | 0 | | |
| 1,1-DICHLOROPROPENE | SW8260B | VOC | ug/L | | | | | 32 | 0 | | | 0 | | |
| CIS-1,3-DICHLOROPROPENE | SW8260B | VOC | ug/L | **4** | | | | 32 | 0 | | | 0 | | |
| TRANS-1,3-DICHLOROPROPENE | SW8260B | VOC | ug/L | **2** | | | | 32 | 0 | | | 0 | | |
| **ETHYLBENZENE** | SW8260B | VOC | ug/L | **700** | | | **1.5** | 32 | 14 | 0.13 | 1930 | **1** | YMW-15 | June |
| 2-BUTANONE (METHYL-ETHYL-KETONE) | SW8260B | VOC | ug/L | | | | **5600** | 32 | 1 | 14 | 14 | 0 | | |
| METHYL TERT-BUTYL ETHER | SW8260B | VOC | ug/L | **30** | | | **14** | 32 | 0 | | | 0 | | |
| METHYLENE CHLORIDE | SW8260B | VOC | ug/L | **5** | | | **11** | 32 | 0 | | | 0 | | |
| STYRENE | SW8260B | VOC | ug/L | **100** | | | **1200** | 32 | 0 | | | 0 | | |
| 1,1,1,2-TETRACHLOROETHANE | SW8260B | VOC | ug/L | | | | **0.57** | 32 | 0 | | | 0 | | |
| 1,1,2,2-TETRACHLOROETHANE | SW8260B | VOC | ug/L | **2** | | | **0.076** | 32 | 0 | | | 0 | | |
| TETRACHLOROETHENE | SW8260B | VOC | ug/L | **5** | | | **11** | 32 | 3 | 0.1 | 3.5 | 0 | | |
| TOLUENE | SW8260B | VOC | ug/L | **1000** | | | **1100** | 32 | 9 | 0.16 | 286 | 0 | | |
| 1,1,1-TRICHLOROETHANE | SW8260B | VOC | ug/L | **200** | | | **8000** | 32 | 0 | | | 0 | | |
| 1,1,2-TRICHLOROETHANE | SW8260B | VOC | ug/L | **3** | | | **0.28** | 32 | 0 | | | 0 | | |

## TABLE 5-8. GROUNDWATER SUMMARY STATISTICS

| Analyte | Method | Fraction | Unit | Yale DEQ-7 - GW Human Health Standards | Yale MDEQ GW RBSL | EPA Drinking Water Regional Secondary MCL | Region 9 Tapwater Screening Level | Total (1) Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedance | Location of Maximum Exceedance | Event |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TRICHLOROETHENE | SW8260B | VOC | ug/L | **5** | | | **0.49** | 32 | 2 | 0.55 | 0.76 | 0 | | |
| TRICHLOROFLUOROMETHANE | SW8260B | VOC | ug/L | **10000** | | | **1100** | 32 | 2 | 0.5 | 1.2 | 0 | | |
| 1,2,3-TRICHLOROPROPANE | SW8260B | VOC | ug/L | | | | **0.00075** | 32 | 0 | | | 0 | | |
| VINYL CHLORIDE | SW8260B | VOC | ug/L | **0.2** | | | **0.019** | 32 | 0 | | | 0 | | |
| M-P XYLENE | SW8260B | VOC | ug/L | **10000** | | | **190** | 32 | 11 | 0.31 | 1210 | 0 | | |
| O-XYLENE | SW8260B | VOC | ug/L | **10000** | | | **190** | 32 | 11 | 0.085 | 123 | 0 | | |
| TOTAL XYLENE | SW8260B | VOC | ug/L | **10000** | | | **190** | 32 | 13 | 0.31 | 1330 | 0 | | |

(1) Inclusive of all groundwater samples for June and September sampling events.

Red - Indicates constituent detected at concentrations greater than the screening level/standard.

## TABLE 5-9. GROUNDWATER CONSTITUENT EXCEEDANCES

| | | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **FRACTION** | **TOTAL [1] ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedance | % Detected Exceedances |
| ***PHYSICAL PARAMETERS*** | | | | | | | |
| TDS (MEASURED AT 180 C) | A2540C | PHYS | 32 | 32 | 100% | 31 | 97% |
| ***COMMON IONS*** | | | | | | | |
| CHLORIDE (CL) | E300.0 | IONS | 32 | 32 | 100% | 8 | 25% |
| SULFATE (SO4) | E300.0 | IONS | 32 | 30 | 94% | 24 | 75% |
| ***MONITORED NATURAL ATTENUATION*** | | | | | | | |
| NITRATE (NO3-N) | CALCULATION | MNA | 32 | 17 | 53% | 12 | 38% |
| NITRATE + NITRITE AS N | E353.2 | MNA | 32 | 29 | 91% | 12 | 38% |
| FERROUS IRON | E200.7 | MNA | 32 | 32 | 100% | 12 | 38% |
| ***TRACE CONSTITUENTS*** | | | | | | | |
| ARSENIC (AS) | E200.8 | DIS | 16 | 16 | 100% | 2 | 13% |
| ARSENIC (AS) | E200.8 | TRC | 16 | 16 | 100% | 6 | 38% |
| LEAD (PB) | E200.8 | DIS | 16 | 3 | 19% | 1 | 6% |
| LEAD (PB) | E200.8 | TRC | 16 | 9 | 56% | 2 | 13% |
| SELENIUM (SE) | E200.8 | DIS | 16 | 8 | 50% | 1 | 6% |
| ***VOLATILE PETROLEUM HYDROCARBONS*** | | | | | | | |
| BENZENE | MA-VPH | VPH | 32 | 12 | 38% | 7 | 22% |
| ETHYLBENZENE | MA-VPH | VPH | 32 | 12 | 38% | 1 | 3% |
| NAPHTHALENE | MA-VPH | VPH | 32 | 11 | 34% | 2 | 6% |
| C9-C10 AROMATICS | MA-VPH | VPH | 32 | 19 | 59% | 3 | 9% |
| C5-C8 ALIPHATICS | MA-VPH | VPH | 32 | 15 | 47% | 5 | 16% |
| C9-C12 ALIPHATICS | MA-VPH | VPH | 32 | 20 | 63% | 3 | 9% |
| TOTAL PURGEABLE HYDROCARBONS | MA-VPH | VPH | 32 | 22 | 69% | 6 | 19% |
| ***EXTRACTABLE PETROLEUM HYDROCARBONS*** | | | | | | | |
| C9-C18 ALIPHATICS | MA-EPH | EPH | 32 | 7 | 22% | 2 | 6% |
| C19-C36 ALIPHATICS | MA-EPH | EPH | 32 | 3 | 9% | 2 | 6% |
| C11-C22 AROMATICS | MA-EPH | EPH | 32 | 7 | 22% | 2 | 6% |
| TOT EXTRACTABLE HYDROCARBON (EPH) | MA-EPH | EPH | 32 | 10 | 31% | 8 | 25% |
| ***POLYNUCLEAR AROMATIC HYDROCARBONS*** | | | | | | | |
| BENZO (A) PYRENE | SW8270C | PAH | 32 | 1 | 3% | 1 | 3% |
| BENZO (B) FLUORANTHENE | SW8270C | PAH | 32 | 1 | 3% | 1 | 3% |
| DIBENZ (A,H) ANTHRACENE | SW8270C | PAH | 32 | 1 | 3% | 1 | 3% |
| INDENO (1,2,3-C,D) PYRENE | SW8270C | PAH | 32 | 1 | 3% | 1 | 3% |
| NAPHTHALENE | SW8270C | PAH | 32 | 16 | 50% | 2 | 6% |
| ***VOLATILE ORGANIC COMPOUNDS*** | | | | | | | |
| BENZENE | SW8260B | VOC | 32 | 12 | 38% | 7 | 22% |
| ETHYLBENZENE | SW8260B | VOC | 32 | 14 | 44% | 1 | 3% |

(1) Inclusive of all groundwater samples for June and September sampling events.

## TABLE 5-10. SURFACE WATER ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| ANALYTE | METHOD | TOTAL [1] ANALYSES | # Detected Analyses | % Detected Analyses | # Detected Exceedance | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| ***PHYSICAL PARAMETERS*** | | | | | | | | | | |
| pH - FLD | FIELD | 8 | 7 | 88% | 0 | 0% | 0 | 0% | 0 | 0% |
| pH - LAB | A4500-HB | 10 | 10 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| SC (UMHOS/CM AT 25 C) | A2510B | 10 | 10 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| SC (UMHOS/CM AT 25 C) (FLD) | FIELD | 8 | 8 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| WATER TEMPERATURE (FLD) | FIELD | 8 | 8 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| FLOW | FIELD | 8 | 8 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| DISSOLVED OXYGEN | FIELD | 4 | 4 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| TOTAL SUSPENDED SOLIDS | A2540D | 10 | 7 | 70% | 0 | 0% | 3 | 30% | 0 | 0% |
| TDS (MEASURED AT 180 C) | A2540C | 10 | 10 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| ***COMMON IONS*** | | | | | | | | | | |
| TOTAL ALKALINITY AS CACO3 | A2320B | 10 | 10 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| BICARBONATE AS HCO3 | A2320B | 10 | 10 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| CHLORIDE (CL) | E300.0 | 10 | 10 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| SULFATE (SO4) | E300.0 | 10 | 10 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| ***TRACE CONSTITUENTS*** | | | | | | | | | | |
| **ARSENIC (AS)** | E200.8 | 10 | 10 | 100% | 10 | **100%** | 0 | 0% | 0 | 0% |
| BARIUM (BA) | E200.8 | 10 | 10 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| CADMIUM (CD) | E200.8 | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 5 | **50%** |
| CALCIUM (CA) | E200.7 | 10 | 10 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| CHROMIUM (CR) | E200.8 | 10 | 5 | 50% | 0 | 0% | 5 | 50% | 0 | 0% |
| **LEAD (PB)** [2] | E200.8 | 10 | 5 | 50% | 5 | **50%** | 5 | 50% | 5 | **50%** |
| MAGNESIUM (MG) | E200.7 | 10 | 10 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| MERCURY (HG) | E245.1 | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 5 | **50%** |
| POTASSIUM (K) | E200.7 | 10 | 10 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| **SELENIUM (SE)** | E200.8 | 10 | 10 | 100% | 10 | **100%** | 0 | 0% | 0 | 0% |
| SILVER (AG) | E200.8 | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 10 | **100%** |
| SODIUM (NA) | E200.7 | 10 | 10 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| TETRAETHYL LEAD | SW8270C | 5 | 0 | 0% | 0 | 0% | 5 | 100% | 0 | 0% |
| ***VOLATILE PETROLEUM HYDROCARBONS*** | | | | | | | | | | |
| METHYL TERT-BUTYL ETHER | MA-VPH | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| BENZENE | MA-VPH | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| TOLUENE | MA-VPH | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| ETHYLBENZENE | MA-VPH | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| M-P XYLENE | MA-VPH | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| O-XYLENE | MA-VPH | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| TOTAL XYLENE | MA-VPH | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| NAPHTHALENE | MA-VPH | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |

## TABLE 5-10. SURFACE WATER ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **TOTAL [1] ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedance | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| C9-C10 AROMATICS | MA-VPH | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| C5-C8 ALIPHATICS | MA-VPH | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| C9-C12 ALIPHATICS | MA-VPH | 10 | 1 | 10% | 0 | 0% | 9 | 90% | 0 | 0% |
| TOTAL PURGEABLE HYDROCARBONS | MA-VPH | 10 | 1 | 10% | 0 | 0% | 9 | 90% | 0 | 0% |
| ***EXTRACTABLE PETROLEUM HYDROCARBONS*** | | | | | | | | | | |
| C9-C18 ALIPHATICS | MA-EPH | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| C19-C36 ALIPHATICS | MA-EPH | 10 | 1 | 10% | 0 | 0% | 9 | 90% | 0 | 0% |
| C11-C22 AROMATICS | MA-EPH | 10 | 1 | 10% | 0 | 0% | 9 | 90% | 0 | 0% |
| TOT EXTRACTABLE HYDROCARBON (EPH) | MA-EPH | 10 | 1 | 10% | 0 | 0% | 9 | 90% | 0 | 0% |
| ***POLYNUCLEAR AROMATIC HYDROCARBONS*** | | | | | | | | | | |
| 2-METHYLNAPHTHALENE | SW8270C | 10 | 1 | 10% | 0 | 0% | 9 | 90% | 0 | 0% |
| ACENAPHTHENE | SW8270C | 10 | 1 | 10% | 0 | 0% | 9 | 90% | 0 | 0% |
| ACENAPHTHYLENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| ANTHRACENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| BENZO (A) ANTHRACENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 10 | **100%** |
| BENZO (A) PYRENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 10 | **100%** |
| BENZO (B) FLUORANTHENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 10 | **100%** |
| BENZO (GHI) PERYLENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| BENZO (K) FLUORANTHENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 10 | **100%** |
| CHRYSENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 10 | **100%** |
| DIBENZ (A,H) ANTHRACENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 10 | **100%** |
| FLUORANTHENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| FLUORENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| INDENO (1,2,3-C,D) PYRENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 10 | **100%** |
| NAPHTHALENE | SW8270C | 10 | 2 | 20% | 0 | 0% | 8 | 80% | 0 | 0% |
| PHENANTHRENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| PYRENE | SW8270C | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| ***VOLATILE ORGANIC COMPOUNDS*** | | | | | | | | | | |
| BENZENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| BROMOBENZENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| BROMOCHLOROMETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| BROMODICHLOROMETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| BROMOFORM | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| BROMOMETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| CARBON TETRACHLORIDE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| CHLOROBENZENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| CHLORODIBROMOMETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |

## TABLE 5-10. SURFACE WATER ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **TOTAL [1] ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedance | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| CHLOROETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 2-CHLOROETHYL VINYL ETHER | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| CHLOROFORM | SW8260B | 10 | 1 | 10% | 0 | 0% | 9 | 90% | 0 | 0% |
| CHLOROMETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 1,2-DIBROMOETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 10 | **100%** |
| 2-CHLOROTOLUENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 4-CHLOROTOLUENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| DIBROMOMETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 10 | **100%** |
| 1,2-DICHLOROBENZENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 1,3-DICHLOROBENZENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 1,4-DICHLOROBENZENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| DICHLORODIFLUOROMETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 1,1-DICHLOROETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 1,2-DICHLOROETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 1,1-DICHLOROETHENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| CIS-1,2-DICHLOROETHENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| TRANS-1,2-DICHLOROETHENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 1,2-DICHLOROPROPANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 1,3-DICHLOROPROPANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 2,2-DICHLOROPROPANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 1,1-DICHLOROPROPENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| CIS-1,3-DICHLOROPROPENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| TRANS-1,3-DICHLOROPROPENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| ETHYLBENZENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 2-BUTANONE (METHYL-ETHYL-KETONE) | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| METHYL TERT-BUTYL ETHER | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| METHYLENE CHLORIDE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| STYRENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 1,1,1,2-TETRACHLOROETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 1,1,2,2-TETRACHLOROETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| TETRACHLOROETHENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| TOLUENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 1,1,1-TRICHLOROETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| 1,1,2-TRICHLOROETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| TRICHLOROETHENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| TRICHLOROFLUOROMETHANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |

## TABLE 5-10. SURFACE WATER ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **TOTAL (1) ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedance | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| 1,2,3-TRICHLOROPROPANE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| VINYL CHLORIDE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 10 | **100%** |
| M-P XYLENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| O-XYLENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |
| TOTAL XYLENE | SW8260B | 10 | 0 | 0% | 0 | 0% | 10 | 100% | 0 | 0% |

(1) Inclusive of all surface water samples for July and September sampling events.
(2) Detected values qualified as non-detect "U" due to contamination in associated blank.
Red - Indicates constituent detected at concentrations greater than the screening level/standard.
Blue - Indicates analyses for which detection limit was greater than the screening level/standard.

## TABLE 5-11. SURFACE WATER SUMMARY STATISTICS

| Analyte | Method | Unit | ale Human Healt tandards | ale uatic cute | ale uatic ronic | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Event |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***PHYSICAL PARAMETERS*** | | | | | | | | | | | | |
| PH - FLD | FIELD | s.u. | **6.5-9.0** | **6.5-9.0** | **6.5-9.0** | 8 | 7 | 7.46 | 8.32 | 0 | | |
| pH - LAB | A4500-HB | s.u. | **6.5-9.0** | **6.5-9.0** | **6.5-9.0** | 10 | 10 | 8 | 8.25 | 0 | | |
| SC (UMHOS/CM AT 25 C) | A2510B | umhos/cm | | | | 10 | 10 | 797 | 1350 | 0 | | |
| SC (UMHOS/CM AT 25 C) (FLD) | FIELD | umhos/cm | | | | 8 | 8 | 645 | 1471 | 0 | | |
| WATER TEMPERATURE (FLD) | FIELD | C | | | | 8 | 8 | 20.4 | 23.3 | 0 | | |
| FLOW | FIELD | cfs | | | | 8 | 8 | 4.28 | 7.6 | 0 | | |
| DISSOLVED OXYGEN | FIELD | mg/L | | | | 4 | 4 | 0.54 | 0.65 | 0 | | |
| TOTAL SUSPENDED SOLIDS | A2540D | mg/L | | | | 10 | 7 | 10 | 36 | 0 | | |
| TDS (MEASURED AT 180 C) | A2540C | mg/L | | | | 10 | 10 | 500 | 933 | 0 | | |
| ***COMMON IONS*** | | | | | | | | | | | | |
| TOTAL ALKALINITY AS CACO3 | A2320B | mg/L | | | | 10 | 10 | 146 | 195 | 0 | | |
| BICARBONATE AS HCO3 | A2320B | mg/L | | | | 10 | 10 | 178 | 237 | 0 | | |
| CHLORIDE (CL) | E300.0 | mg/L | | | | 10 | 10 | 40 | 79 | 0 | | |
| SULFATE (SO4) | E300.0 | mg/L | | | | 10 | 10 | 190 | 402 | 0 | | |
| ***TRACE CONSTITUENTS*** | | | | | | | | | | | | |
| **ARSENIC (AS)** | E200.8 | mg/L | **0.01** | **0.34** | **0.15** | 10 | 10 | 0.018 | 0.025 | **10** | YD-1/YD-3 | September |
| BARIUM (BA) | E200.8 | mg/L | **1** | | | 10 | 10 | 0.11 | 0.156 | 0 | | |
| CADMIUM (CD) | E200.8 | mg/L | **0.005** | **0.00052** | **0.000097** | 10 | 0 | | | 0 | | |
| CALCIUM (CA) | E200.7 | mg/L | | | | 10 | 10 | 58 | 102 | 0 | | |
| CHROMIUM (CR) | E200.8 | mg/L | **0.1** | | | 10 | 5 | 0.001 | 0.002 | 0 | | |
| **LEAD (PB)** [2] | E200.8 | mg/L | **0.015** | **0.01398** | **0.000545** | 10 | 5 | 0.0013 | 0.0023 | **5** | YD-3 | September |
| MAGNESIUM (MG) | E200.7 | mg/L | | | | 10 | 10 | 25 | 42 | 0 | | |
| MERCURY (HG) | E245.1 | mg/L | **0.00005** | **0.0017** | **0.00091** | 10 | 0 | | | 0 | | |
| POTASSIUM (K) | E200.7 | mg/L | | | | 10 | 10 | 20 | 45 | 0 | | |
| **SELENIUM (SE)** | E200.8 | mg/L | **0.05** | **0.020** | **0.005** | 10 | 10 | 0.024 | 0.035 | **10** | YD-1 | September |
| SILVER (AG) | E200.8 | mg/L | **0.1** | **0.000374** | | 10 | 0 | | | 0 | | |
| SODIUM (NA) | E200.7 | mg/L | | | | 10 | 10 | 63 | 132 | 0 | | |
| TETRAETHYL LEAD | SW8270C | ug/L | | | | 5 | 0 | | | 0 | | |
| ***VOLATILE PETROLEUM HYDROCARBONS*** | | | | | | | | | | | | |
| METHYL TERT-BUTYL ETHER | MA-VPH | ug/L | **30** | | | 10 | 0 | | | 0 | | |
| BENZENE | MA-VPH | ug/L | **5** | | | 10 | 0 | | | 0 | | |
| TOLUENE | MA-VPH | ug/L | **1000** | | | 10 | 0 | | | 0 | | |
| ETHYLBENZENE | MA-VPH | ug/L | **530** | | | 10 | 0 | | | 0 | | |
| M-P XYLENE | MA-VPH | ug/L | **10000** | | | 10 | 0 | | | 0 | | |
| O-XYLENE | MA-VPH | ug/L | **10000** | | | 10 | 0 | | | 0 | | |
| TOTAL XYLENE | MA-VPH | ug/L | **10000** | | | 10 | 0 | | | 0 | | |
| NAPHTHALENE | MA-VPH | ug/L | **100** | | | 10 | 0 | | | 0 | | |

## TABLE 5-11. SURFACE WATER SUMMARY STATISTICS

| Analyte | Method | Unit | ale Human Healt tandards | ale uatic cute | ale uatic ronic | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Event |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C9-C10 AROMATICS | MA-VPH | ug/L | | | | 10 | 0 | | | 0 | | |
| C5-C8 ALIPHATICS | MA-VPH | ug/L | | | | 10 | 0 | | | 0 | | |
| C9-C12 ALIPHATICS | MA-VPH | ug/L | | | | 10 | 1 | 37 | 37 | 0 | | |
| TOTAL PURGEABLE HYDROCARBONS | MA-VPH | ug/L | | | | 10 | 1 | 38 | 38 | 0 | | |
| ***EXTRACTABLE PETROLEUM HYDROCARBONS*** | | | | | | | | | | | | |
| C9-C18 ALIPHATICS | MA-EPH | ug/L | | | | 10 | 0 | | | 0 | | |
| C19-C36 ALIPHATICS | MA-EPH | ug/L | | | | 10 | 1 | 491 | 491 | 0 | | |
| C11-C22 AROMATICS | MA-EPH | ug/L | | | | 10 | 1 | 325 | 325 | 0 | | |
| TOT EXTRACTABLE HYDROCARBON (EPH) | MA-EPH | ug/L | | | | 10 | 1 | 1070 | 1070 | 0 | | |
| ***POLYNUCLEAR AROMATIC HYDROCARBONS*** | | | | | | | | | | | | |
| 2-METHYLNAPHTHALENE | SW8270C | ug/L | | | | 10 | 1 | 0.28 | 0.28 | 0 | | |
| ACENAPHTHENE | SW8270C | ug/L | **670** | | | 10 | 1 | 0.23 | 0.23 | 0 | | |
| ACENAPHTHYLENE | SW8270C | ug/L | | | | 10 | 0 | | | 0 | | |
| ANTHRACENE | SW8270C | ug/L | **8300** | | | 10 | 0 | | | 0 | | |
| BENZO (A) ANTHRACENE | SW8270C | ug/L | **0.038** | | | 10 | 0 | | | 0 | | |
| BENZO (A) PYRENE | SW8270C | ug/L | **0.038** | | | 10 | 0 | | | 0 | | |
| BENZO (B) FLUORANTHENE | SW8270C | ug/L | **0.038** | | | 10 | 0 | | | 0 | | |
| BENZO (GHI) PERYLENE | SW8270C | ug/L | | | | 10 | 0 | | | 0 | | |
| BENZO (K) FLUORANTHENE | SW8270C | ug/L | **0.038** | | | 10 | 0 | | | 0 | | |
| CHRYSENE | SW8270C | ug/L | **0.038** | | | 10 | 0 | | | 0 | | |
| DIBENZ (A,H) ANTHRACENE | SW8270C | ug/L | **0.038** | | | 10 | 0 | | | 0 | | |
| FLUORANTHENE | SW8270C | ug/L | **130** | | | 10 | 0 | | | 0 | | |
| FLUORENE | SW8270C | ug/L | **1100** | | | 10 | 0 | | | 0 | | |
| INDENO (1,2,3-C,D) PYRENE | SW8270C | ug/L | **0.038** | | | 10 | 0 | | | 0 | | |
| NAPHTHALENE | SW8270C | ug/L | **100** | | | 10 | 2 | 0.29 | 0.42 | 0 | | |
| PHENANTHRENE | SW8270C | ug/L | | | | 10 | 0 | | | 0 | | |
| PYRENE | SW8270C | ug/L | **830** | | | 10 | 0 | | | 0 | | |
| ***VOLATILE ORGANIC COMPOUNDS*** | | | | | | | | | | | | |
| BENZENE | SW8260B | ug/L | **5** | | | 10 | 0 | | | 0 | | |
| BROMOBENZENE | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| BROMOCHLOROMETHANE | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| BROMODICHLOROMETHANE | SW8260B | ug/L | **5.5** | | | 10 | 0 | | | 0 | | |
| BROMOFORM | SW8260B | ug/L | **43** | | | 10 | 0 | | | 0 | | |
| BROMOMETHANE | SW8260B | ug/L | **47** | | | 10 | 0 | | | 0 | | |
| CARBON TETRACHLORIDE | SW8260B | ug/L | **2.3** | | | 10 | 0 | | | 0 | | |
| CHLOROBENZENE | SW8260B | ug/L | **100** | | | 10 | 0 | | | 0 | | |

## TABLE 5-11. SURFACE WATER SUMMARY STATISTICS

| Analyte | Method | Unit | ale Human Healt tandards | ale uatic cute | ale uatic ronic | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Event |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CHLORODIBROMOMETHANE | SW8260B | ug/L | **4** | | | 10 | 0 | | | 0 | | |
| CHLOROETHANE | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| 2-CHLOROETHYL VINYL ETHER | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| CHLOROFORM | SW8260B | ug/L | **57** | | | 10 | 1 | 0.23 | 0.23 | 0 | | |
| CHLOROMETHANE | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| 1,2-DIBROMOETHANE | SW8260B | ug/L | **0.004** | | | 10 | 0 | | | 0 | | |
| 2-CHLOROTOLUENE | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| 4-CHLOROTOLUENE | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| DIBROMOMETHANE | SW8260B | ug/L | **0.004** | | | 10 | 0 | | | 0 | | |
| 1,2-DICHLOROBENZENE | SW8260B | ug/L | **420** | | | 10 | 0 | | | 0 | | |
| 1,3-DICHLOROBENZENE | SW8260B | ug/L | **320** | | | 10 | 0 | | | 0 | | |
| 1,4-DICHLOROBENZENE | SW8260B | ug/L | **75** | | | 10 | 0 | | | 0 | | |
| DICHLORODIFLUOROMETHANE | SW8260B | ug/L | **1000** | | | 10 | 0 | | | 0 | | |
| 1,1-DICHLOROETHANE | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| 1,2-DICHLOROETHANE | SW8260B | ug/L | **3.8** | | | 10 | 0 | | | 0 | | |
| 1,1-DICHLOROETHENE | SW8260B | ug/L | **7** | | | 10 | 0 | | | 0 | | |
| CIS-1,2-DICHLOROETHENE | SW8260B | ug/L | **70** | | | 10 | 0 | | | 0 | | |
| TRANS-1,2-DICHLOROETHENE | SW8260B | ug/L | **100** | | | 10 | 0 | | | 0 | | |
| 1,2-DICHLOROPROPANE | SW8260B | ug/L | **5** | | | 10 | 0 | | | 0 | | |
| 1,3-DICHLOROPROPANE | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| 2,2-DICHLOROPROPANE | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| 1,1-DICHLOROPROPENE | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| CIS-1,3-DICHLOROPROPENE | SW8260B | ug/L | **3.4** | | | 10 | 0 | | | 0 | | |
| TRANS-1,3-DICHLOROPROPENE | SW8260B | ug/L | **2** | | | 10 | 0 | | | 0 | | |
| ETHYLBENZENE | SW8260B | ug/L | **530** | | | 10 | 0 | | | 0 | | |
| 2-BUTANONE (METHYL-ETHYL-KETONE) | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| METHYL TERT-BUTYL ETHER | SW8260B | ug/L | **30** | | | 10 | 0 | | | 0 | | |
| METHYLENE CHLORIDE | SW8260B | ug/L | **5** | | | 10 | 0 | | | 0 | | |
| STYRENE | SW8260B | ug/L | **100** | | | 10 | 0 | | | 0 | | |
| 1,1,1,2-TETRACHLOROETHANE | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| 1,1,2,2-TETRACHLOROETHANE | SW8260B | ug/L | **1.7** | | | 10 | 0 | | | 0 | | |
| TETRACHLOROETHENE | SW8260B | ug/L | **5** | | | 10 | 0 | | | 0 | | |
| TOLUENE | SW8260B | ug/L | **1000** | | | 10 | 0 | | | 0 | | |
| 1,1,1-TRICHLOROETHANE | SW8260B | ug/L | **200** | | | 10 | 0 | | | 0 | | |
| 1,1,2-TRICHLOROETHANE | SW8260B | ug/L | **3** | | | 10 | 0 | | | 0 | | |
| TRICHLOROETHENE | SW8260B | ug/L | **5** | | | 10 | 0 | | | 0 | | |
| TRICHLOROFLUOROMETHANE | SW8260B | ug/L | **10000** | | | 10 | 0 | | | 0 | | |
| 1,2,3-TRICHLOROPROPANE | SW8260B | ug/L | | | | 10 | 0 | | | 0 | | |
| VINYL CHLORIDE | SW8260B | ug/L | **0.25** | | | 10 | 0 | | | 0 | | |

## TABLE 5-11. SURFACE WATER SUMMARY STATISTICS

| Analyte | Method | Unit | ale Human Healt tandards | ale uatic cute | ale uatic ronic | Total (1) Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Event |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M-P XYLENE | SW8260B | ug/L | **10000** | | | 10 | 0 | | | 0 | | |
| O-XYLENE | SW8260B | ug/L | **10000** | | | 10 | 0 | | | 0 | | |
| TOTAL XYLENE | SW8260B | ug/L | **10000** | | | 10 | 0 | | | 0 | | |

(1) Inclusive of all surface water samples for July and September sampling events.
(2) Detected values qualified as non-detect "U" due to contamination in associated blank.
Red - Indicates constituent detected at concentrations greater than the screening level/standard.

## TABLE 5-12. SEDIMENT ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **TOTAL [1] ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedances | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| ***PHYSICAL PARAMETERS*** | | | | | | | | | | |
| MOISTURE % BY WT. | SW3550A | 11 | 11 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| pH OF SOIL & WASTE | | 11 | 11 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| ***METALS*** | | | | | | | | | | |
| **ARSENIC (AS)** | SW6020 | 11 | 11 | 100% | 5 | **45%** | 0 | 0% | 0 | 0% |
| BARIUM (BA) | SW6010B/SW6020 | 11 | 11 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| CADMIUM (CD) | SW6010B/SW6020 | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| **CHROMIUM (CR)** | SW6010B/SW6020 | 11 | 11 | 100% | 1 | **9%** | 0 | 0% | 0 | 0% |
| **LEAD (PB)** | SW6010B/SW6020 | 11 | 11 | 100% | 6 | **55%** | 0 | 0% | 0 | 0% |
| MERCURY (HG) | SW7471A/B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| **SELENIUM (SE)** | SW6020 | 11 | 11 | 100% | 10 | **91%** | 0 | 0% | 0 | 0% |
| SILVER (AG) | SW6010B/SW6020 | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| TETRAETHYL LEAD | SW8270C | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| ***VOLATILE PETROLEUM HYDROCARBONS*** | | | | | | | | | | |
| METHYL TERT-BUTYL ETHER | MA-VPH | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| BENZENE | MA-VPH | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| TOLUENE | MA-VPH | 11 | 6 | 55% | 0 | 0% | 5 | 45% | 0 | 0% |
| ETHYLBENZENE | MA-VPH | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| M-P XYLENE | MA-VPH | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| O-XYLENE | MA-VPH | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| TOTAL XYLENE | MA-VPH | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| NAPHTHALENE | MA-VPH | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 6 | **55%** |
| C9-C10 AROMATICS | MA-VPH | 11 | 5 | 45% | 0 | 0% | 6 | 55% | 0 | 0% |
| C5-C8 ALIPHATICS | MA-VPH | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| C9-C12 ALIPHATICS | MA-VPH | 11 | 6 | 55% | 0 | 0% | 5 | 45% | 0 | 0% |
| TOTAL PURGEABLE HYDROCARBONS | MA-VPH | 11 | 8 | 73% | 0 | 0% | 3 | 27% | 0 | 0% |
| ***EXTRACTABLE PETROLEUM HYDROCARBONS*** | | | | | | | | | | |
| C11-C22 AROMATICS | MA-EPH | 11 | 11 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| C9-C18 ALIPHATICS | MA-EPH | 11 | 4 | 36% | 0 | 0% | 7 | 64% | 0 | 0% |
| C19-C36 ALIPHATICS | MA-EPH | 11 | 11 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |
| TOT EXTRACTABLE HYDROCARBON (EPH) | MA-EPH | 11 | 11 | 100% | 0 | 0% | 0 | 0% | 0 | 0% |

## TABLE 5-12. SEDIMENT ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **TOTAL [1] ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedances | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| ***POLYNUCLEAR AROMATIC HYDROCARBONS*** | | | | | | | | | | |
| 2-METHYLNAPHTHALENE | SW8270C | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| **ACENAPHTHENE** | SW8270C | 11 | 1 | 9% | 1 | **9%** | 10 | 91% | 10 | **91%** |
| ACENAPHTHYLENE | SW8270C | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| **ANTHRACENE** | SW8270C | 11 | 8 | 73% | 4 | **36%** | 3 | 27% | 0 | 0% |
| **BENZO (A) ANTHRACENE** | SW8270C | 11 | 11 | 100% | 7 | **64%** | 0 | 0% | 0 | 0% |
| **BENZO (A) PYRENE** | SW8270C | 11 | 11 | 100% | 7 | **64%** | 0 | 0% | 0 | 0% |
| **BENZO (B) FLUORANTHENE** | SW8270C | 11 | 11 | 100% | 11 | **100%** | 0 | 0% | 0 | 0% |
| **BENZO (GHI) PERYLENE** | SW8270C | 11 | 11 | 100% | 4 | **36%** | 0 | 0% | 0 | 0% |
| **BENZO (K) FLUORANTHENE** | SW8270C | 11 | 11 | 100% | 2 | **18%** | 0 | 0% | 0 | 0% |
| **CHRYSENE** | SW8270C | 11 | 11 | 100% | 6 | **55%** | 0 | 0% | 0 | 0% |
| DIBENZ (A,H) ANTHRACENE | SW8270C | 11 | 1 | 9% | 0 | 0% | 10 | 91% | 0 | 0% |
| **FLUORANTHENE** | SW8270C | 11 | 11 | 100% | 4 | **36%** | 0 | 0% | 0 | 0% |
| FLUORENE | SW8270C | 11 | 4 | 36% | 0 | 0% | 7 | 64% | 0 | 0% |
| **INDENO (1,2,3-C,D) PYRENE** | SW8270C | 11 | 11 | 100% | 11 | **100%** | 0 | 0% | 0 | 0% |
| NAPHTHALENE | SW8270C | 11 | 3 | 27% | 0 | 0% | 8 | 73% | 0 | 0% |
| **PHENANTHRENE** | SW8270C | 11 | 11 | 100% | 4 | **36%** | 0 | 0% | 0 | 0% |
| **PYRENE** | SW8270C | 11 | 11 | 100% | 7 | **64%** | 0 | 0% | 0 | 0% |
| ***VOLATILE ORGANIC COMPOUNDS*** | | | | | | | | | | |
| BENZENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| BROMOBENZENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| BROMOCHLOROMETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| BROMODICHLOROMETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| BROMOFORM | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| BROMOMETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| CARBON TETRACHLORIDE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| CHLOROBENZENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| CHLOROETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 2-CHLOROETHYL VINYL ETHER | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| CHLOROFORM | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| CHLOROMETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 2-CHLOROTOLUENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 4-CHLOROTOLUENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |

## TABLE 5-12. SEDIMENT ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **TOTAL [1] ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedances | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| CHLORODI- BROMOMETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 1,2-DIBROMOETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| DIBROMO- METHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 1,2-DICHLOROBENZENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| 1,3-DICHLOROBENZENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 1,4-DICHLOROBENZENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| DICHLORODI-FLUOROMETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 1,1-DICHLOROETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 1,2-DICHLOROETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| CIS-1,2-DICHLOROETHENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 1,1-DICHLOROETHENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| TRANS-1,2-DICHLOROETHENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 1,2-DICHLOROPROPANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 1,3-DICHLOROPROPANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 2,2-DICHLOROPROPANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 1,1-DICHLOROPROPENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| CIS-1,3-DICHLOROPROPENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| TRANS-1,3-DICHLOROPROPENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| ETHYLBENZENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| METHYL TERT-BUTYL ETHER | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| METHYLENE CHLORIDE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 2-BUTANONE (METHYL-ETHYL-KETONE) | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| STYRENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 1,1,1,2-TETRACHLOROETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 1,1,2,2-TETRACHLOROETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| TETRACHLOROETHENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 1 | **9%** |
| TOLUENE | SW8260B | 11 | 6 | 55% | 0 | 0% | 5 | 45% | 0 | 0% |
| 1,1,1-TRICHLOROETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| 1,1,2-TRICHLOROETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| TRICHLOROETHENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| TRICHLOROFLUOROMETHANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| 1,2,3-TRICHLOROPROPANE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| VINYL CHLORIDE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |

## TABLE 5-12. SEDIMENT ANALYSIS SUMMARY

| | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | | NON-DETECT ANALYSES | | DETECTION LIMITS EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **TOTAL (1) ANALYSES** | # Detected Analyses | % Detected Analyses | # Detected Exceedances | % Detected Exceedances | # Non-detect Analyses | % Non-detect Analyses | # Non-Detect Exceedances | % Detection Limit Exceedances |
| M-P XYLENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |
| O-XYLENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 0 | 0% |
| TOTAL XYLENE | SW8260B | 11 | 0 | 0% | 0 | 0% | 11 | 100% | 11 | **100%** |

(1) Includes all sediment analyses from the Yegen Ditch, all intervals (A,B,C).

Red - Indicates constituent detected at concentrations greater than the screening level/standard.

Blue - Indicates analyses for which detection limit was greater than the screening level/standard.

## TABLE 5-13. SEDIMENT SUMMARY STATISTICS

| Analyte | Method | Unit | Ecological Risk Based Screening Concentration-Freshwater Sediment[2] | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Interval | Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***PHYSICAL PARAMETERS*** | | | | | | | | | | | |
| MOISTURE % BY WT. | SW3550A | % | | 11 | 11 | 14 | 62 | 0 | | | |
| pH OF SOIL & WASTE | SW9045D | s.u. | | 11 | 11 | 7.2 | 8 | 0 | | | |
| ***METALS*** | | | | | | | | | | | |
| **ARSENIC (AS)** | SW6020 | mg/kg | **9.8** | 11 | 11 | 7 | 16 | **5** | YD-3 | B | 6-12" |
| BARIUM (BA) | SW6010B/SW6020 | mg/kg | | 11 | 11 | 81 | 319 | 0 | | | |
| CADMIUM (CD) | SW6010B/SW6020 | mg/kg | **0.99** | 11 | 0 | | | 0 | | | |
| **CHROMIUM (CR)** | SW6010B/SW6020 | mg/kg | **43.4** | 11 | 11 | 12 | 46 | **1** | YD-1 | B | 6-12" |
| **LEAD (PB)** | SW6010B/SW6020 | mg/kg | **35.8** | 11 | 11 | 10 | 92 | **6** | YD-4 | A | 0-6" |
| MERCURY (HG) | SW7471A/B | mg/kg | **0.18** | 11 | 0 | | | 0 | | | |
| **SELENIUM (SE)** | SW6020 | mg/kg | **2** | 11 | 11 | 1 | 11 | **10** | YD-3 | A | 0-6" |
| SILVER (AG) | SW6010B/SW6020 | mg/kg | **1** | 11 | 0 | | | 0 | | | |
| TETRAETHYL LEAD | SW8270C | mg/kg | | 11 | 0 | | | 0 | | | |
| ***VOLATILE PETROLEUM HYDROCARBONS*** | | | | | | | | | | | |
| METHYL TERT-BUTYL ETHER | MA-VPH | mg/kg | | 11 | 0 | | | 0 | | | |
| BENZENE | MA-VPH | mg/kg | | 11 | 0 | | | 0 | | | |
| TOLUENE | MA-VPH | mg/kg | | 11 | 6 | 0.074 | 0.32 | 0 | | | |
| ETHYLBENZENE | MA-VPH | mg/kg | **1.1** | 11 | 0 | | | 0 | | | |
| M-P XYLENE | MA-VPH | mg/kg | **0.0252** | 11 | 0 | | | 0 | | | |
| O-XYLENE | MA-VPH | mg/kg | | 11 | 0 | | | 0 | | | |
| TOTAL XYLENE | MA-VPH | mg/kg | **0.025** | 11 | 0 | | | 0 | | | |
| NAPHTHALENE | MA-VPH | mg/kg | **0.176** | 11 | 0 | | | 0 | | | |
| C9-C10 AROMATICS | MA-VPH | mg/kg | | 11 | 5 | 3.3 | 74 | 0 | | | |
| C5-C8 ALIPHATICS | MA-VPH | mg/kg | | 11 | 0 | | | 0 | | | |
| C9-C12 ALIPHATICS | MA-VPH | mg/kg | | 11 | 6 | 3.3 | 70 | 0 | | | |
| TOTAL PURGEABLE HYDROCARBONS | MA-VPH | mg/kg | | 11 | 8 | 2.7 | 245 | 0 | | | |
| ***EXTRACTABLE PETROLEUM HYDROCARBONS*** | | | | | | | | | | | |
| C11-C22 AROMATICS | MA-EPH | mg/kg | | 11 | 11 | 20 | 297 | 0 | | | |
| C9-C18 ALIPHATICS | MA-EPH | mg/kg | | 11 | 4 | 40 | 529 | 0 | | | |
| C19-C36 ALIPHATICS | MA-EPH | mg/kg | | 11 | 11 | 36 | 318 | 0 | | | |
| TOT EXTRACTABLE HYDROCARBON (EPH) | MA-EPH | mg/kg | | 11 | 11 | 72 | 1110 | 0 | | | |

## TABLE 5-13. SEDIMENT SUMMARY STATISTICS

| Analyte | Method | Unit | Ecological Risk Based Screening Concentration-Freshwater Sediment[2] | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Interval | Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***POLYNUCLEAR AROMATIC HYDROCARBONS*** | | | | | | | | | | | |
| 2-METHYLNAPHTHALENE | SW8270C | mg/kg | **0.0202** | 11 | 0 | | | 0 | | | |
| **ACENAPHTHENE** | SW8270C | mg/kg | **0.0067** | 11 | 1 | 0.016 | 0.016 | **1** | YD-1 | B | 6-12" |
| ACENAPHTHYLENE | SW8270C | mg/kg | **0.0059** | 11 | 0 | | | 0 | | | |
| **ANTHRACENE** | SW8270C | mg/kg | **0.0572** | 11 | 8 | 0.023 | 0.11 | **4** | YD-5 | C | 12-18" |
| **BENZO (A) ANTHRACENE** | SW8270C | mg/kg | **0.108** | 11 | 11 | 0.06 | 0.32 | **7** | YD-1 | A | 0-6" |
| **BENZO (A) PYRENE** | SW8270C | mg/kg | **0.15** | 11 | 11 | 0.074 | 0.44 | **7** | YD-1 | A | 0-6" |
| **BENZO (B) FLUORANTHENE** | SW8270C | mg/kg | **0.0272** | 11 | 11 | 0.1 | 0.43 | **11** | YD-1 | A | 0-6" |
| **BENZO (GHI) PERYLENE** | SW8270C | mg/kg | **0.17** | 11 | 11 | 0.055 | 0.29 | **4** | YD-5 | C | 12-18" |
| **BENZO (K) FLUORANTHENE** | SW8270C | mg/kg | **0.24** | 11 | 11 | 0.026 | 0.28 | **2** | YD-1 | A | 0-6" |
| **CHRYSENE** | SW8270C | mg/kg | **0.166** | 11 | 11 | 0.046 | 0.44 | **6** | YD-1 | A | 0-6" |
| DIBENZ (A,H) ANTHRACENE | SW8270C | mg/kg | **0.033** | 11 | 1 | 0.017 | 0.017 | 0 | | | |
| **FLUORANTHENE** | SW8270C | mg/kg | **0.423** | 11 | 11 | 0.11 | 0.85 | **4** | YD-1 | A | 0-6" |
| FLUORENE | SW8270C | mg/kg | **0.0774** | 11 | 4 | 0.021 | 0.07 | 0 | | | |
| **INDENO (1,2,3-C,D) PYRENE** | SW8270C | mg/kg | **0.017** | 11 | 11 | 0.061 | 0.35 | **11** | YD-1 | A | 0-6" |
| NAPHTHALENE | SW8270C | mg/kg | **0.176** | 11 | 3 | 0.015 | 0.02 | 0 | | | |
| **PHENANTHRENE** | SW8270C | mg/kg | **0.204** | 11 | 11 | 0.04 | 0.32 | **4** | YD-1 | A | 0-6" |
| **PYRENE** | SW8270C | mg/kg | **0.195** | 11 | 11 | 0.13 | 0.67 | **7** | YD-1 | A | 0-6" |
| ***VOLATILE ORGANIC COMPOUNDS*** | | | | | | | | | | | |
| BENZENE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| BROMOBENZENE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| BROMOCHLOROMETHANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| BROMODICHLOROMETHANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| BROMOFORM | SW8260B | mg/kg | **0.654** | 11 | 0 | | | 0 | | | |
| BROMOMETHANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| CARBON TETRACHLORIDE | SW8260B | mg/kg | **0.0642** | 11 | 0 | | | 0 | | | |
| CHLOROBENZENE | SW8260B | mg/kg | **0.00842** | 11 | 0 | | | 0 | | | |
| CHLOROETHANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| 2-CHLOROETHYL VINYL ETHER | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| CHLOROFORM | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| CHLOROMETHANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| 2-CHLOROTOLUENE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| 4-CHLOROTOLUENE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |

## TABLE 5-13. SEDIMENT SUMMARY STATISTICS

| Analyte | Method | Unit | Ecological Risk Based Screening Concentration-Freshwater Sediment[2] | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Interval | Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CHLORODIBROMOMETHANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| 1,2-DIBROMOETHANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| DIBROMOMETHANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| 1,2-DICHLOROBENZENE | SW8260B | mg/kg | **0.0165** | 11 | 0 | | | 0 | | | |
| 1,3-DICHLOROBENZENE | SW8260B | mg/kg | **4.43** | 11 | 0 | | | 0 | | | |
| 1,4-DICHLOROBENZENE | SW8260B | mg/kg | **0.599** | 11 | 0 | | | 0 | | | |
| DICHLORODI-FLUOROMETHANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| 1,1-DICHLOROETHANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| 1,2-DICHLOROETHANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| CIS-1,2-DICHLOROETHENE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| 1,1-DICHLOROETHENE | SW8260B | mg/kg | **0.031** | 11 | 0 | | | 0 | | | |
| TRANS-1,2-DICHLOROETHENE | SW8260B | mg/kg | **1.05** | 11 | 0 | | | 0 | | | |
| 1,2-DICHLOROPROPANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| 1,3-DICHLOROPROPANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| 2,2-DICHLOROPROPANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| 1,1-DICHLOROPROPENE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| CIS-1,3-DICHLOROPROPENE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| TRANS-1,3-DICHLOROPROPENE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| ETHYLBENZENE | SW8260B | mg/kg | **1.1** | 11 | 0 | | | 0 | | | |
| METHYL TERT-BUTYL ETHER | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| METHYLENE CHLORIDE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| 2-BUTANONE (METHYL-ETHYL-KETONE) | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| STYRENE | SW8260B | mg/kg | **0.559** | 11 | 0 | | | 0 | | | |
| 1,1,1,2-TETRACHLOROETHANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| 1,1,2,2-TETRACHLOROETHANE | SW8260B | mg/kg | **1.36** | 11 | 0 | | | 0 | | | |
| TETRACHLOROETHENE | SW8260B | mg/kg | **0.468** | 11 | 0 | | | 0 | | | |
| TOLUENE | SW8260B | mg/kg | | 11 | 6 | 0.046 | 0.66 | 0 | | | |
| 1,1,1-TRICHLOROETHANE | SW8260B | mg/kg | **0.0302** | 11 | 0 | | | 0 | | | |
| 1,1,2-TRICHLOROETHANE | SW8260B | mg/kg | **1.24** | 11 | 0 | | | 0 | | | |
| TRICHLOROETHENE | SW8260B | mg/kg | **0.0969** | 11 | 0 | | | 0 | | | |
| TRICHLOROFLUOROMETHANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |

## TABLE 5-13. SEDIMENT SUMMARY STATISTICS

| Analyte | Method | Unit | Ecological Risk Based Screening Concentration-Freshwater Sediment[2] | Total [1] Analyses | # Detected Analyses | Minimum Detected Concentration | Maximum Concentration | # Detected Exceedances | Location of Maximum Exceedance | Interval | Depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,2,3-TRICHLOROPROPANE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| VINYL CHLORIDE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| M-P XYLENE | SW8260B | mg/kg | **0.0252** | 11 | 0 | | | 0 | | | |
| O-XYLENE | SW8260B | mg/kg | | 11 | 0 | | | 0 | | | |
| TOTAL XYLENE | SW8260B | mg/kg | **0.025** | 11 | 0 | | | 0 | | | |

(1) Includes all sediment analyses from the Yegen Ditch, all intervals (A,B,C).

(2) http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fwsed/screenbench.htm#table

Red - Indicates constituent detected at concentrations greater than the screening level/standard.

## TABLE 5-14. SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN

| | | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **FRACTION** | **TOTAL ANALYSES** | # Detected Analyses | % Detected Analyses | **# Detected Exceedance** | **% Detected Exceedances** |
| SURFACE SOILS | | | | | | | |
| ARSENIC (AS) | SW6010B/SW6020 | TOT | 283 | 283 | 100% | 15 | 5% |
| BARIUM (BA) | SW6010B/SW6020 | TOT | 257 | 257 | 100% | 47 | 18% |
| LEAD (PB) | SW6010B/SW6020 | TOT | 487 | 487 | 100% | 246 | 51% |
| MERCURY (HG) | SW7471A | TOT | 257 | 7 | 3% | 7 | 3% |
| BENZENE | MA-VPH/SW8260 | VPH/VOC | 326 | 24 | 7% | 21 | 6% |
| TOLUENE | MA-VPH/SW8260 | VPH/VOC | 326 | 24 | 7% | 3 | 1% |
| ETHYLBENZENE | MA-VPH/SW8260 | VPH/VOC | 326 | 26 | 8% | 7 | 2% |
| NAPHTHALENE | MA-VPH/SW8270C | VPH/PAH | 437 | 74 | 17% | 13 | 3% |
| C9-C10 AROMATICS | MA-VPH | VPH | 237 | 47 | 20% | 18 | 8% |
| C5-C8 ALIPHATICS | MA-VPH | VPH | 237 | 35 | 15% | 18 | 8% |
| C9-C12 ALIPHATICS | MA-VPH | VPH | 237 | 54 | 23% | 21 | 9% |
| C9-C18 ALIPHATICS | MA-EPH | EPH | 153 | 88 | 58% | 39 | 25% |
| C11-C22 AROMATICS | MA-EPH | EPH | 153 | 139 | 91% | 45 | 29% |
| 2-METHYLNAPHTHALENE | SW8270C | PAH | 200 | 76 | 38% | 16 | 8% |
| BENZO (A) ANTHRACENE | SW8270C | PAH | 200 | 116 | 58% | 40 | 20% |
| BENZO (A) PYRENE | SW8270C | PAH | 200 | 134 | 67% | 123 | 62% |
| BENZO (B) FLUORANTHENE | SW8270C | PAH | 200 | 136 | 68% | 57 | 29% |
| BENZO (K) FLUORANTHENE | SW8270C | PAH | 200 | 125 | 63% | 4 | 2% |
| CHRYSENE | SW8270C | PAH | 200 | 137 | 69% | 3 | 2% |
| DIBENZ (A,H) ANTHRACENE | SW8270C | PAH | 200 | 39 | 20% | 35 | 18% |
| FLUORANTHENE | SW8270C | PAH | 200 | 148 | 74% | 1 | 1% |
| INDENO (1,2,3-C,D) PYRENE | SW8270C | PAH | 200 | 137 | 69% | 59 | 30% |
| PYRENE | SW8270C | PAH | 200 | 162 | 81% | 1 | 1% |
| SUBSURFACE SOILS | | | | | | | |
| ARSENIC (AS) | SW6010B/SW6020 | TOT | 392 | 392 | 100% | 4 | 1% |
| BARIUM (BA) | SW6010B/SW6020 | TOT | 332 | 332 | 100% | 5 | 2% |
| LEAD (PB) | SW6010B/SW6020 | TOT | 392 | 390 | 99% | 31 | 8% |
| MERCURY (HG) | SW7471A/B | TOT | 332 | 2 | 1% | 2 | 1% |
| TETRAETHYL LEAD | SW8270C | SVOC | 23 | 3 | 13% | 3 | 13% |
| BENZENE | MA-VPH/SW8260 | VPH/VOC | 462 | 88 | 19% | 85 | 18% |
| TOLUENE | MA-VPH | VPH | 392 | 29 | 7% | 3 | 1% |
| ETHYLBENZENE | MA-VPH/SW8260 | VPH/VOC | 462 | 105 | 23% | 63 | 14% |
| M-P XYLENE | MA-VPH/SW8260 | VPH/VOC | 462 | 120 | 26% | 9 | 2% |
| O-XYLENE | MA-VPH/SW8260 | VPH/VOC | 462 | 118 | 26% | 1 | 0.22% |
| TOTAL XYLENE | MA-VPH | VPH | 392 | 102 | 26% | 3 | 1% |
| NAPHTHALENE | MA-VPH/SW8270C/SW8270C-H | VPH/PAH/SW8270-H | 713 | 271 | 38% | 81 | 11% |
| C9-C10 AROMATICS | MA-VPH | VPH | 392 | 230 | 59% | 187 | 48% |

## TABLE 5-14. SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN

| | | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **FRACTION** | **TOTAL ANALYSES** | # Detected Analyses | % Detected Analyses | **# Detected Exceedance** | **% Detected Exceedances** |
| C5-C8 ALIPHATICS | MA-VPH | VPH | 392 | 189 | 48% | 123 | 31% |
| C9-C12 ALIPHATICS | MA-VPH | VPH | 392 | 232 | 59% | 121 | 31% |
| C11-C22 AROMATICS | MA-EPH | EPH | 319 | 238 | 75% | 165 | 52% |
| C9-C18 ALIPHATICS | MA-EPH | EPH | 319 | 229 | 72% | 98 | 31% |
| 1-METHYLNAPHTHALENE | SW8270C-H | SW8270-H | 2 | 2 | 100% | 2 | 100% |
| 2-METHYLNAPHTHALENE | SW8270C/SW8270C-H | PAH/SW8270-H | 321 | 240 | 75% | 120 | 37% |
| CHLOROBENZENE | SW8260B | VOC | 70 | 1 | 1% | 1 | 1% |
| GROUNDWATER | | | | | | | |
| TDS (MEASURED AT 180 C) | A2540C | PHYS | 32 | 32 | 100% | 31 | 97% |
| CHLORIDE (CL) | E300.0 | IONS | 32 | 32 | 100% | 8 | 25% |
| SULFATE (SO4) | E300.0 | IONS | 32 | 30 | 94% | 24 | 75% |
| NITRATE (NO3-N) | CALCULATION | MNA | 32 | 17 | 53% | 12 | 38% |
| NITRATE + NITRITE AS N | E353.2 | MNA | 32 | 19 | 59% | 12 | 38% |
| FERROUS IRON | E200.7 | MNA | 32 | 32 | 100% | 12 | 38% |
| ARSENIC (AS) | E200.8 | DIS/TRC | 32 | 32 | 100% | 8 | 25% |
| LEAD (PB) | E200.8 | DIS/TRC | 32 | 12 | 38% | 3 | 9% |
| SELENIUM | E200.8 | DIS | 16 | 8 | 50% | 1 | 6% |
| BENZENE | MA-VPH/SW8260B | VPH/VOC | 64 | 24 | 38% | 14 | 22% |
| ETHYLBENZENE | MA-VPH/SW8260B | VPH/VOC | 64 | 26 | 41% | 2 | 3% |
| NAPHTHALENE | MA-VPH/SW8270C | VPH/PAH | 64 | 27 | 42% | 4 | 6% |
| C9-C10 AROMATICS | MA-VPH | VPH | 32 | 19 | 59% | 3 | 9% |
| C5-C8 ALIPHATICS | MA-VPH | VPH | 32 | 15 | 47% | 5 | 16% |
| C9-C12 ALIPHATICS | MA-VPH | VPH | 32 | 20 | 63% | 3 | 9% |
| TOTAL PURGEABLE HYDROCARBONS | MA-VPH | VPH | 32 | 22 | 69% | 6 | 19% |
| C9-C18 ALIPHATICS | MA-EPH | EPH | 32 | 7 | 22% | 2 | 6% |
| C19-C36 ALIPHATICS | MA-EPH | EPH | 32 | 3 | 9% | 2 | 6% |
| C11-C22 AROMATICS | MA-EPH | EPH | 32 | 7 | 22% | 2 | 6% |
| TOT EXTRACTABLE HYDROCARBON (EPH) | MA-EPH | EPH | 32 | 10 | 31% | 8 | 25% |
| BENZO (A) PYRENE | SW8270C | PAH | 32 | 1 | 3% | 1 | 3% |
| BENZO (B) FLUORANTHENE | SW8270C | PAH | 32 | 1 | 3% | 1 | 3% |
| DIBENZ (A,H) ANTHRACENE | SW8270C | PAH | 32 | 1 | 3% | 1 | 3% |
| INDENO (1,2,3-C,D) PYRENE | SW8270C | PAH | 32 | 1 | 3% | 1 | 3% |

## TABLE 5-14. SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN

| | | | | DETECTED ANALYSES | | DETECTED ANALYSES EXCEEDING SCREENING LEVEL(s) | |
|---|---|---|---|---|---|---|---|
| **ANALYTE** | **METHOD** | **FRACTION** | **TOTAL ANALYSES** | # Detected Analyses | % Detected Analyses | **# Detected Exceedance** | **% Detected Exceedances** |
| SURFACE WATER | | | | | | | |
| ARSENIC (AS) | E200.8 | TRC | 10 | 10 | 100% | 10 | 100% |
| SELENIUM (SE) | E200.8 | TRC | 10 | 10 | 100% | 10 | 100% |
| SEDIMENTS | | | | | | | |
| ARSENIC (AS) | SW6020 | TOT | 11 | 11 | 100% | 5 | 45% |
| CHROMIUM (CR) | SW6010B/SW6020 | TOT | 11 | 11 | 100% | 1 | 9% |
| LEAD (PB) | SW6010B/SW6020 | TOT | 11 | 11 | 100% | 6 | 55% |
| SELENIUM (SE) | SW6020 | TOT | 11 | 11 | 100% | 10 | 91% |
| ACENAPHTHENE | SW8270C | NO MEAS | 11 | 1 | 9% | 1 | 9% |
| ANTHRACENE | SW8270C | NO MEAS | 11 | 8 | 73% | 4 | 36% |
| BENZO (A) ANTHRACENE | SW8270C | NO MEAS | 11 | 11 | 100% | 7 | 64% |
| BENZO (A) PYRENE | SW8270C | NO MEAS | 11 | 11 | 100% | 7 | 64% |
| BENZO (B) FLUORANTHENE | SW8270C | NO MEAS | 11 | 11 | 100% | 11 | 100% |
| BENZO (GHI) PERYLENE | SW8270C | NO MEAS | 11 | 11 | 100% | 4 | 36% |
| BENZO (K) FLUORANTHENE | SW8270C | NO MEAS | 11 | 11 | 100% | 2 | 18% |
| CHRYSENE | SW8270C | NO MEAS | 11 | 11 | 100% | 6 | 55% |
| FLUORANTHENE | SW8270C | NO MEAS | 11 | 11 | 100% | 4 | 36% |
| INDENO (1,2,3-C,D) PYRENE | SW8270C | NO MEAS | 11 | 11 | 100% | 11 | 100% |
| PHENANTHRENE | SW8270C | NO MEAS | 11 | 11 | 100% | 4 | 36% |
| PYRENE | SW8270C | NO MEAS | 11 | 11 | 100% | 7 | 64% |

## TABLE 6-1. SITE CONCEPTUAL MODEL

| Primary Sources | Primary Release Mechanism | Secondary Sources | Secondary Release Mechanism | Pathway | Exposure Route | Receptors | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Current/Future Land Use Facility | | | | Current/Future Land Use Off-Facility | | | | Ecological | |
| | | | | | | Potential Future Residents | C/I - Workers | Construction Workers | Site Trespassers | C/I - Indoor Workers | C/I - Outdoor Workers | Construction Workers | Park* User | Terrestrial Ecological | Facility Aquatic Ecological |
| Surface Sources | Spills, Impoundments, and Operational Discharges | Surface Soil and Ditch/Pond Sediments | None | Surface Soil | Ingestion | ● | ● | ● | ● | ● | X | ● | X | ● | X |
| | | | | | Dermal | ● | ● | ● | ● | ● | X | ● | X | ● | X |
| | | | Fugitive Dust | Ambient Air | Inhalation | ● | ● | ● | ● | ● | ● | ● | ● | ● | X |
| | | | Volatile Emissions | Ambient Indoor Air | Inhalation | ● | ● | X | X | ● | X | X | X | X | X |
| | | | | Ambient Outdoor Air | Inhalation | ● | ● | ● | ● | ● | ● | ● | ● | ● | X |
| | | | Surface Water Runoff | Surface Water | Ingestion | ● | ● | ● | ● | X | X | ● | X | ● | ● |
| | | | | | Dermal | ● | ● | ● | ● | X | X | ● | X | ● | ● |
| | | | Leaching | Subsurface Soil | Ingestion | X | X | ● | X | X | X | X | X | ● | X |
| | | | | | Dermal | X | X | ● | X | X | X | X | X | ● | X |
| | | | | Groundwater | Ingestion | ● | X | ● | X | ● | X | ● | X | ● | ● |
| | | | | | Dermal | ● | X | ● | X | ● | X | ● | X | ● | ● |
| Subsurface Sources | Leaks and Operational Discharges | Subsurface Soil | None | Subsurface Soil | Ingestion | X | X | ● | X | X | X | ● | X | ● | X |
| | | | | | Dermal | X | X | ● | X | X | X | ● | X | ● | X |
| | | | Volatile Emissions | Ambient Indoor Air | Inhalation | ● | ● | X | X | ● | X | X | X | X | X |
| | | | | Ambient Outdoor Air | Inhalation | ● | ● | ● | ● | ● | ● | ● | ● | ● | X |
| | | | Trenching | Subsurface Soil | Ingestion | X | X | ● | X | X | X | ● | X | X | X |
| | | | | | Dermal | X | X | ● | X | X | X | ● | X | X | X |
| | | | | Ambient Indoor Air | Inhalation | X | X | X | X | X | X | X | X | X | X |
| | | | | Ambient Outdoor Air | Inhalation | ● | ● | ● | ● | ● | ● | ● | ● | ● | X |
| | | Groundwater | None | Groundwater | Ingestion | ● | X | ● | X | X | X | ● | X | ● | ● |
| | | | | | Dermal | ● | X | ● | X | X | X | ● | X | ● | ● |
| | | | Volatile Emissions | Ambient Indoor Air | Inhalation | ● | ● | X | X | ● | X | X | X | X | X |
| | | | | Ambient Outdoor Air | Inhalation | ● | ● | ● | ● | ● | ● | ● | ● | ● | X |

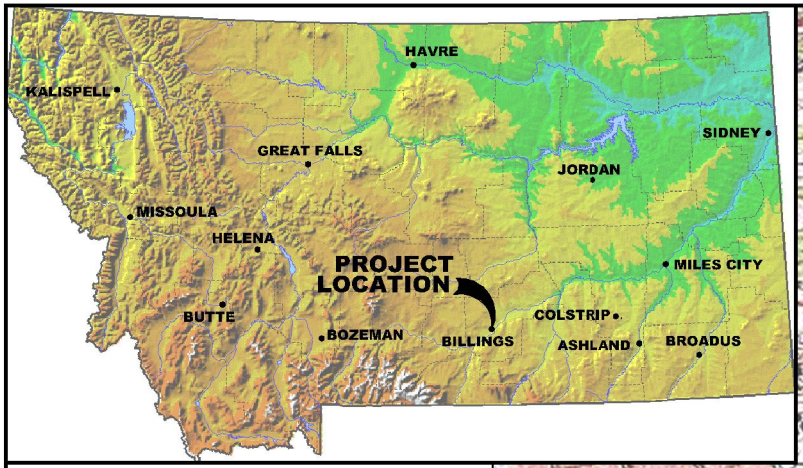
*Notes:*

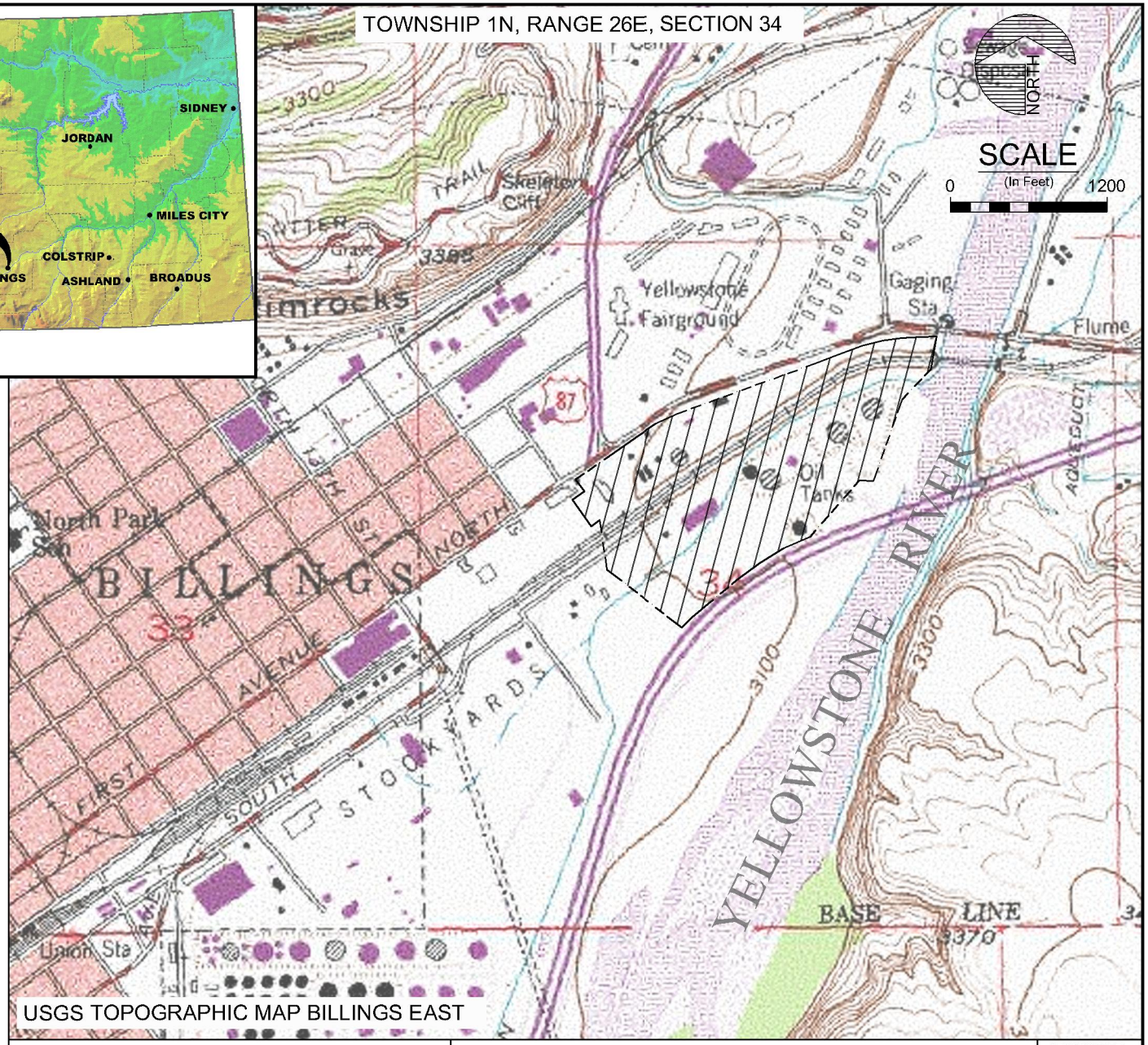
C/I Commercial/Industrial

● Potentially complete exposure pathway

X Incomplete exposure pathway

Park* Heritage Trail system walking trail located adjacent on the eastern Facility boundary




Please Note:
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LEGEND

-·-·- FACILITY BOUNDARY

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**FACILITY LOCATION**
(Topographic)

FIGURE
**1-1**

Hydrometrics, Inc.
Consulting Scientists and Engineers

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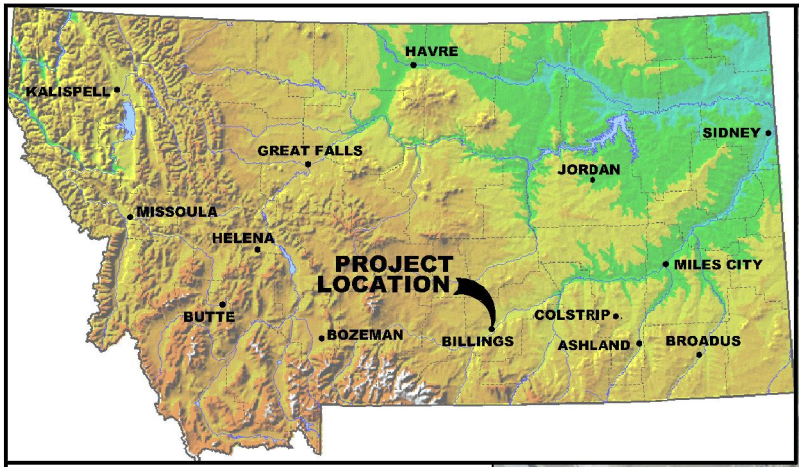


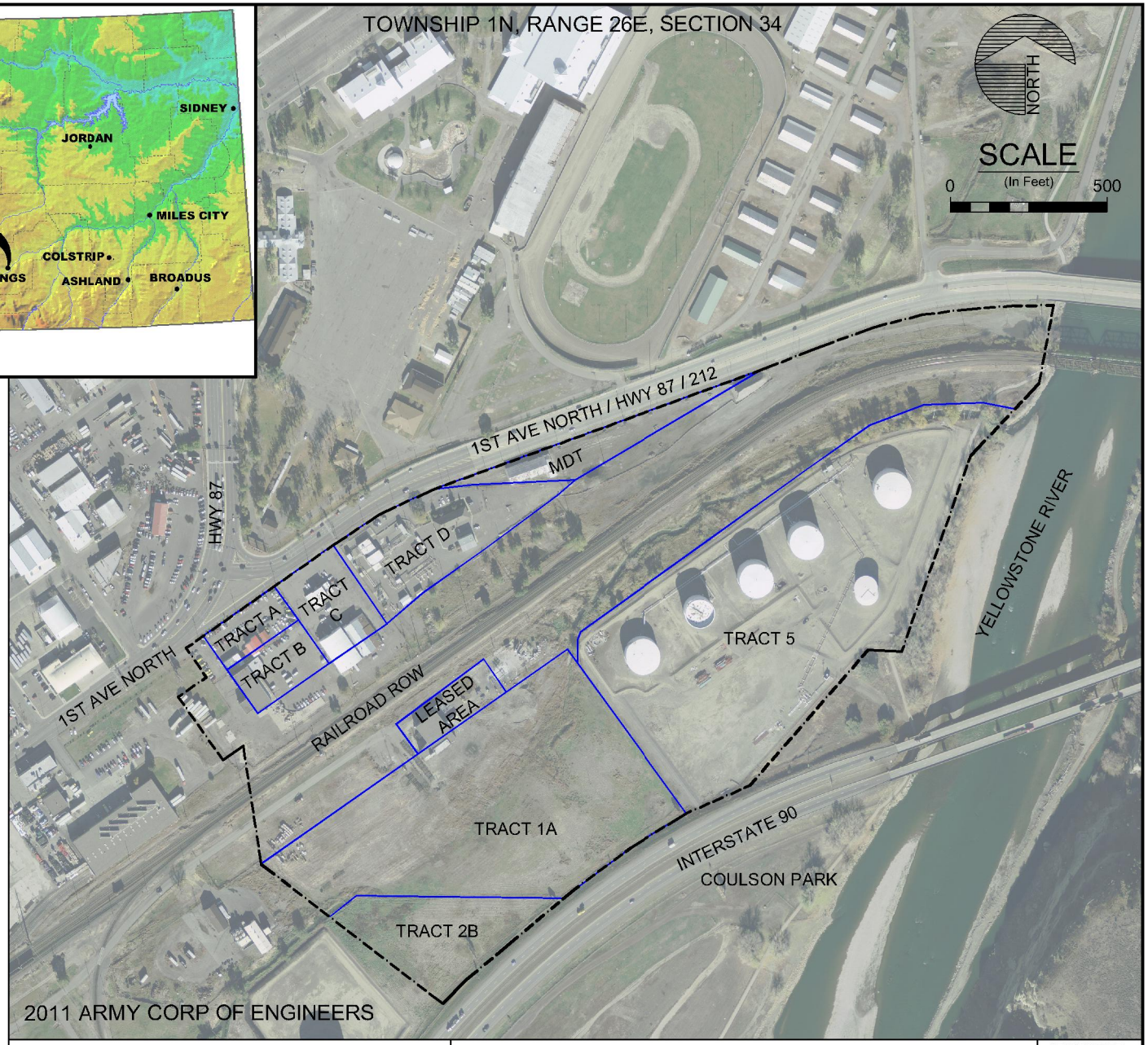


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LEGEND

- - - - FACILITY BOUNDARY

—— TRACT BOUNDARY

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CECRA FACILITY

**FACILITY LOCATION**
(Air Photo)

FIGURE
**1-2**

Hydrometrics, Inc.
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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**YALE OIL REFINERY (CIRCA 1940'S)**

FIGURE
**1-3**

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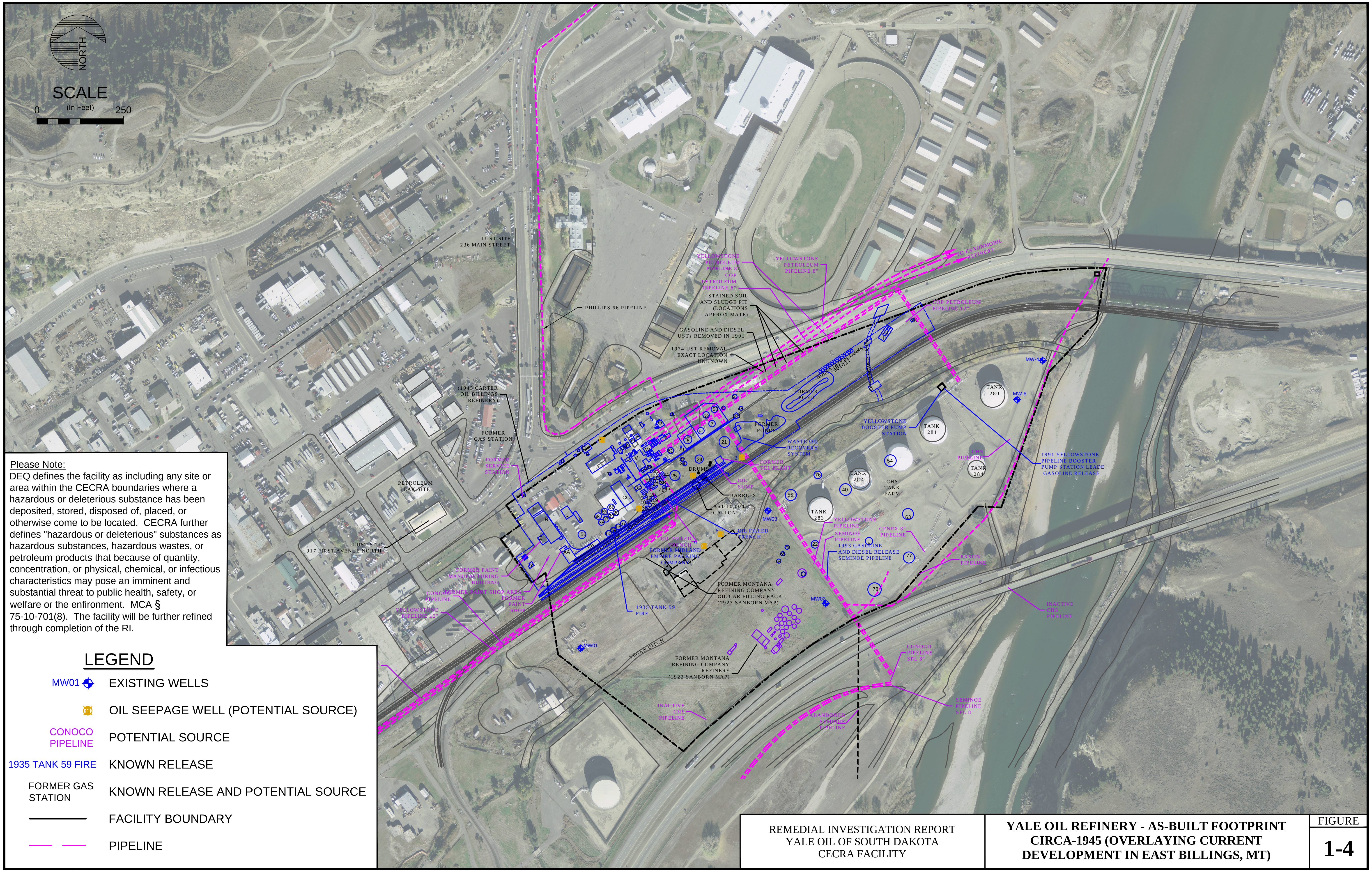


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## LEGEND

| | |
|---|---|
| MW01 | EXISTING WELLS |
| | OIL SEEPAGE WELL (POTENTIAL SOURCE) |
| CONOCO PIPELINE | POTENTIAL SOURCE |
| 1935 TANK 59 FIRE | KNOWN RELEASE |
| FORMER GAS STATION | KNOWN RELEASE AND POTENTIAL SOURCE |
| | FACILITY BOUNDARY |
| | PIPELINE |

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**YALE OIL REFINERY - AS-BUILT FOOTPRINT CIRCA-1945 (OVERLAYING CURRENT DEVELOPMENT IN EAST BILLINGS, MT)**

FIGURE
**1-4**

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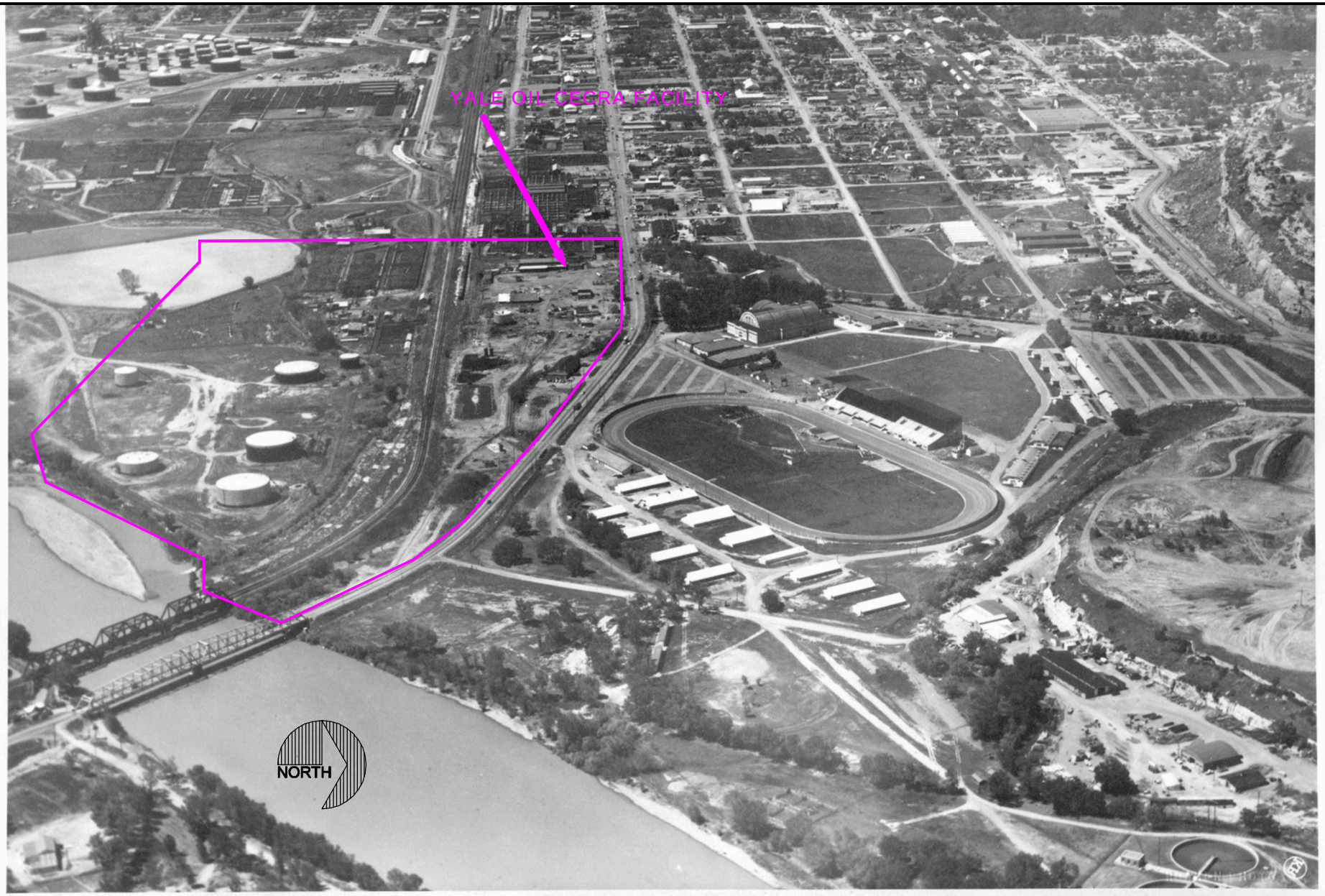


REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**OBLIQUE AERIAL PHOTO - YALE OIL REFINERY DISMANTLED CIRCA - EARLY 1950's**

FIGURE

**1-5**

UPDATE TIME: 4:20 PM
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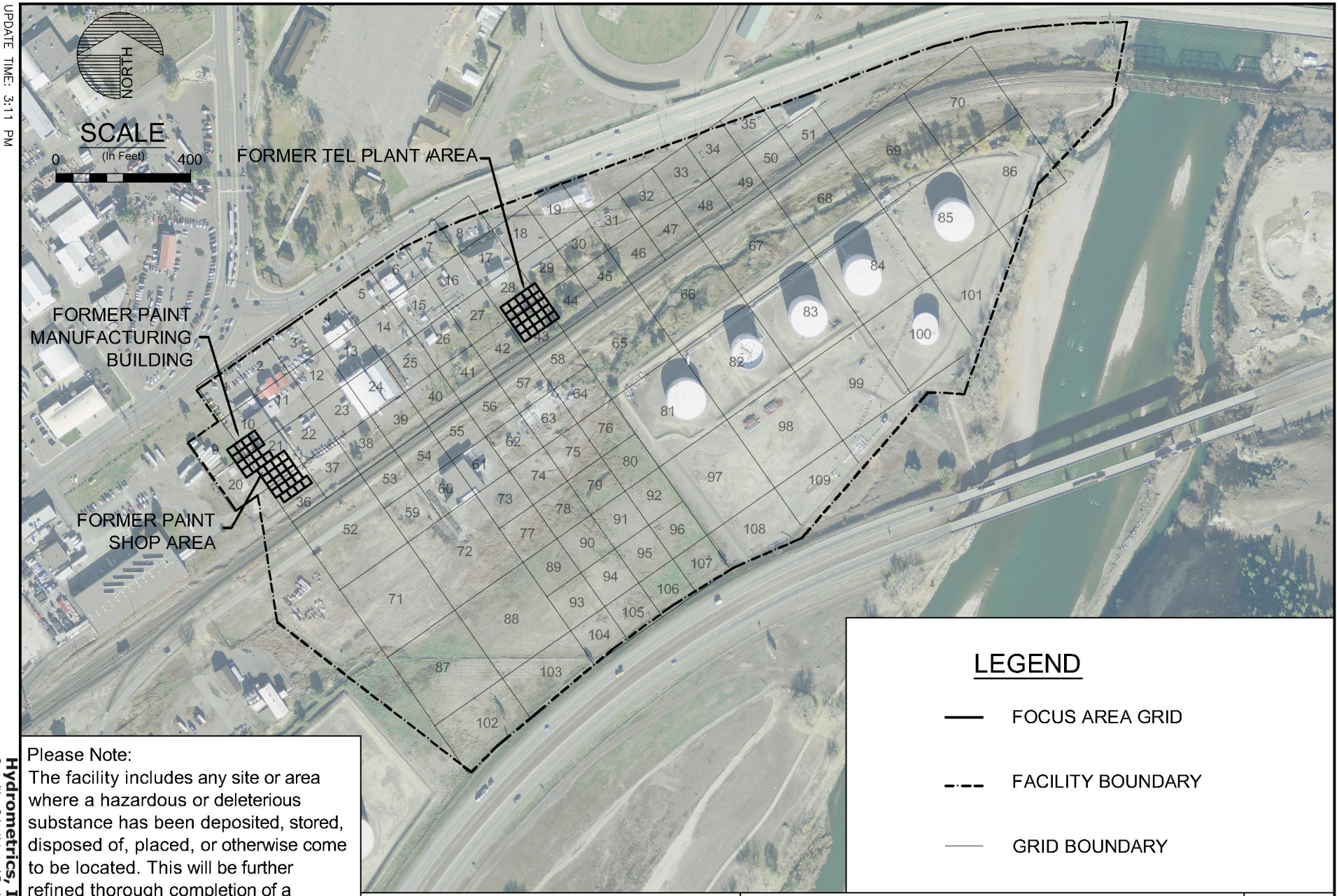


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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SURFACE SOIL SAMPLING GRID DESIGNATIONS**

FIGURE
**3-1**

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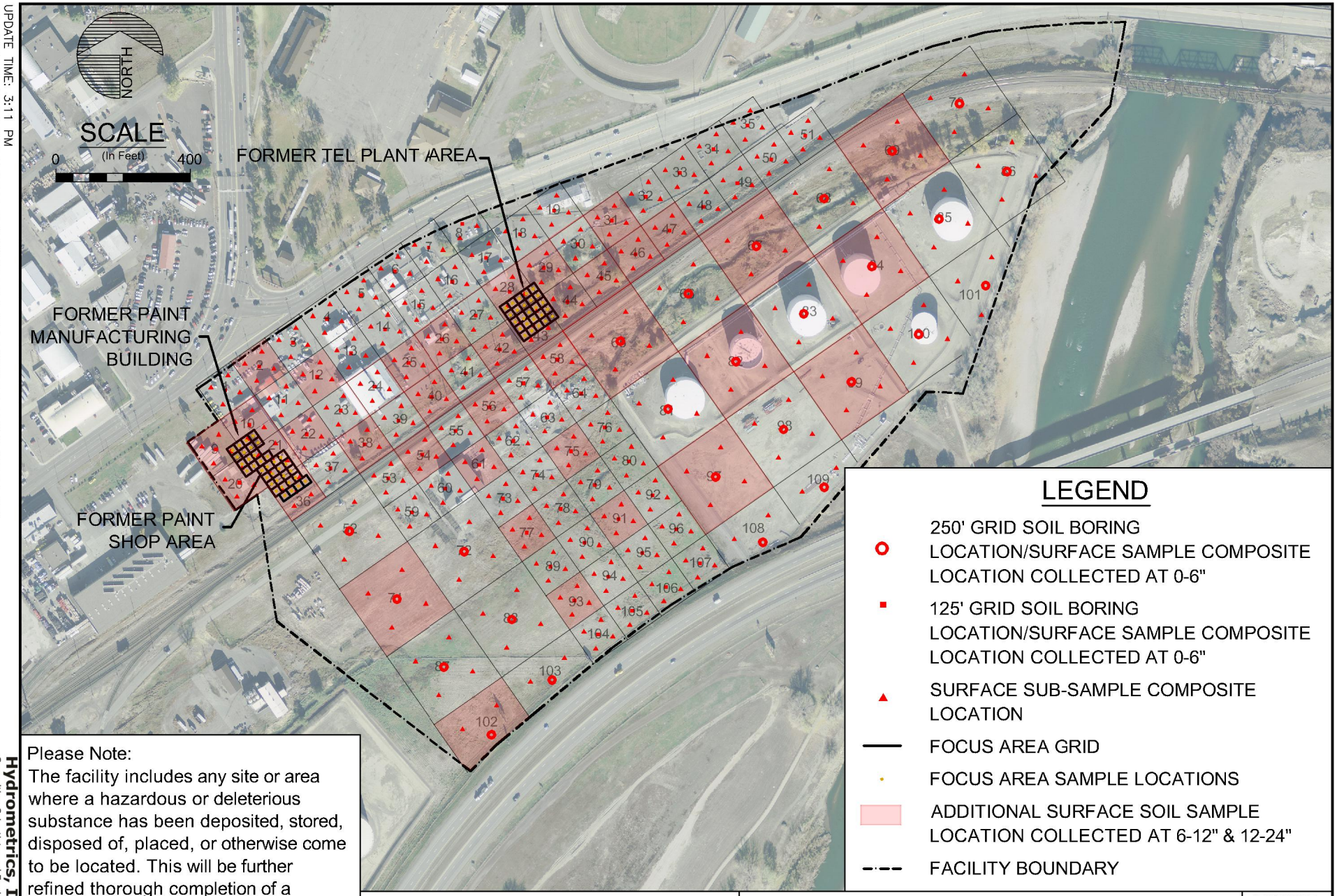


Please Note:
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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SURFACE SOIL SAMPLING LOCATIONS**

FIGURE
**3-2**

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The facility includes any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. This will be further refined thorough completion of a remedial investigation (RI).

## LEGEND

SAMPLE LOCATIONS

| | | |
|---|---|---|
| SURFACE SOIL ANALYTICAL RESULTS REPORT YALE OIL OF SOUTH DAKOTA CECRA FACILITY | **TETRAETHYL LEAD PLANT AREA SAMPLING LOCATIONS** | FIGURE **3-3** |

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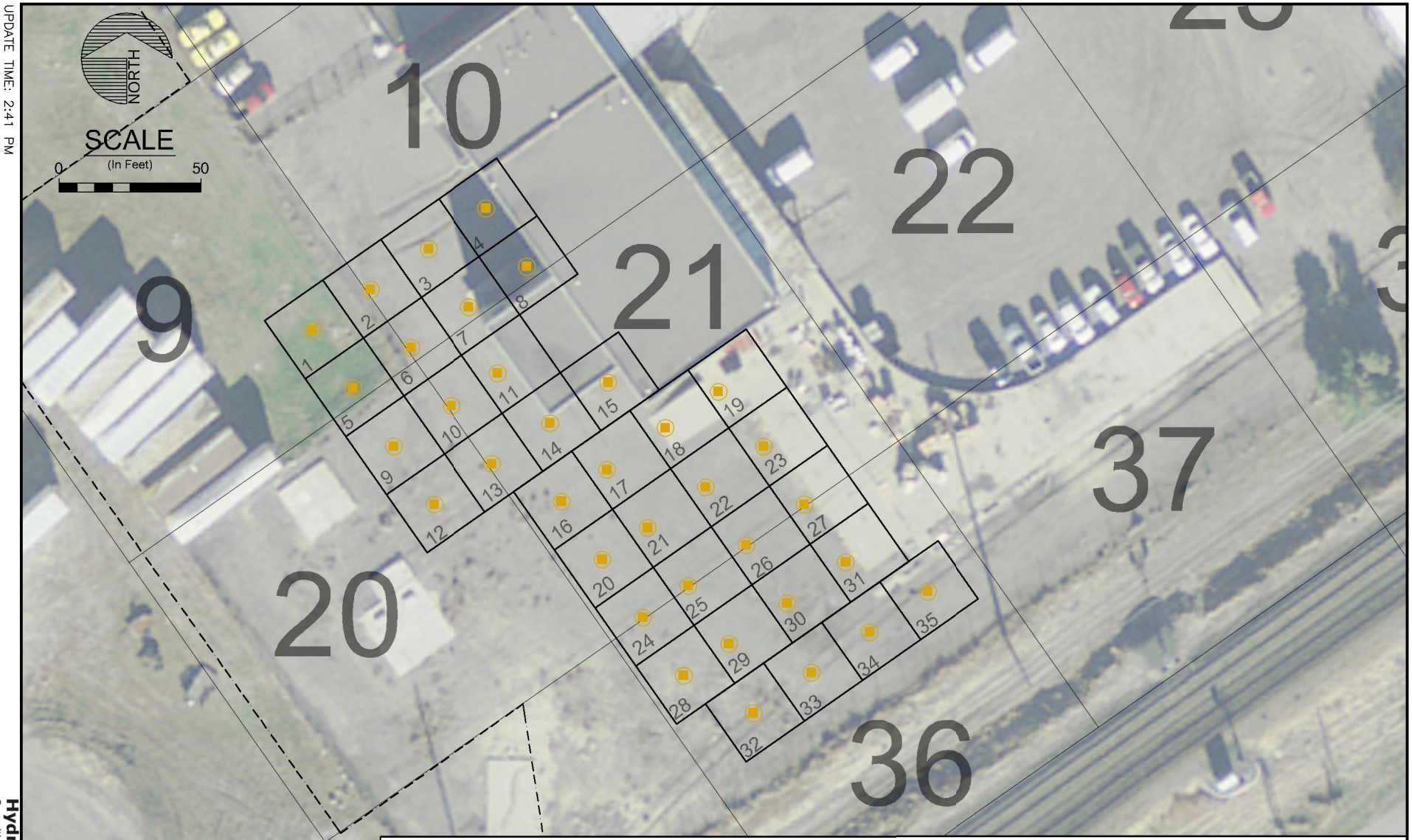


Please Note:
The facility includes any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. This will be further refined thorough completion of a remedial investigation (RI).

## LEGEND

- SAMPLE LOCATIONS
- FACILITY BOUNDARY

| | | |
|---|---|---|
| SURFACE SOIL ANALYTICAL RESULTS REPORT YALE OIL OF SOUTH DAKOTA CECRA FACILITY | **PAINT SHOP AREA SAMPLING LOCATIONS** | FIGURE **3-4** |

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UPDATE TIME: 2:41 PM
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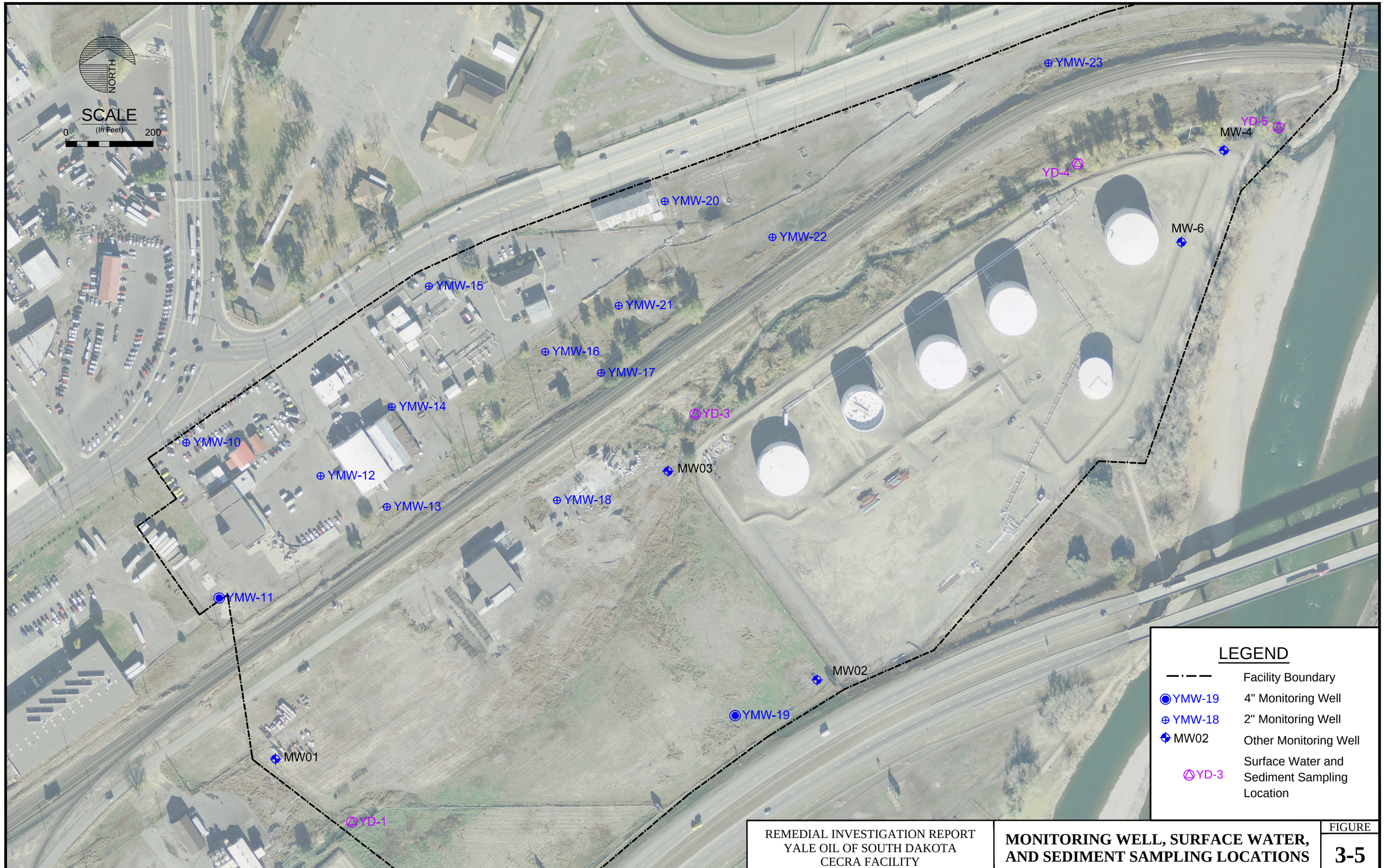


REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**MONITORING WELL, SURFACE WATER, AND SEDIMENT SAMPLING LOCATIONS**

FIGURE
**3-5**

UPDATE TIME: 1:48 PM
LTABORSKY\BIL\20131212\I:\LAND PROJECTS\1110813\1110813B019.DWG

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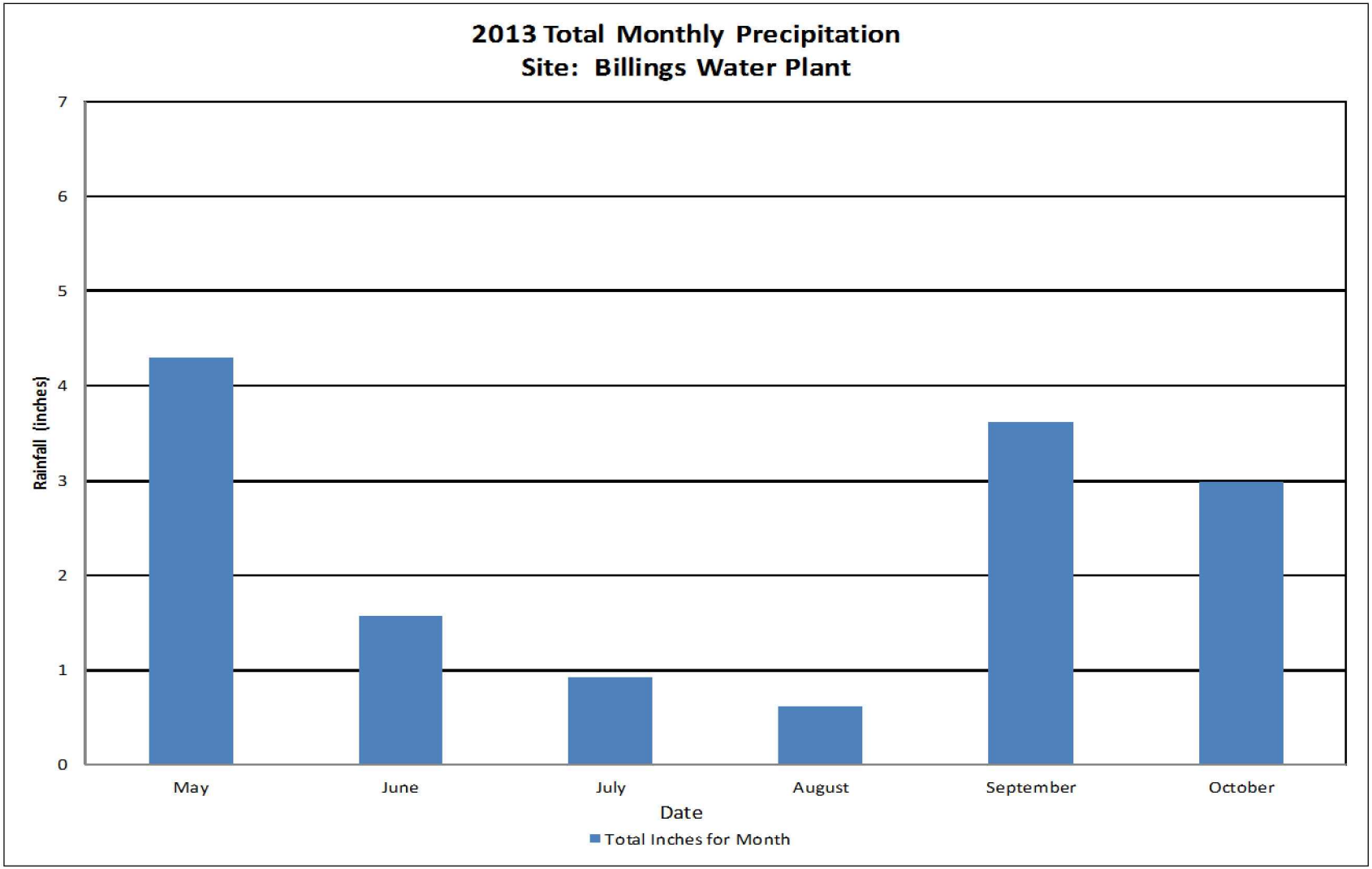


SOURCE: http://www1.ancdc.noaa.gov/pub/orders/cdo/224720.pdf

| | | |
|---|---|---|
| REMEDIAL INVESTIGATION REPORT<br>YALE OIL OF SOUTH DAKOTA<br>CECRA FACILITY | **2013 TOTAL MONTHLY PRECIPITATION** | FIGURE<br>**4-1** |

UPDATE TIME: 1:16 PM
LTABORSKY\BIL\20140630\I:\LAND PROJECTS\1110813\1110813B021.DWG
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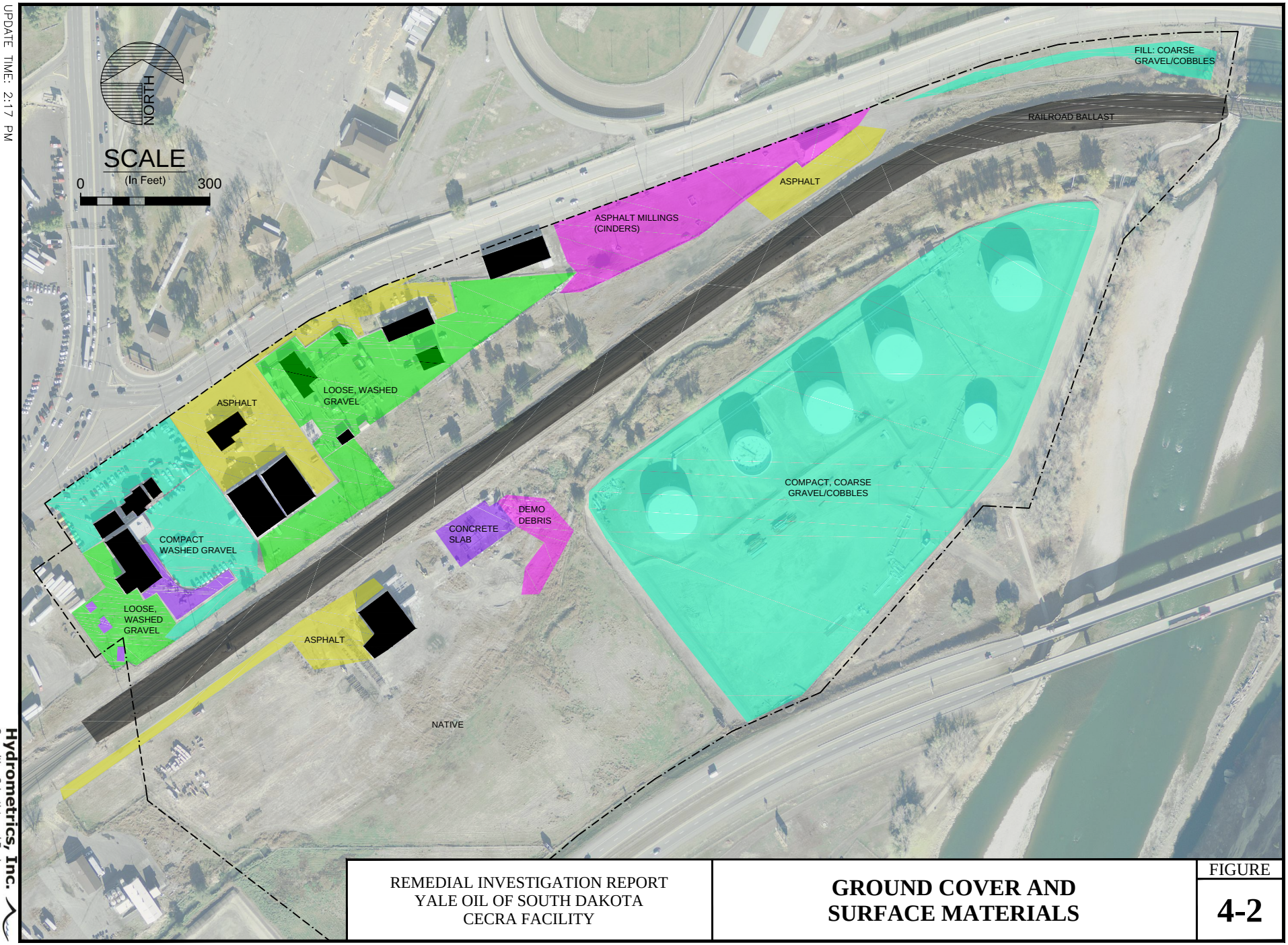


REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**GROUND COVER AND SURFACE MATERIALS**

FIGURE
**4-2**

UPDATE TIME: 2:17 PM
LTABORSKY\BIL\20131205\I:\LAND PROJECTS\YALE OIL\1110813\1110813B006.DWG

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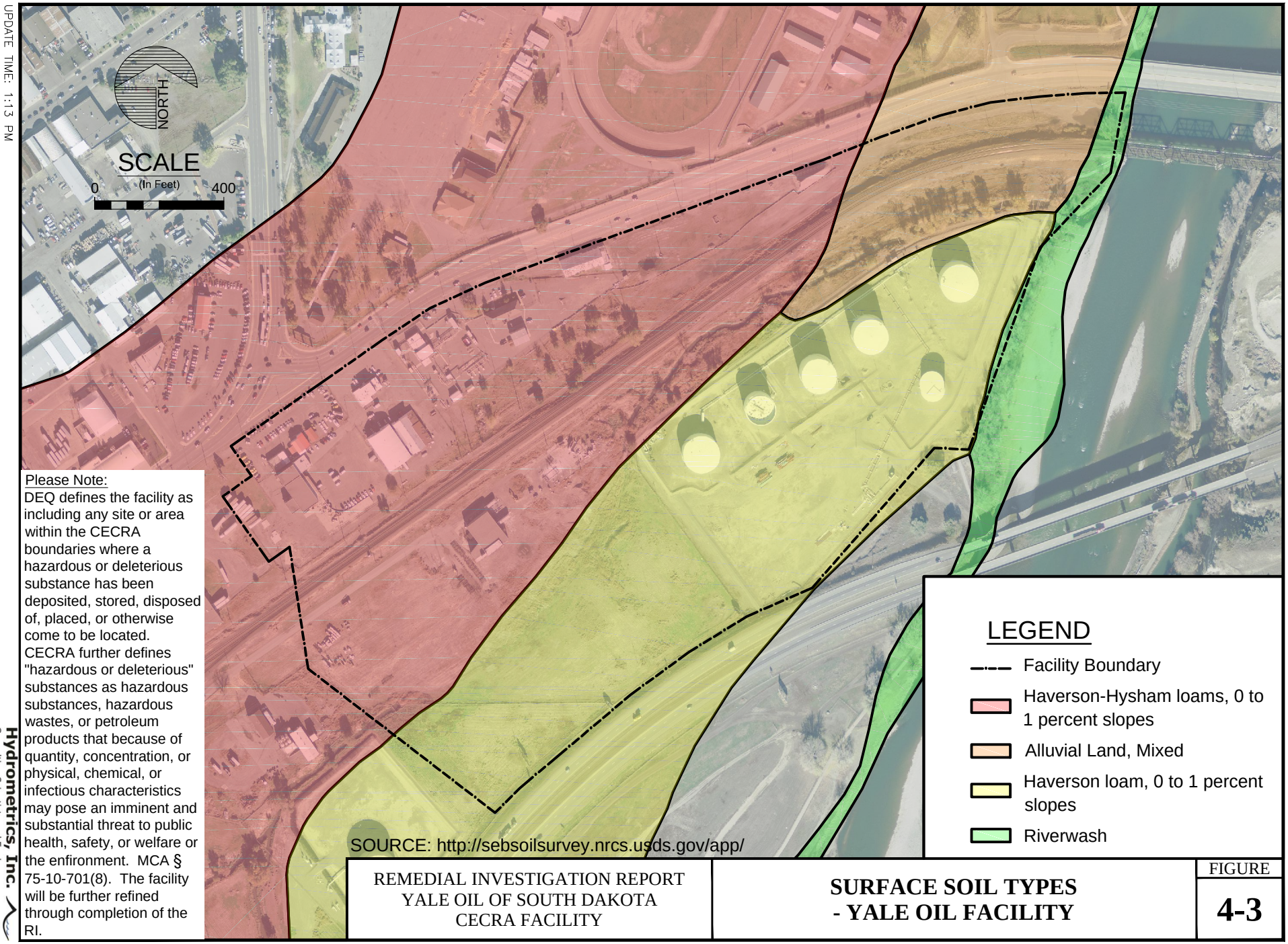


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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SURFACE SOIL TYPES - YALE OIL FACILITY**

FIGURE
**4-3**

Hydrometrics, Inc.
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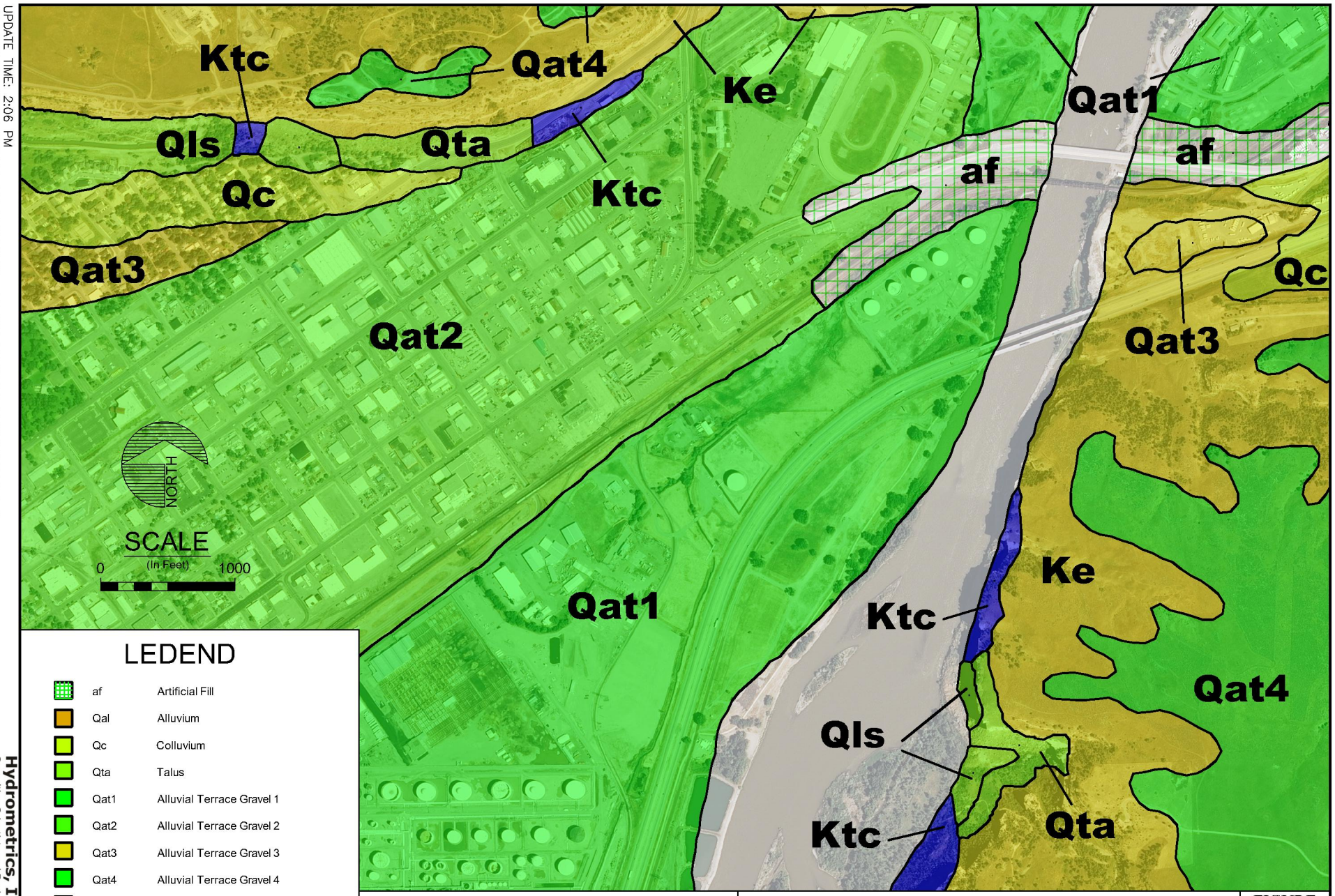
UPDATE TIME: 1:13 PM
LTABORSKY\BIL\20140630\I:\LAND PROJECTS\1110813\1110813B018.DWG




## LEDEND

| | | |
|---|---|---|
| | af | Artificial Fill |
| | Qal | Alluvium |
| | Qc | Colluvium |
| | Qta | Talus |
| | Qat1 | Alluvial Terrace Gravel 1 |
| | Qat2 | Alluvial Terrace Gravel 2 |
| | Qat3 | Alluvial Terrace Gravel 3 |
| | Qat4 | Alluvial Terrace Gravel 4 |
| | Ke | Eagle Sandstone |
| | Ktc | Telegraph Creek Formation |
| | Kn | Niobrara Formation |

REMEDIAL INVESTIGATION REPORT FOR THE YALE OIL SOUTH DAKOTA CECRA FACILITY IN BILLINGS, MONTANA

**SURFICIAL GEOLOGY (LOPEZ, 2002)**

FIGURE

**4-4**

Hydrometrics, Inc.
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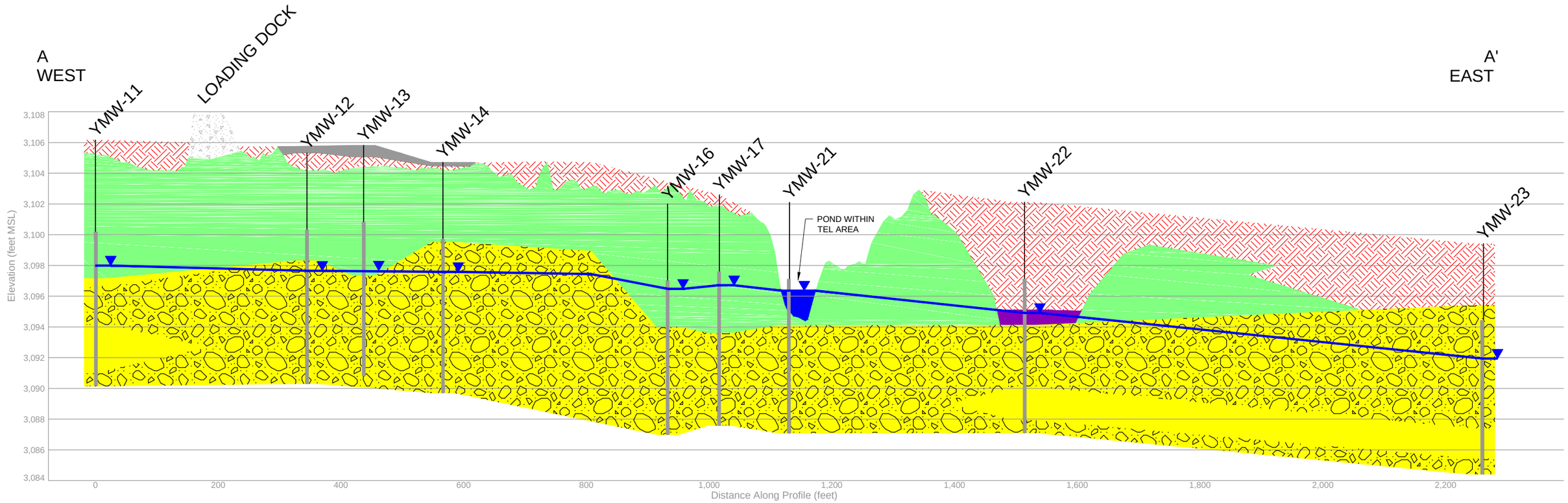
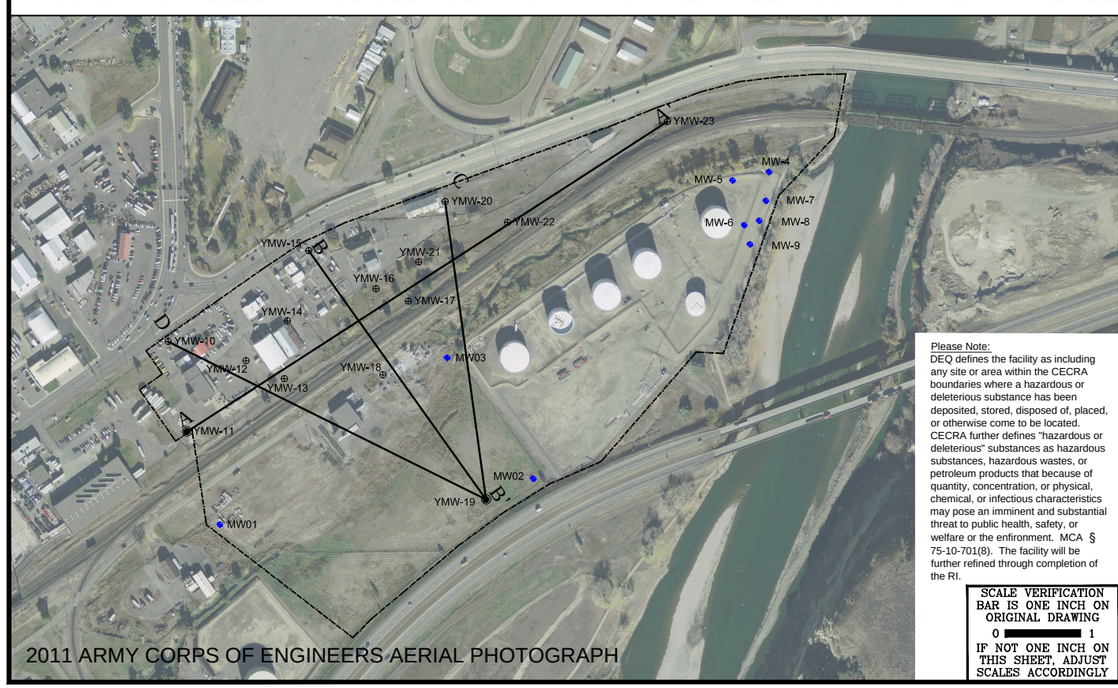
UPDATE TIME: 2:06 PM
JBERGIN\BIL\20131204\I:\LAND PROJECTS\YALE OIL\1110813\1110B13B016.DWG




(5:2 VERTICAL EXAGGERATION)

GROUND SURFACE ELEVATION BASED ON 2004 ARMY CORP OF ENGINEERS IMPACTS STUDY TO THE YELLOWSTONE RIVER CHANNEL AND FLOODPLAIN




2011 ARMY CORPS OF ENGINEERS AERIAL PHOTOGRAPH

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NORTH

SCALE
(In Feet)
300 0 300 600 900
(Approximate Only)

FACILITY BOUNDARY

CROSS SECTION LINE

YMW-12 ⊕ 2" MONITORING WELL

YMW-11 ◉ 4" MONITORING WELL

MW03 ◆ OTHER MONITORING WELL

## LEGEND

- FINE GRAINED ALLUVIUM (Qat1f*)
- COARSE GRAINED ALLUVIUM (Qat1c*)
- ALLUVIAL GRAVEL/COBBLES (Qat1c*)
- ASPHALT
- CONCRETE
- SLUDGE
- ARTIFICIAL FILL AND/ OR DEMOLITION DEBRIS (af*)

YMW-11 — WELL DESIGNATION

MONITOR WELL

GROUNDWATER ELEVATION OCTOBER 2013

SCREENED INTERVAL

TOTAL DEPTH OF HOLE

*MBMG MAP SERIES 61-A

SCALE VERIFICATION BAR IS ONE INCH ON ORIGINAL DRAWING
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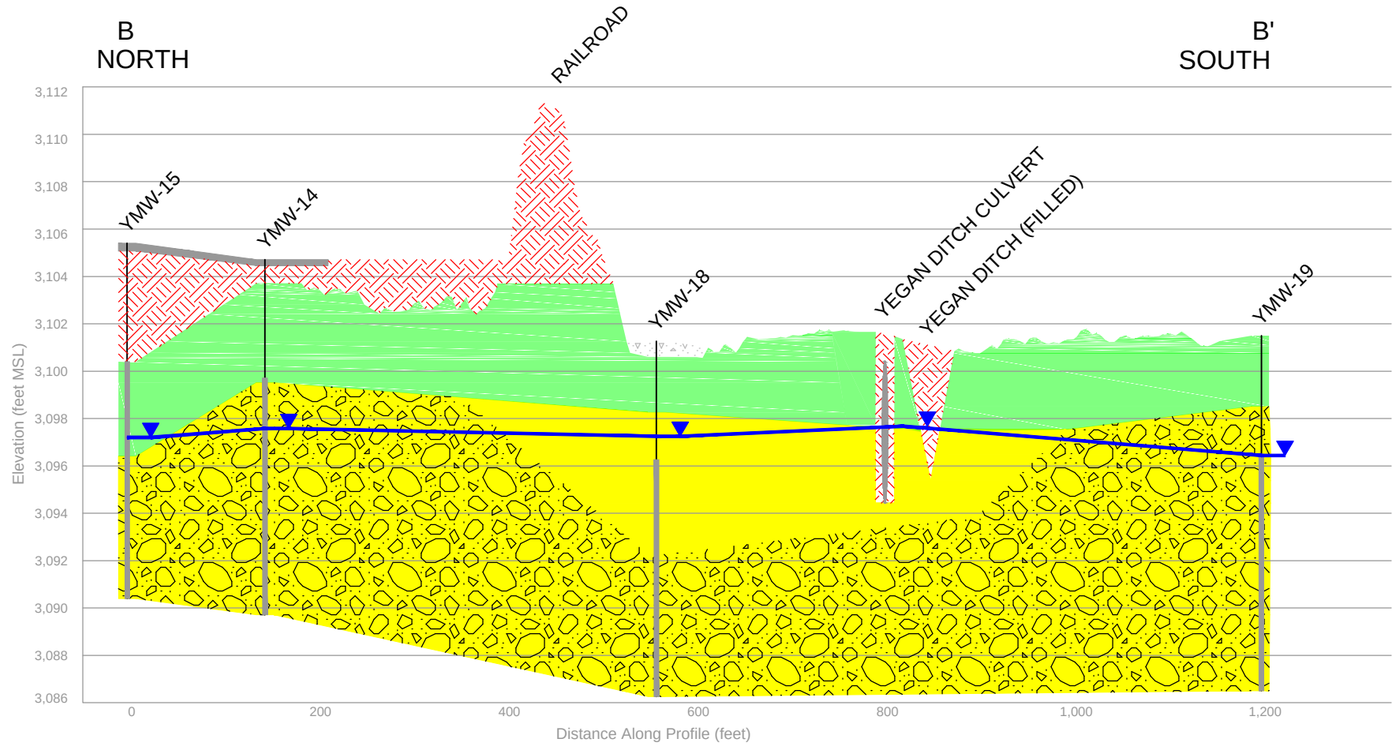
REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**WEST-EAST GEOLOGIC CROSS SECTION A-A'**

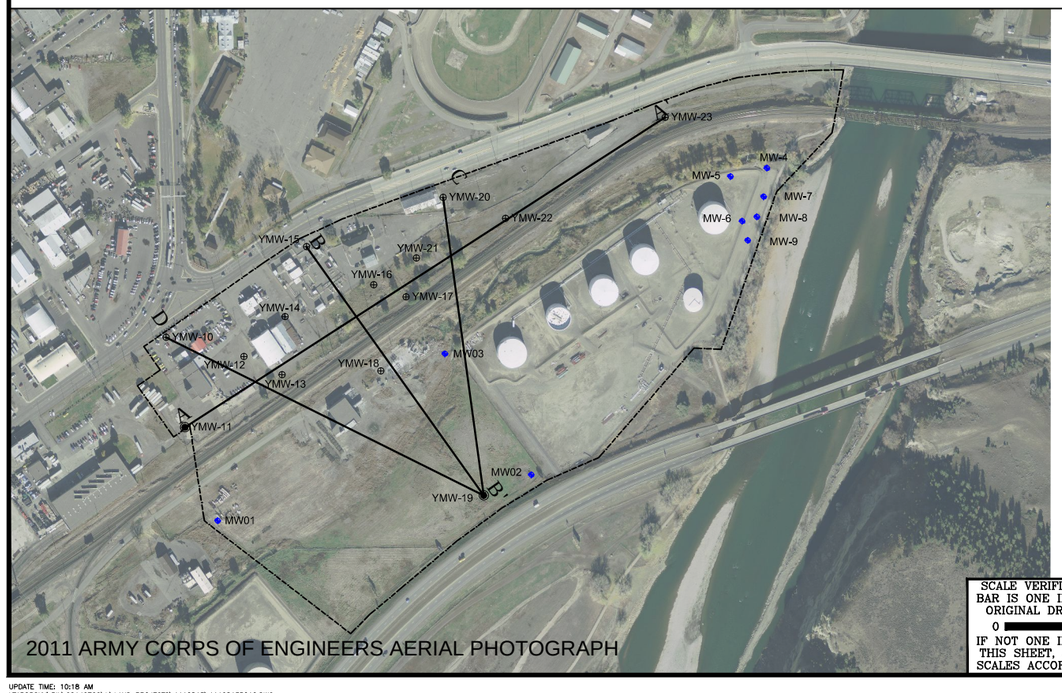
DRAWING FILE NUMBER
1110813B010
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**4-5**

UPDATE TIME: 2:00 PM
LTABORSKY\BL\20140630\I\LAND PROJECTS\1110813\1110813B010.DWG




(5:2 VERTICAL EXAGGERATION)

GROUND SURFACE ELEVATION BASED ON 2004 ARMY CORP OF ENGINEERS IMPACTS STUDY TO THE YELLOWSTONE RIVER CHANNEL AND FLOODPLAIN




2011 ARMY CORPS OF ENGINEERS AERIAL PHOTOGRAPH

NORTH

SCALE
(In Feet)
300 0 300 600 900
(Approximate Only)

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FACILITY BOUNDARY

CROSS SECTION LINE

YMW-12 2" MONITORING WELL

YMW-11 4" MONITORING WELL

MW03 OTHER MONITORING WELL

## LEGEND

- FINE GRAINED ALLUVIUM (Qat1f*)
- COARSE GRAINED ALLUVIUM (Qat1c*)
- ALLUVIAL GRAVEL/COBBLES (Qat1c*)
- ASPHALT
- CONCRETE
- SLUDGE
- ARTIFICIAL FILL AND/ OR DEMOLITION DEBRIS (af*)

YMW-19
- WELL DESIGNATION
- MONITOR WELL
- GROUNDWATER ELEVATION OCTOBER 2013
- SCREENED INTERVAL
- TOTAL DEPTH OF HOLE

*MBMG MAP SERIES 61-A

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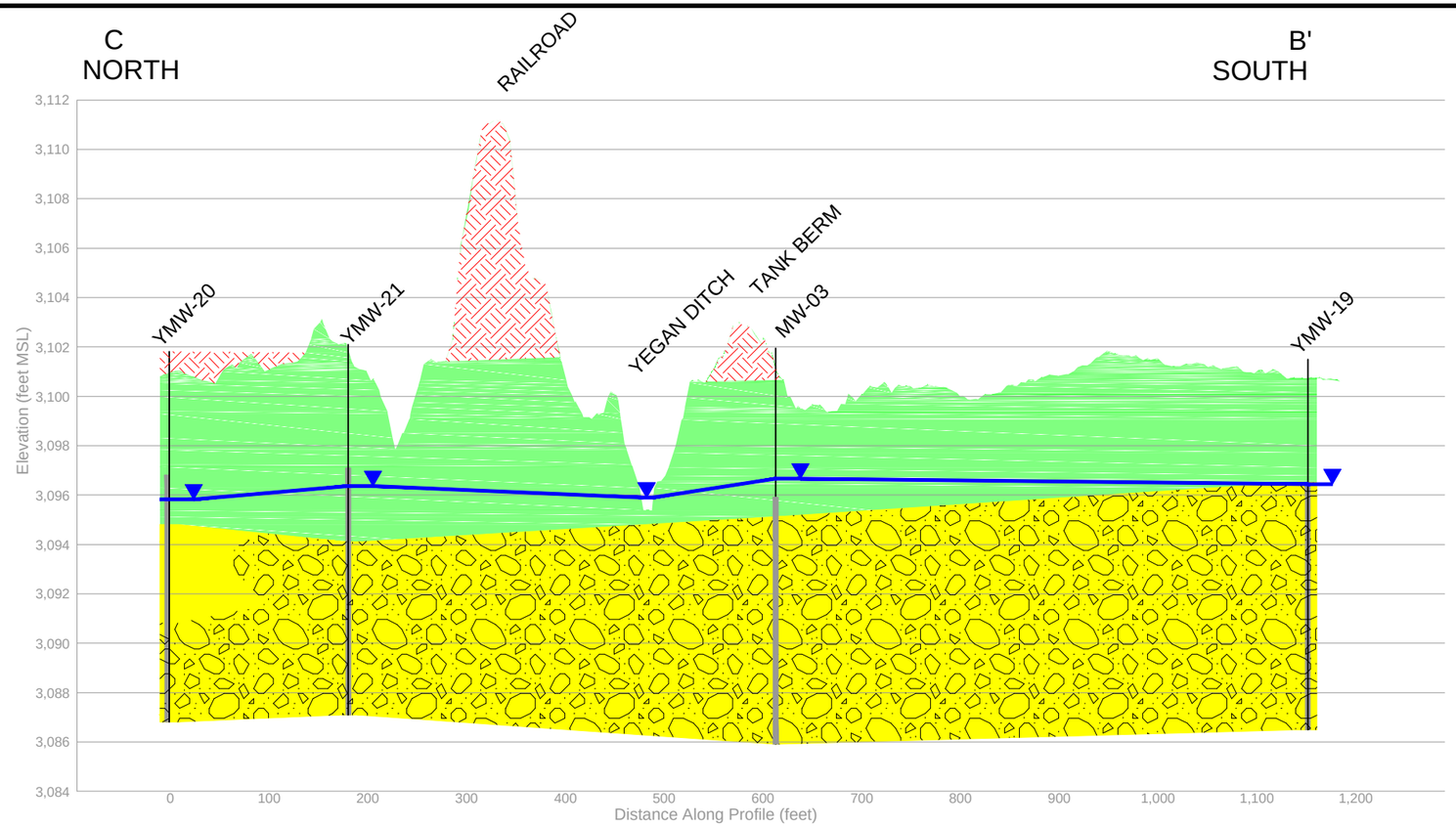
REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**NORTH-SOUTH GEOLOGIC CROSS SECTION B-B'**

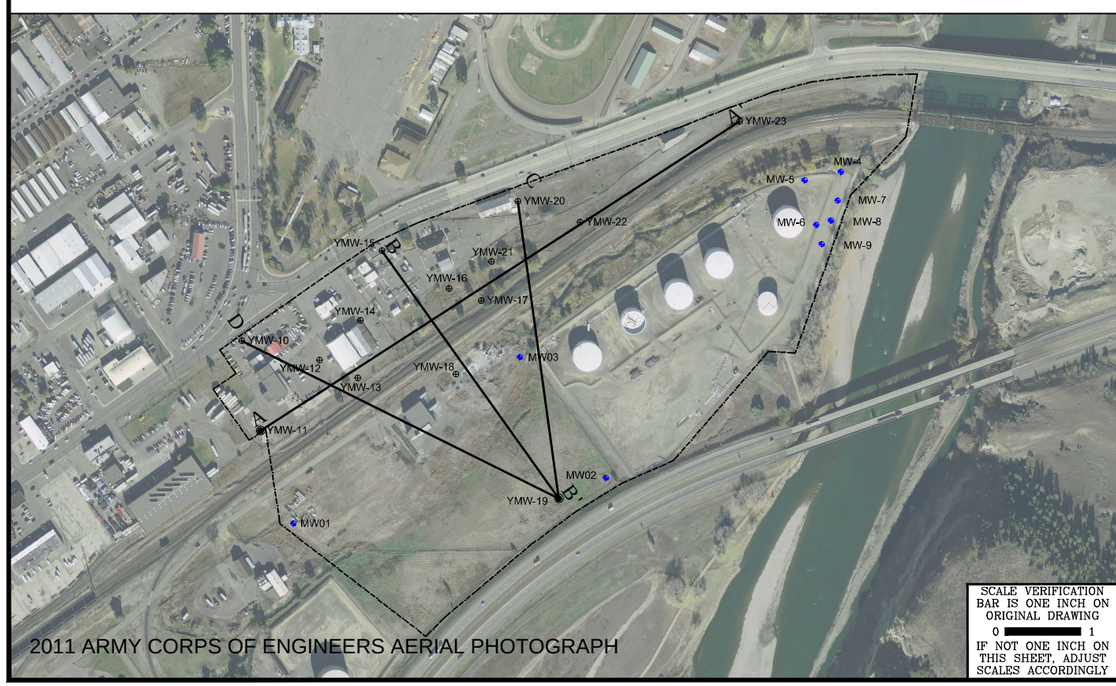
DRAWING FILE NUMBER
1110813B010
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**4-6**

UPDATE TIME: 10:18 AM
LTABORSKY\BIL\20140702\I:\LAND PROJECTS\1110813\1110813B010.DWG

GROUND SURFACE ELEVATION BASED ON 2004 ARMY CORP OF ENGINEERS IMPACTS STUDY TO THE YELLOWSTONE RIVER CHANNEL AND FLOODPLAIN




(5:2 VERTICAL EXAGGERATION)




2011 ARMY CORPS OF ENGINEERS AERIAL PHOTOGRAPH

NORTH

SCALE
(In Feet)
300 0 300 600 900
(Approximate Only)

FACILITY BOUNDARY

CROSS SECTION LINE

YMW-12 2" MONITORING WELL

YMW-11 4" MONITORING WELL

MW03 OTHER MONITORING WELL

## LEGEND

- FINE GRAINED ALLUVIUM (Qat1f*)
- COARSE GRAINED ALLUVIUM (Qat1c*)
- ALLUVIAL GRAVEL/COBBLES (Qat1c*)
- ASPHALT
- CONCRETE
- SLUDGE
- ARTIFICIAL FILL AND/ OR DEMOLITION DEBRIS (af*)

YMW-19 — WELL DESIGNATION

MONITOR WELL

GROUNDWATER ELEVATION OCTOBER 2013

SCREENED INTERVAL

TOTAL DEPTH OF HOLE

*MBMG MAP SERIES 61-A

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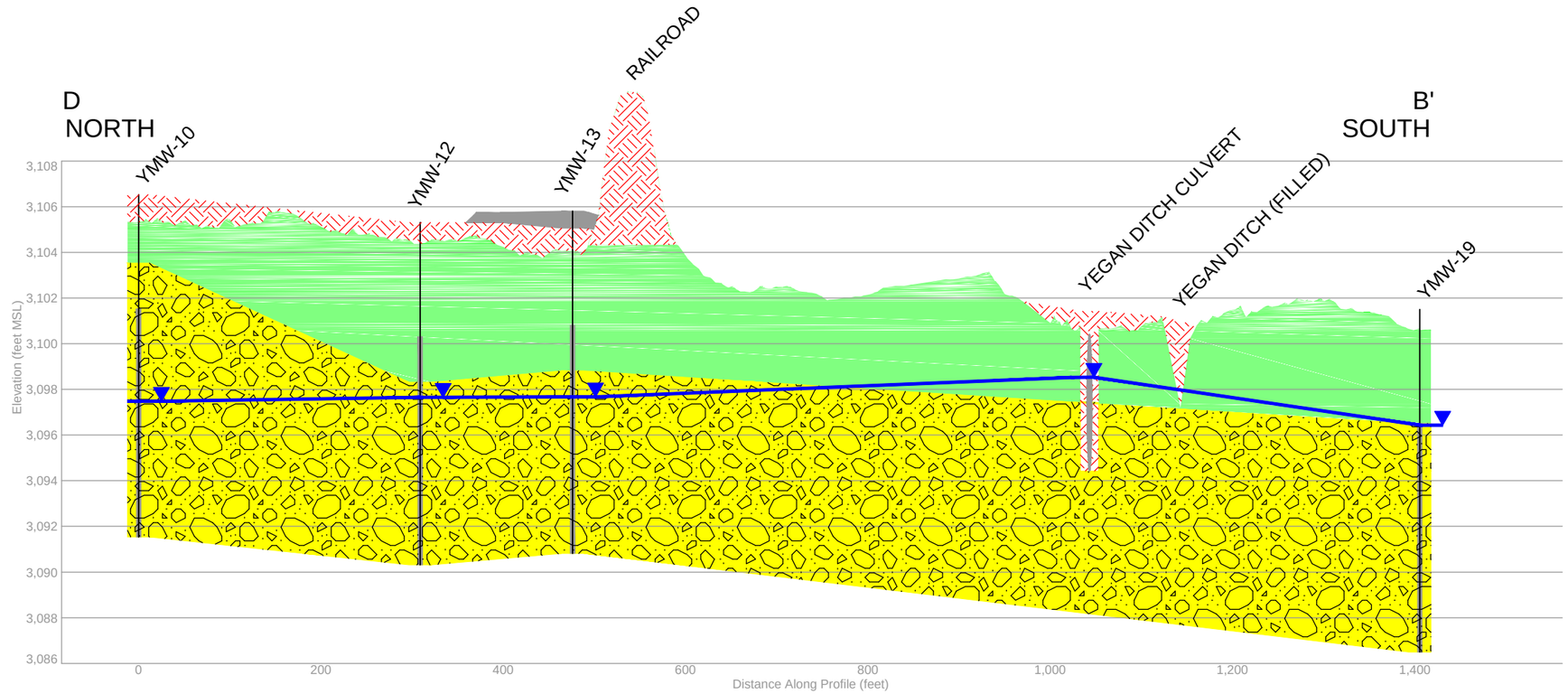
REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

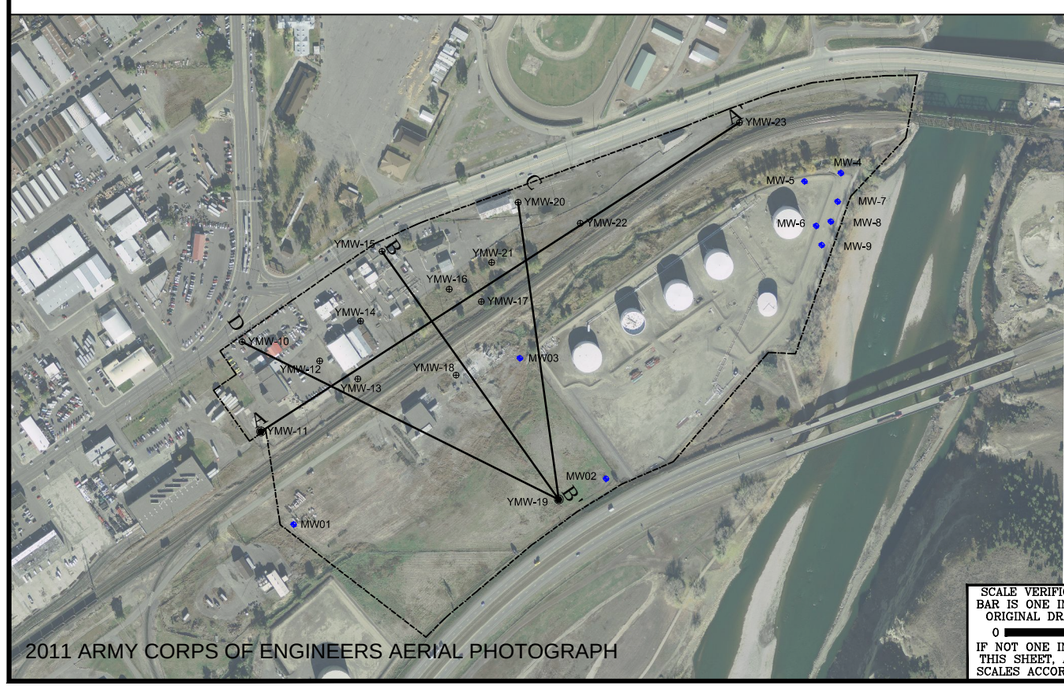
**NORTH-SOUTH GEOLOGIC CROSS SECTION C-B'**

DRAWING FILE NUMBER
1110813B010
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**4-7**

UPDATE TIME: 2:25 PM
LTABORSKY\BIL\20131203\I:\LAND PROJECTS\1110813\1110813B010.DWG

GROUND SURFACE ELEVATION BASED ON 2004 ARMY CORP OF ENGINEERS IMPACTS STUDY TO THE YELLOWSTONE RIVER CHANNEL AND FLOODPLAIN




2011 ARMY CORPS OF ENGINEERS AERIAL PHOTOGRAPH

NORTH

SCALE
(In Feet)
300 0 300 600 900
(Approximate Only)

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FACILITY BOUNDARY

CROSS SECTION LINE

YMW-12 ⊕ 2" MONITORING WELL

YMW-11 ◉ 4" MONITORING WELL

MW03 ◆ OTHER MONITORING WELL

## LEGEND

- FINE GRAINED ALLUVIUM (Qat1f*)
- COARSE GRAINED ALLUVIUM (Qat1c*)
- ALLUVIAL GRAVEL/COBBLES (Qat1c*)
- ASPHALT
- CONCRETE
- SLUDGE
- ARTIFICIAL FILL AND/ OR DEMOLITION DEBRIS (af*)

YMW-19 — WELL DESIGNATION

MONITOR WELL

GROUNDWATER ELEVATION OCTOBER 2013

SCREENED INTERVAL

TOTAL DEPTH OF HOLE

*MBMG MAP SERIES 61-A

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**NORTH-SOUTH GEOLOGIC CROSS SECTION D-B'**

DRAWING FILE NUMBER
1110813B010
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**4-8**

UPDATE TIME: 11:26 AM
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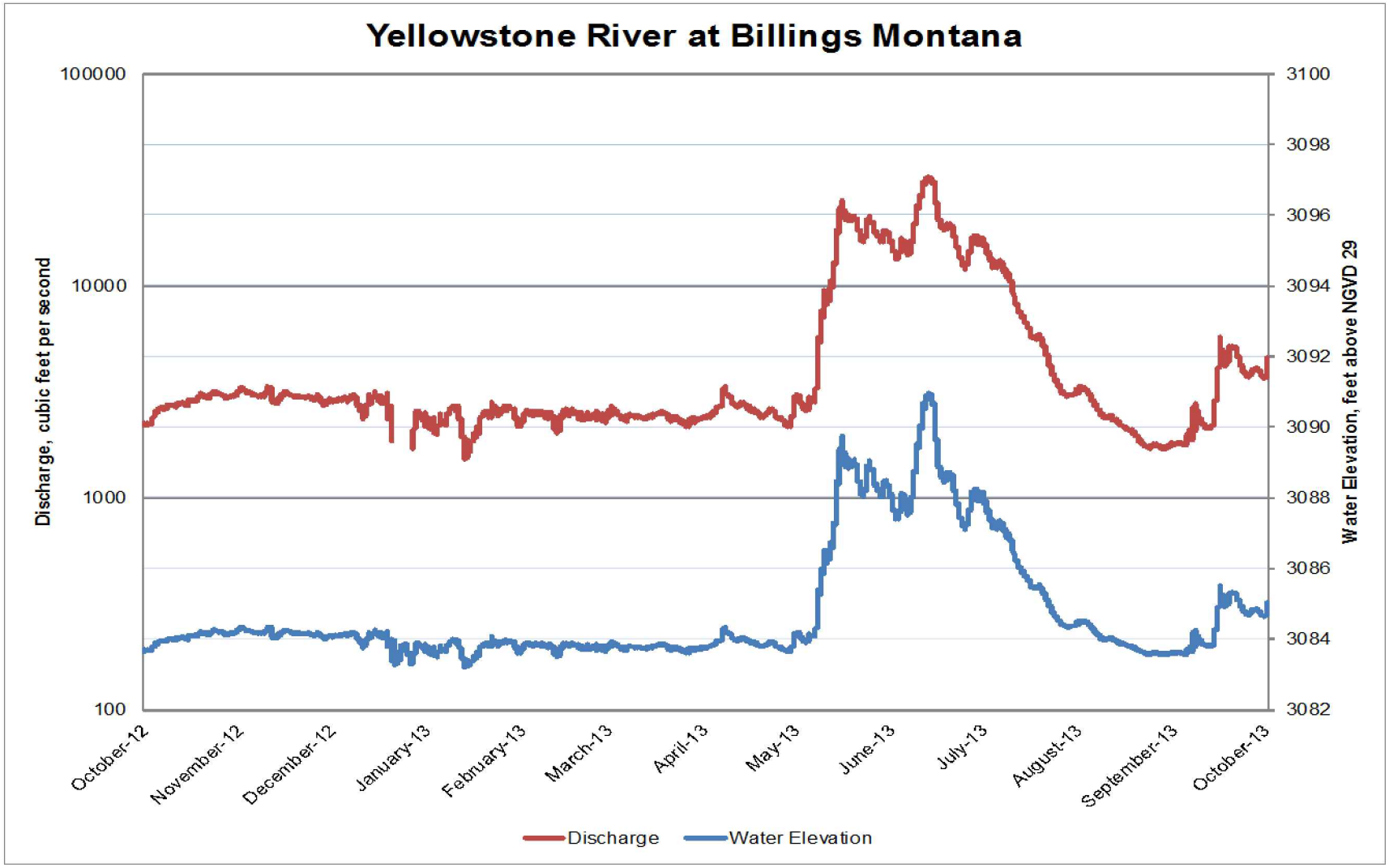


| REMEDIAL INVESTIGATION REPORT<br>YALE OIL OF SOUTH DAKOTA<br>CECRA FACILITY | **DAILY MEAN GAGE HEIGHT AND DISCHARGE, YELLOWSTONE RIVER AT BILLINGS MONTANA (OCTOBER 2012 TO OCTOBER 2013)** | FIGURE<br>**4-9** |
|---|---|---|

UPDATE TIME: 12:28 PM
JBERGIN\BIL\20131205\I:\LAND PROJECTS\YALE OIL\1110813\1110813B021.DWG

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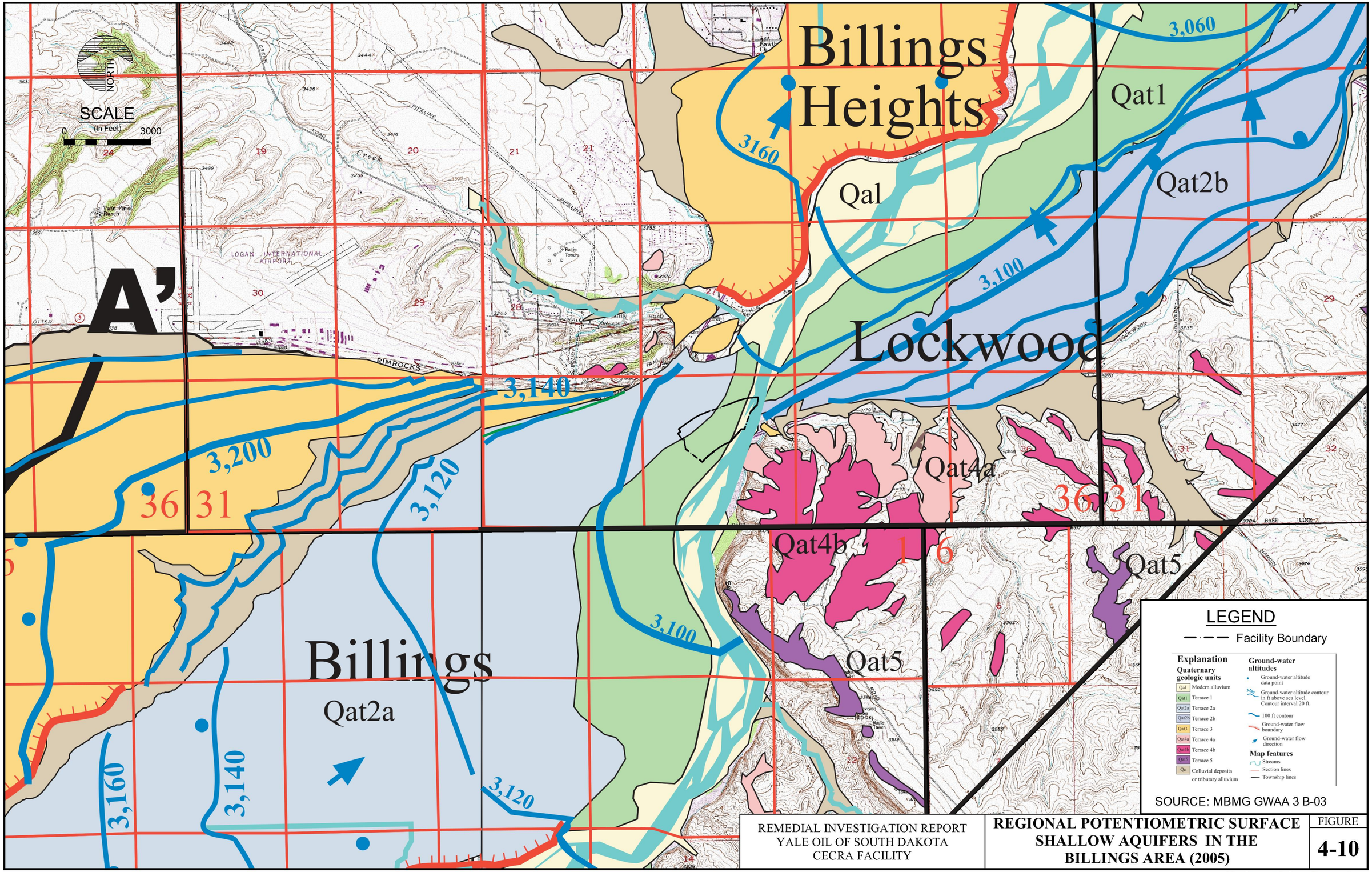


SOURCE: MBMG GWAA 3 B-03

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**REGIONAL POTENTIOMETRIC SURFACE SHALLOW AQUIFERS IN THE BILLINGS AREA (2005)**

FIGURE
**4-10**

UPDATE TIME: 10:53 AM
JBERGIN\BIL\20131205\I:\LAND PROJECTS\YALE OIL\1110813\1110813B020.DWG

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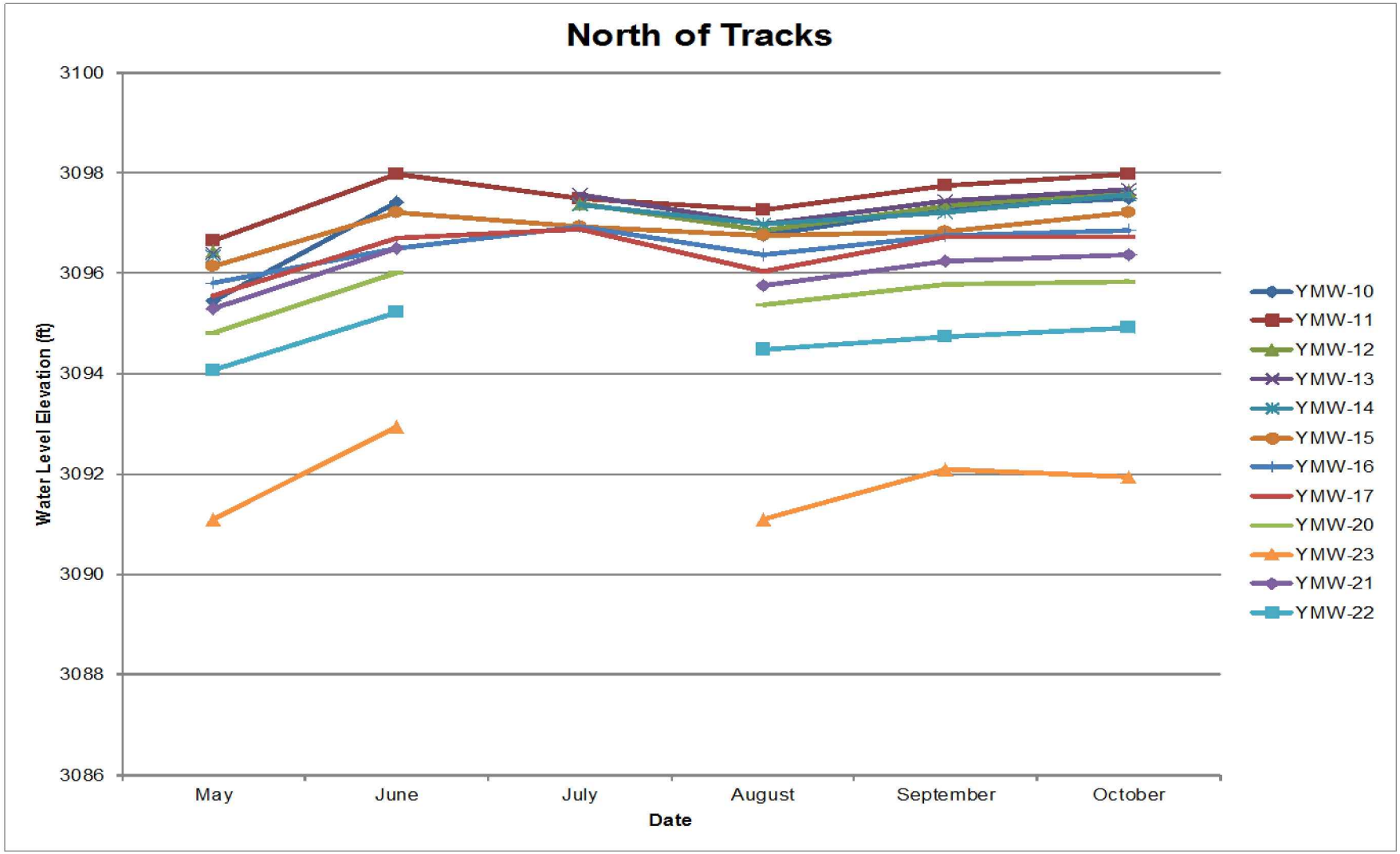


| | | |
|---|---|---|
| REMEDIAL INVESTIGATION REPORT<br>YALE OIL OF SOUTH DAKOTA<br>CECRA FACILITY | **GROUNDWATER HYDROGRAPHS<br>OF NETWORK MONITORING WELLS<br>NORTH OF RR TRACKS -<br>YALE OIL FACILITY (MAY -OCTOBER 2013)** | FIGURE<br>**4-11** |

UPDATE TIME: 4:01 PM
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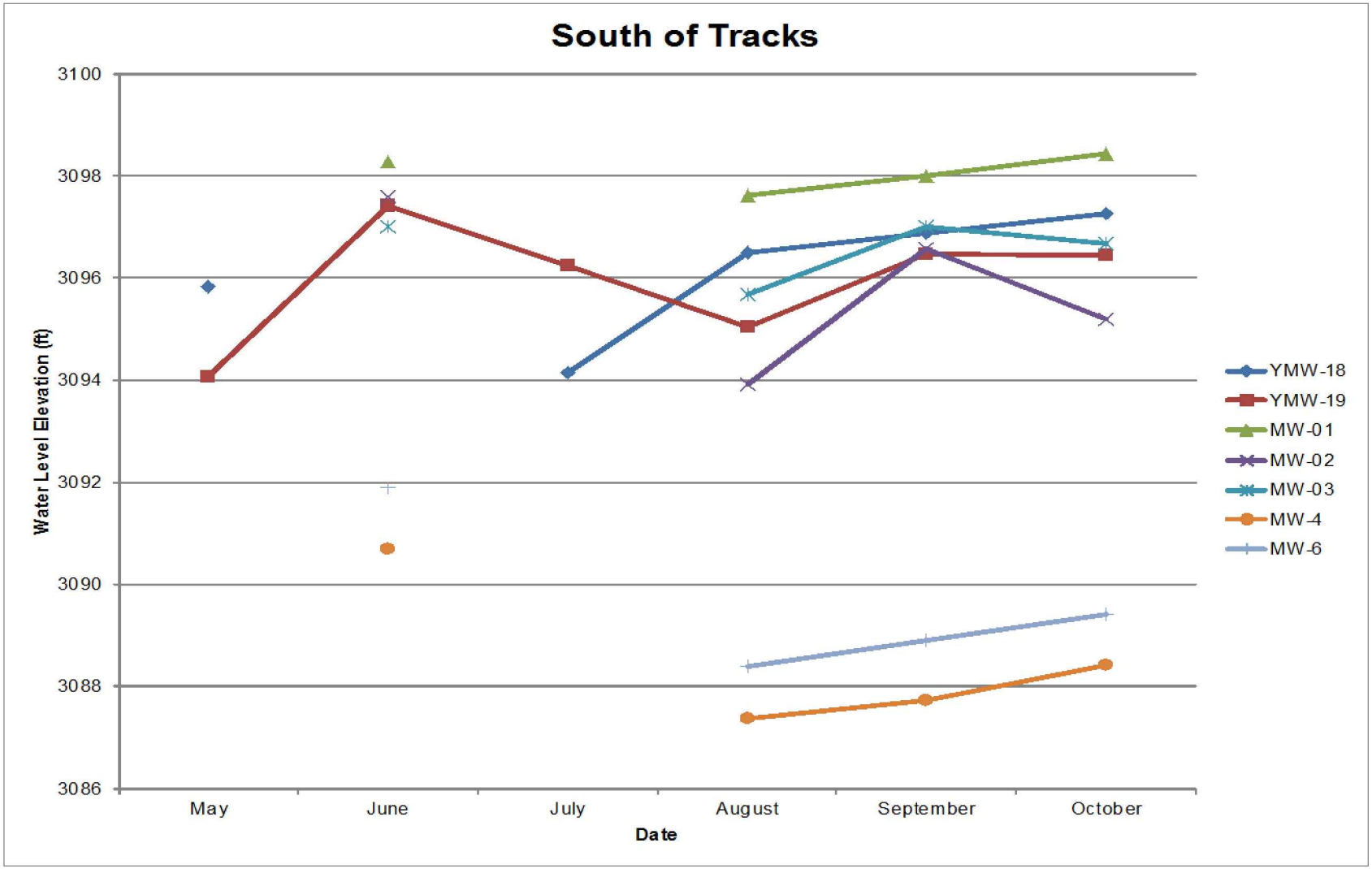


| | | |
|---|---|---|
| REMEDIAL INVESTIGATION REPORT<br>YALE OIL OF SOUTH DAKOTA<br>CECRA FACILITY | **GROUNDWATER HYDROGRAPHS<br>OF NETWORK MONITORING WELLS<br>SOUTH OF RR TRACKS -<br>YALE OIL FACILITY (MAY -OCTOBER 2013)** | FIGURE<br>**4-12** |

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UPDATE TIME: 12:19 PM
JBERGIN\BIL\20131205\I:\LAND PROJECTS\YALE OIL\1110813\1110813B021.DWG

NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| ● YMW-11 | MONITORING WELL |
| ● YMW-13 | MONITORING WELL WITH LNAPL |
| 1.13 | LNAPL THICKNESS (FEET) |

NOTES:
1. Wells with LNAPL Sheen are shown in Red and do not have a LNAPL thickness
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. The facility includes any site or are where a hazardous or deleterious substance has been deposited, stored, disposed or, place, or otherwise come to be located. This will be further refined through completion of a remedial investigation (RI).

SOURCE:
Interpreted from Analytical Results - Appendix ??
US Army Corps of Engineers Aerial Photo (2011)

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(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**MAY 2013 LNAPL THICKNESS**

DRAWING FILE NUMBER
1110813B007
AUTOCAD 2000 DRAWING (DWG)
EXHIBIT
**4-13**

UPDATE TIME: 11:30 AM
LTABORSKY\BIL\20140729\I:\LAND PROJECTS\1110813\1110813B007.DWG

NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| ● YMW-11 | MONITORING WELL |
| ● YMW-13 | MONITORING WELL WITH LNAPL |
| 1.13 | LNAPL THICKNESS (FEET) |

NOTES:
1. Wells with LNAPL Sheen are shown in Red and do not have a LNAPL thickness
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. The facility includes any site or are where a hazardous or deleterious substance has been deposited, stored, disposed or, place, or otherwise come to be located. This will be further refined through completion of a remedial investigation (RI).

SOURCE:
Interpreted from Analytical Results - Appendix ??
US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**JULY 2013 LNAPL THICKNESS**

DRAWING FILE NUMBER
1110813B007
AUTOCAD 2000 DRAWING (DWG)
EXHIBIT
**4-14**

UPDATE TIME: 11:30 AM
LTABORSKY\BIL\20140729\I:\LAND PROJECTS\1110813\1110813B007.DWG

NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| ● YMW-11 | MONITORING WELL |
| ● YMW-13 | MONITORING WELL WITH LNAPL |
| 1.13 | LNAPL THICKNESS (FEET) |

NOTES:
1. Wells with LNAPL Sheen are shown in Red and do not have a LNAPL thickness
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. The facility includes any site or are where a hazardous or deleterious substance has been deposited, stored, disposed or, place, or otherwise come to be located. This will be further refined through completion of a remedial investigation (RI).

SOURCE:
Interpreted from Analytical Results - Appendix ??
US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**AUGUST 2013 LNAPL THICKNESS**

DRAWING FILE NUMBER
1110813B007
AUTOCAD 2000 DRAWING (DWG)
EXHIBIT
**4-15**

UPDATE TIME: 11:30 AM
LTABORSKY\BIL\20140729\I:\LAND PROJECTS\1110813\1110813B007.DWG

NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| ● YMW-11 | MONITORING WELL |
| ● YMW-13 | MONITORING WELL WITH LNAPL |
| 1.13 | LNAPL THICKNESS (FEET) |

NOTES:
1. Wells with LNAPL Sheen are shown in Red and do not have a LNAPL thickness
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. The facility includes any site or are where a hazardous or deleterious substance has been deposited, stored, disposed or, place, or otherwise come to be located. This will be further refined through completion of a remedial investigation (RI).

SOURCE:
Interpreted from Analytical Results - Appendix ??
US Army Corps of Engineers Aerial Photo (2011)

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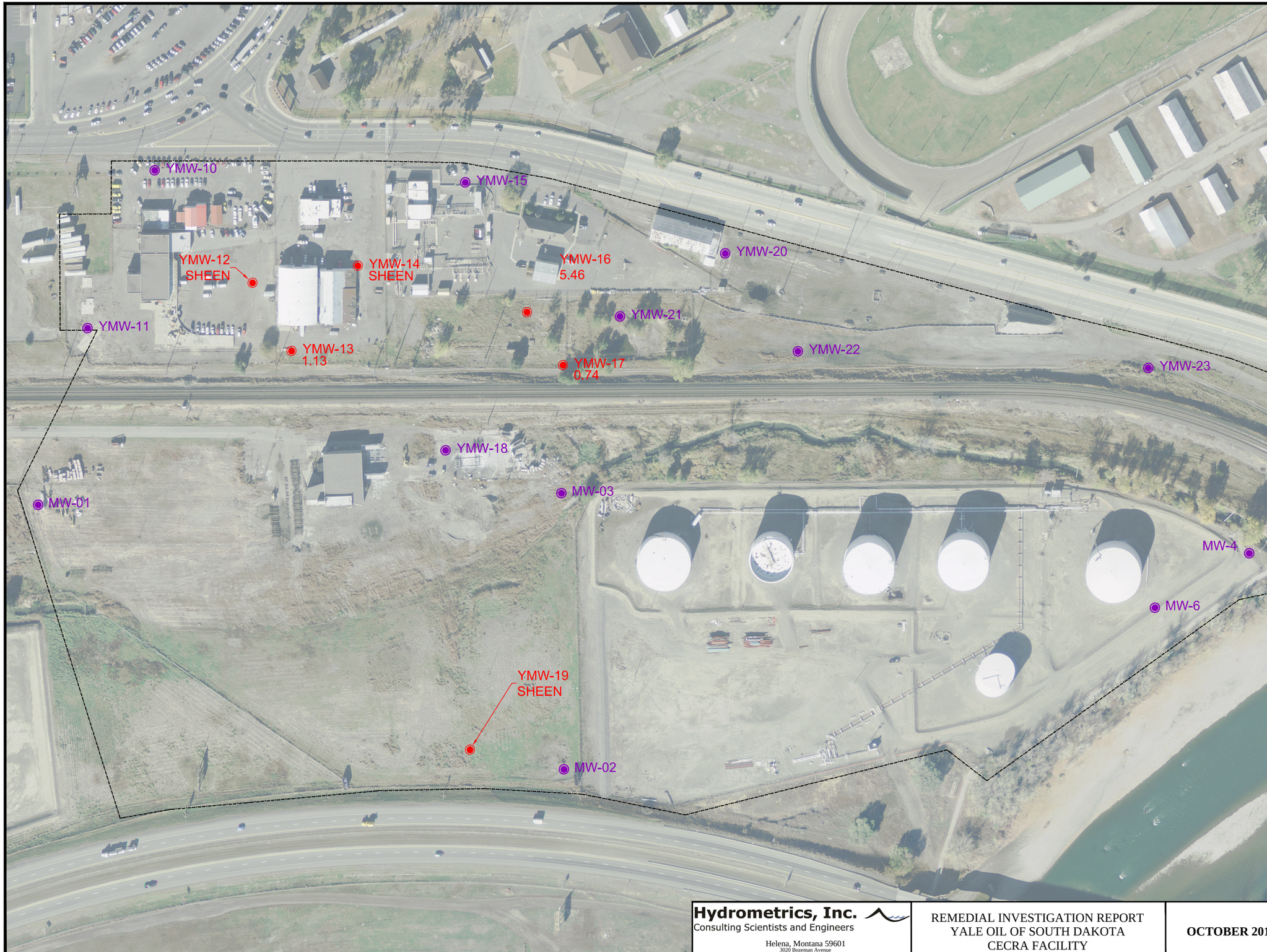
3020 Bozeman Avenue
(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SEPTEMBER 2013 LNAPL THICKNESS**

DRAWING FILE NUMBER
1110813B007
AUTOCAD 2000 DRAWING (DWG)
EXHIBIT
**4-16**

UPDATE TIME: 8:49 AM
LTABORSKY\BIL\20140730\I:\LAND PROJECTS\1110813\1110813B007.DWG




NORTH

SCALE
(In Feet)
100 0 100 200 300
(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| ● YMW-11 | MONITORING WELL |
| ● YMW-13 | MONITORING WELL WITH LNAPL |
| 1.13 | LNAPL THICKNESS (FEET) |

NOTES:
1. Wells with LNAPL Sheen are shown in Red and do not have a LNAPL thickness
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. The facility includes any site or are where a hazardous or deleterious substance has been deposited, stored, disposed or, place, or otherwise come to be located. This will be further refined through completion of a remedial investigation (RI).

SOURCE:
Interpreted from Analytical Results - Appendix ??
US Army Corps of Engineers Aerial Photo (2011)

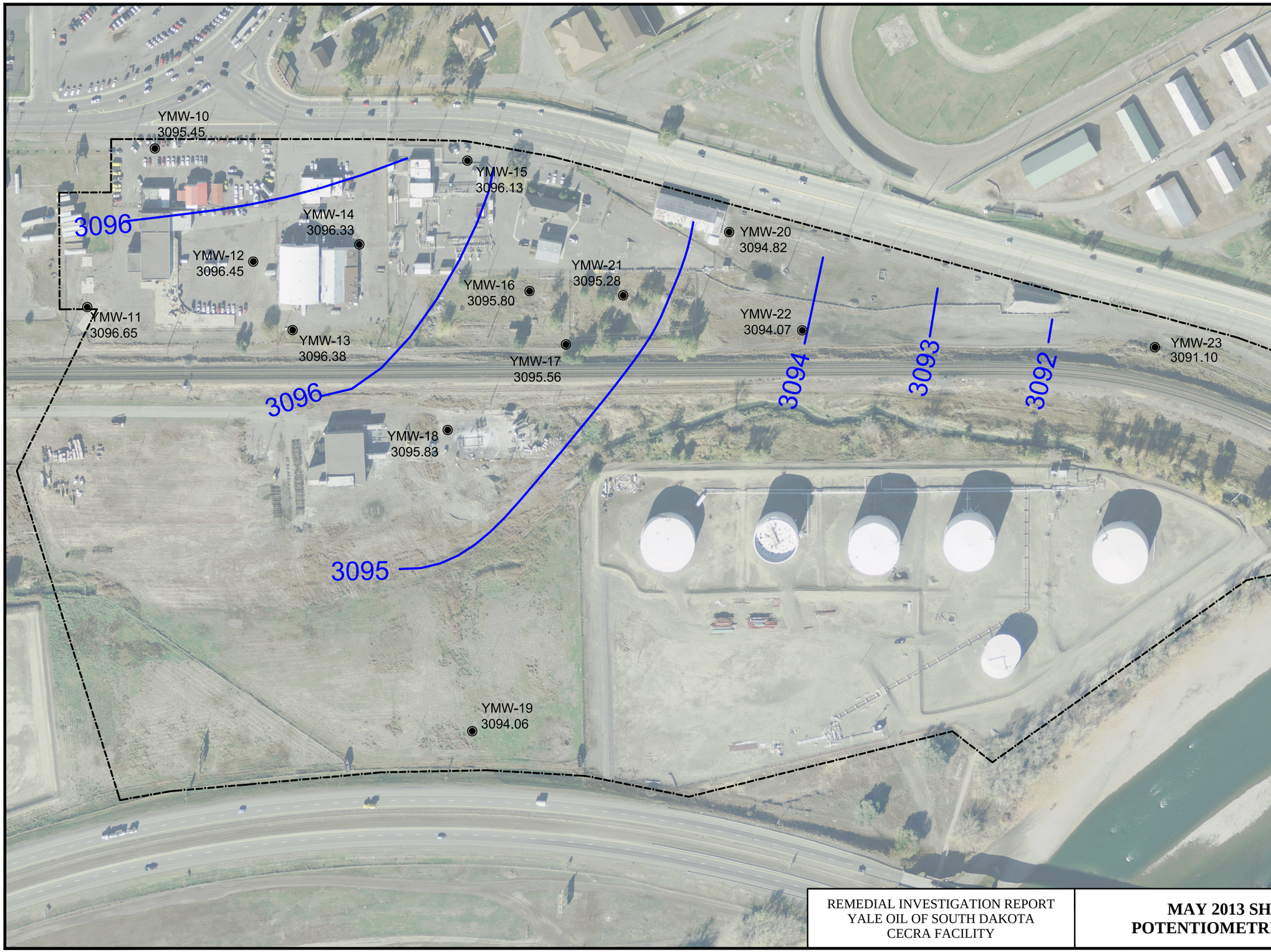
**Hydrometrics, Inc.**
Consulting Scientists and Engineers
Helena, Montana 59601
3020 Bozeman Avenue
(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**OCTOBER 2013 LNAPL THICKNESS**

DRAWING FILE NUMBER
1110813B007
AUTOCAD 2000 DRAWING (DWG)
EXHIBIT
**4-17**

UPDATE TIME: 8:45 AM
LTABORSKY\BIL\20140731\I:\LAND PROJECTS\1110813\1110813B007.DWG




NORTH

SCALE
0 (In Feet) 200

## LEGEND

FACILITY BOUNDARY

MONITORING WELL

3096.65 GROUNDWATER ELEVATION

POTENTIOMETRIC LINE (1 FOOT CONTOUR INTERVAL)

NOTES:
1. All Elevations above Mean Sea Level (MSL)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

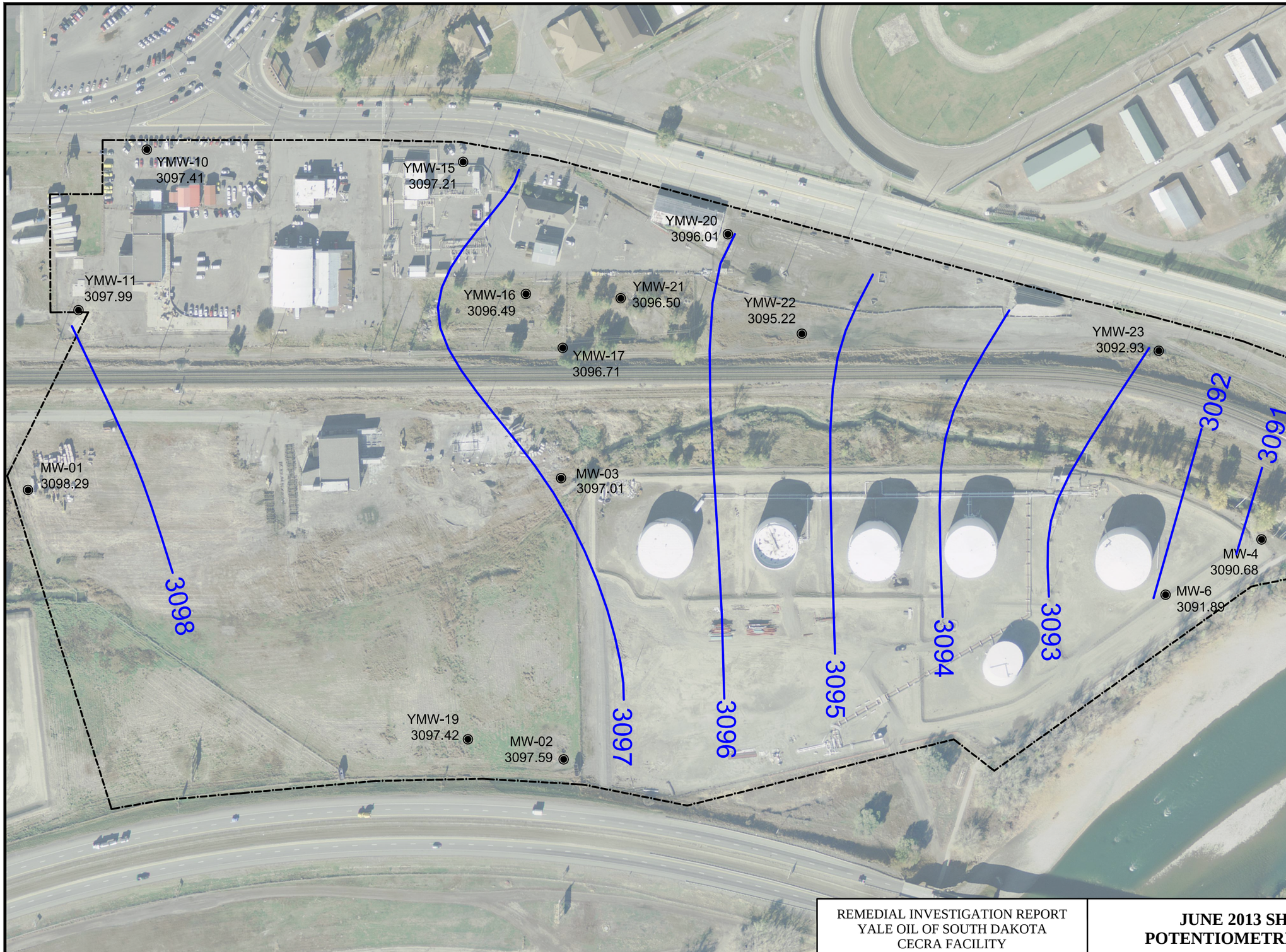
REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**MAY 2013 SHALLOW POTENTIOMETRIC SURFACE**

FIGURE
**4-18**

UPDATE TIME: 10:04 AM
LTABORSKY\HEL\20140731\I:\LAND PROJECTS\1110813\1110813B008.DWG

Hydrometrics, Inc.
Consulting Scientists and Engineers




NORTH

SCALE
(In Feet)
0 200

## LEGEND

- FACILITY BOUNDARY
- MONITORING WELL
- 3096.65 GROUNDWATER ELEVATION
- POTENTIOMETRIC LINE (1 FOOT CONTOUR INTERVAL)

NOTES:
1. All Elevations above Mean Sea Level (MSL)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

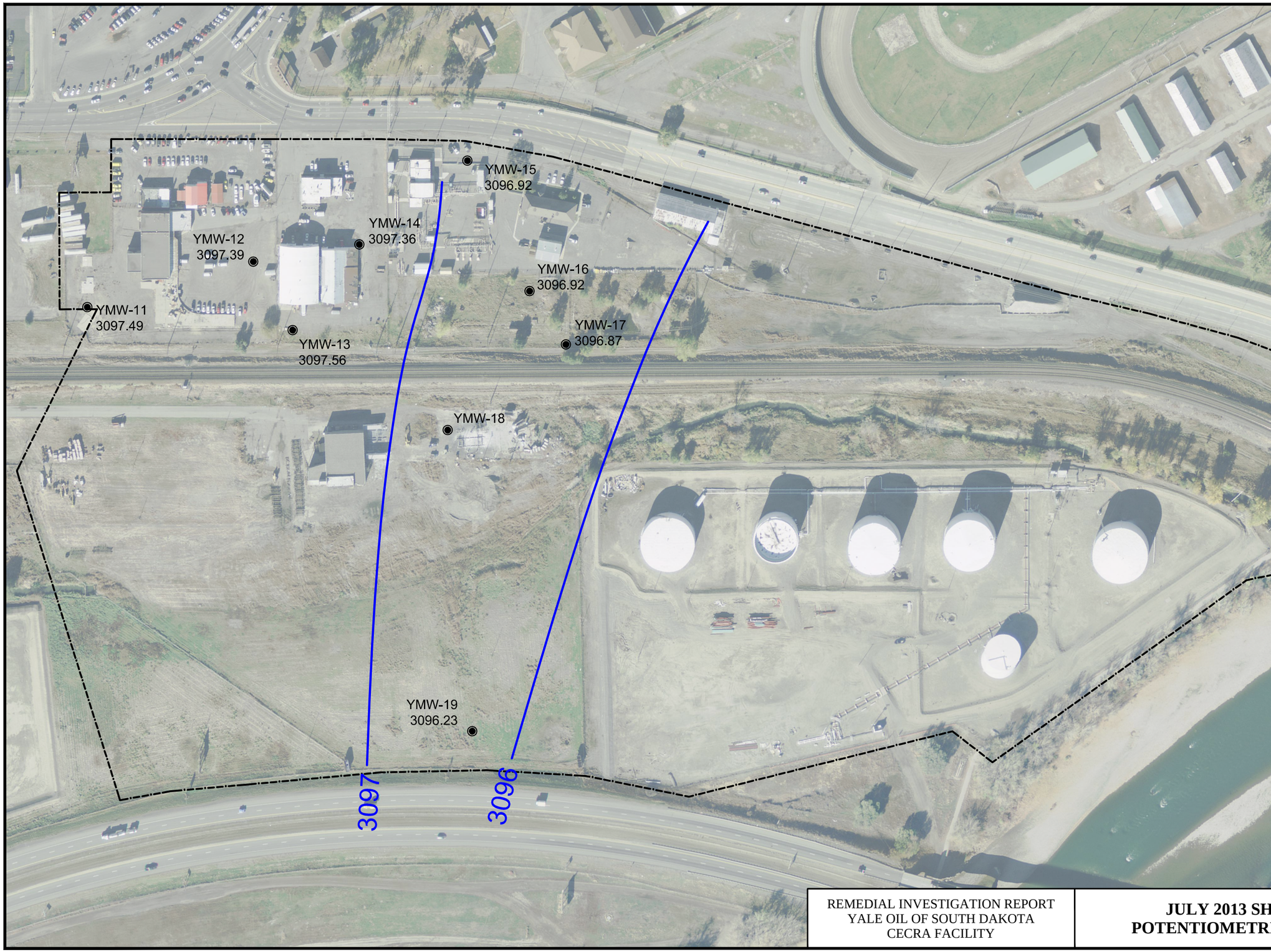
REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**JUNE 2013 SHALLOW POTENTIOMETRIC SURFACE**

FIGURE
**4-19**

UPDATE TIME: 10:10 AM
LTABORSKY\HEL\20140731\I:\LAND PROJECTS\1110813\1110813B008.DWG

Hydrometrics, Inc.
Consulting Scientists and Engineers




NORTH

SCALE
0 (In Feet) 200

## LEGEND

- FACILITY BOUNDARY
- MONITORING WELL
- 3096.65 GROUNDWATER ELEVATION
- POTENTIOMETRIC LINE (1 FOOT CONTOUR INTERVAL)

NOTES:
1. All Elevations above Mean Sea Level (MSL)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

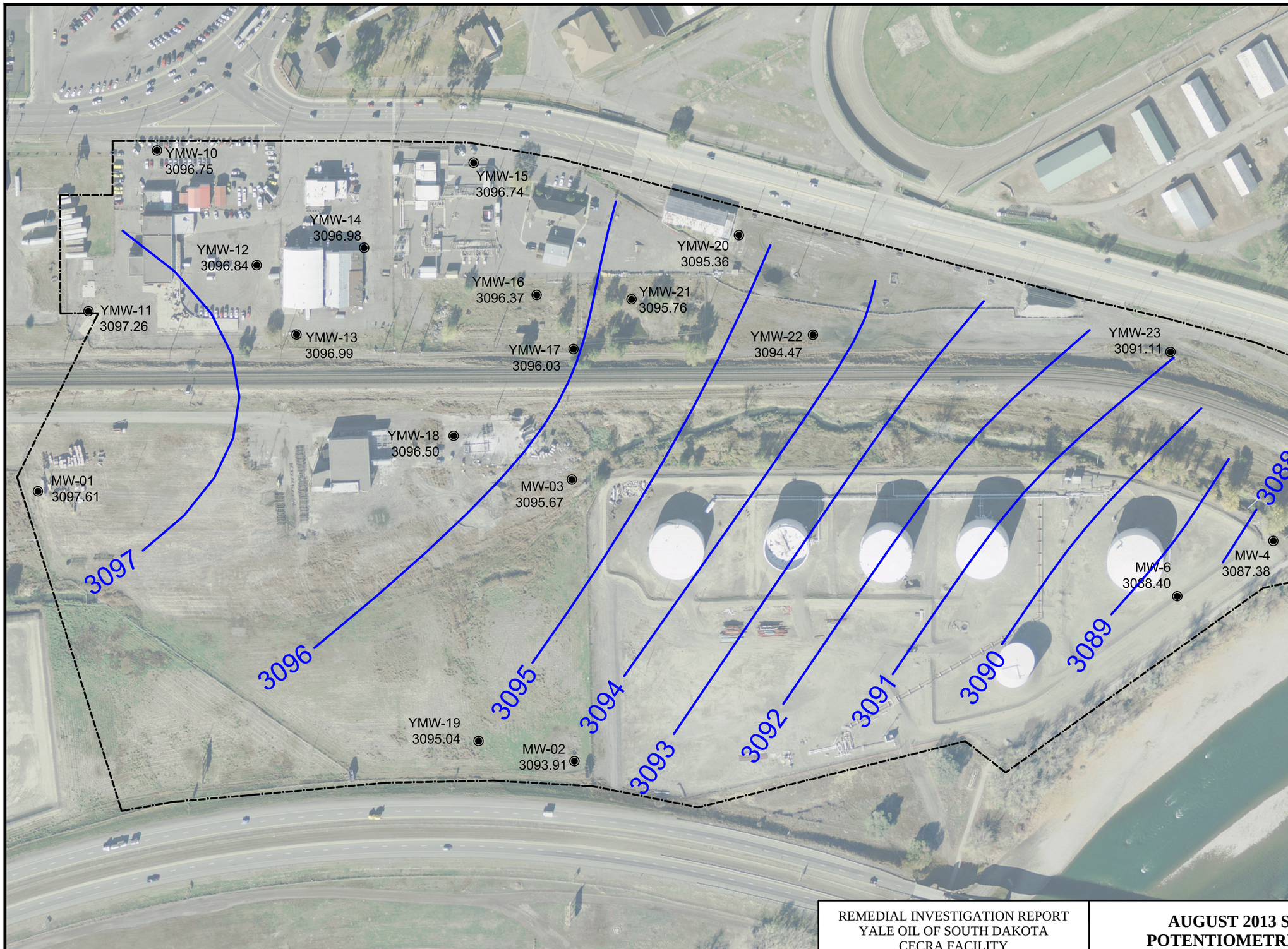
REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**JULY 2013 SHALLOW POTENTIOMETRIC SURFACE**

FIGURE
**4-20**

UPDATE TIME: 10:10 AM
LTABORSKY\HEL\20140731\I:\LAND PROJECTS\1110813\1110813B008.DWG

Hydrometrics, Inc.
Consulting Scientists and Engineers




NORTH

SCALE
0 (In Feet) 200

## LEGEND

FACILITY BOUNDARY

MONITORING WELL

3096.65 GROUNDWATER ELEVATION

POTENTIOMETRIC LINE (1 FOOT CONTOUR INTERVAL)

NOTES:
1. All Elevations above Mean Sea Level (MSL)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

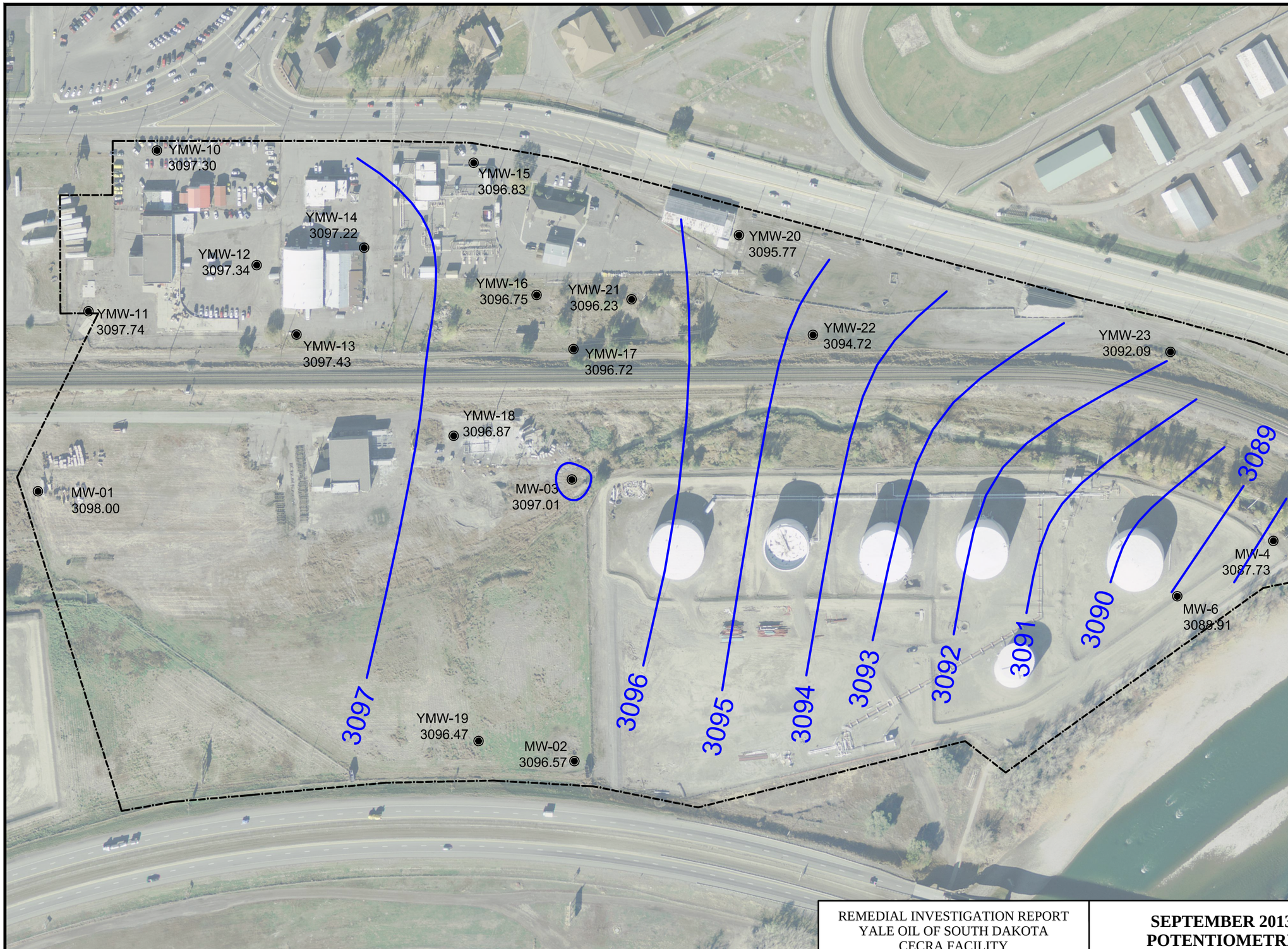
REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**AUGUST 2013 SHALLOW POTENTIOMETRIC SURFACE**

FIGURE
**4-21**

UPDATE TIME: 10:17 AM
LTABORSKY\HEL\20140731\I:\LAND PROJECTS\1110813\1110813B008.DWG

Hydrometrics, Inc.
Consulting Scientists and Engineers




NORTH

SCALE
0 (In Feet) 200

## LEGEND

FACILITY BOUNDARY

MONITORING WELL

3096.65 GROUNDWATER ELEVATION

POTENTIOMETRIC LINE (1 FOOT CONTOUR INTERVAL)

NOTES:
1. All Elevations above Mean Sea Level (MSL)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

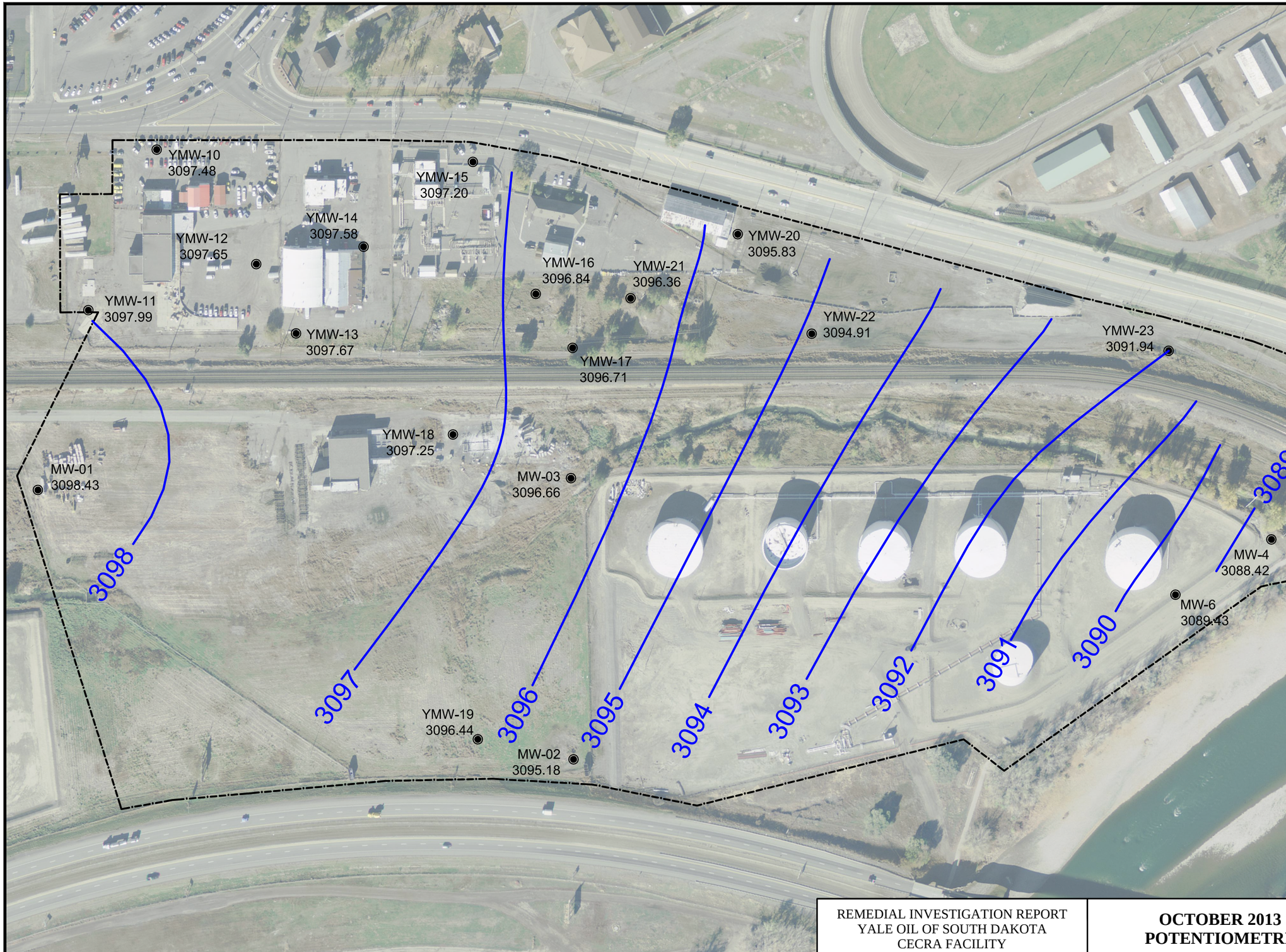
REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SEPTEMBER 2013 SHALLOW POTENTIOMETRIC SURFACE**

FIGURE
**4-22**

UPDATE TIME: 10:17 AM
LTABORSKY\HEL\20140731\I:\LAND PROJECTS\1110813\1110813B008.DWG

Hydrometrics, Inc.
Consulting Scientists and Engineers




NORTH

SCALE
0 (In Feet) 200

## LEGEND

- FACILITY BOUNDARY
- MONITORING WELL
- 3096.65 GROUNDWATER ELEVATION
- POTENTIOMETRIC LINE (1 FOOT CONTOUR INTERVAL)

NOTES:
1. All Elevations above Mean Sea Level (MSL)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**OCTOBER 2013 SHALLOW POTENTIOMETRIC SURFACE**

FIGURE
**4-23**

UPDATE TIME: 10:17 AM
LTABORSKY\HEL\20140731\I:\LAND PROJECTS\1110813\1110813B008.DWG

Hydrometrics, Inc.
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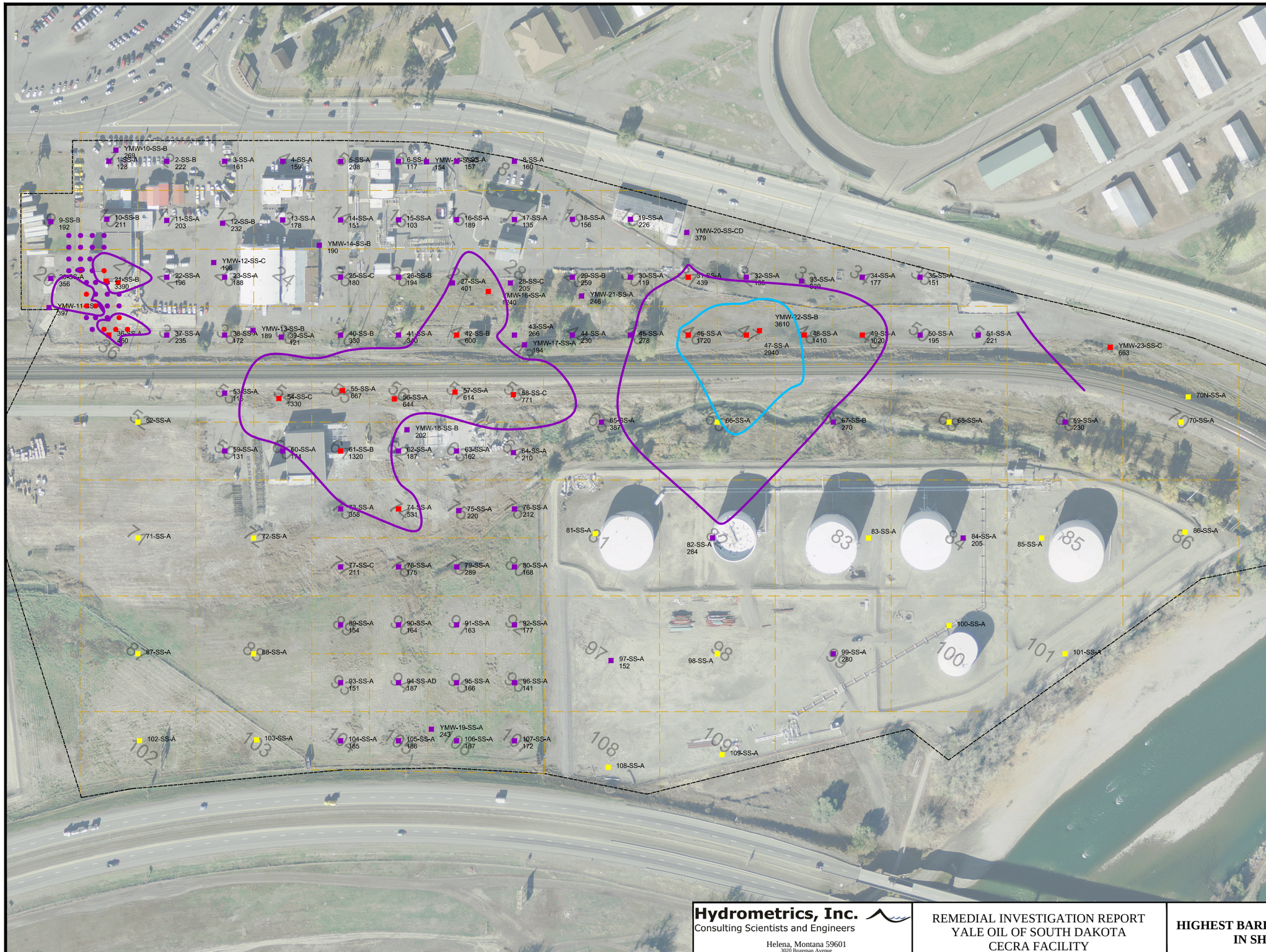



NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 69-SS-A | SOIL SAMPLING LOCATION |
| 230 | SAMPLING RESULT |
| ● | FOCUS AREA SAMPLING LOCATION |
| ■ ● | SAMPLING RESULT BELOW 421 MG/KG |
| ■ ● | SAMPLE RESULT ABOVE 421 MG/KG |
| ■ | LOCATION NOT SAMPLED FOR THIS ANALYTE |
| ——— | ISOCONTOURS: Approximate Extent of Shallow Soil with Concentrations of Barium above MDEQ Leaching to Groundwater Screening Level - 421 mg/kg |
| ——— | Approximate Extent of Shallow Soil with Concentrations of Barium above Direct Contact for Residential Soils RSL - 1500 mg/kg |
| ——— | Approximate Extent of Shallow Soil with Concentrations of Barium above Direct Contact for Commercial Soils RSL - 22000 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram. (Parts per Million)
2. Maximum Concentration Shown for Each Location with Corresponding Sample Depth Identified in the Sample ID as "A", "B", or "C".
3. Sample Depth Interval "A" is 0-6"
4. Sample Depth Interval "B" is 6-12"
5. Sample Depth Interval "C" is 12-24"
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

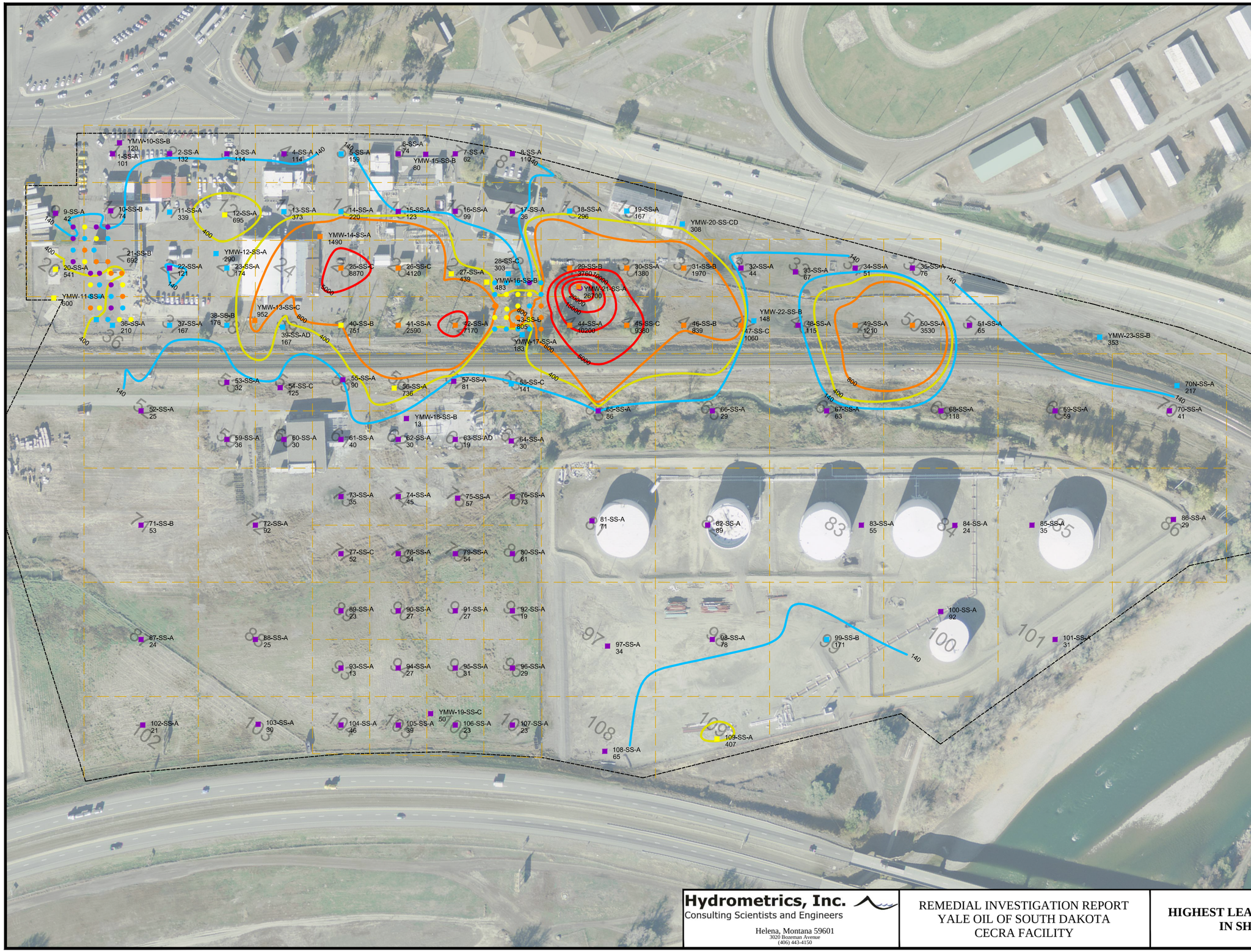
**Hydrometrics, Inc.**
Consulting Scientists and Engineers
Helena, Montana 59601
3020 Bozeman Avenue
(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**HIGHEST BARIUM CONCENTRATIONS IN SHALLOW SOILS**

DRAWING FILE NUMBER
1110813B014
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-1**

UPDATE TIME: 10:56 AM
LTABORSKY\BIL\20150309\I:\LAND PROJECTS\1110813\1110813B014.DWG




## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

- FACILITY BOUNDARY
- GRID BOUNDARY
- 70 GRID NUMBER
- 70-SS-A SOIL SAMPLING LOCATION
- 41 SAMPLING RESULT
- FOCUS AREA SAMPLING LOCATION
- SAMPLING RESULT BELOW 140 MG/KG
- SAMPLE RESULT ABOVE 140 MG/KG AND BELOW 400 MG/KG
- SAMPLE RESULT ABOVE 400 MG/KG AND BELOW 800 MG/KG
- SAMPLE RESULT ABOVE 800 MG/KG
- ISOCONTOURS: Approximate Extent of Surface Soil with Concentrations of Lead above MDEQ Leaching to Groundwater Screening Level - 140 mg/kg
- Approximate Extent of Surface Soil with Concentrations of Lead above Direct Contact for Residential Soils RSL - 400 mg/kg
- Approximate Extent of Surface Soil with Concentrations of Lead above Direct Contact for Commercial Soils RSL - 800 mg/kg
- Higher Concentration Iso-Contours - >800 mg/kg

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Maximum Concentration Shown for Each Location with Corresponding Sample Depth Identified in the Sample ID as "A", "B", or "C".
3. Sample Depth Interval "A" is 0-6"
4. Sample Depth Interval "B" is 6-12"
5. Sample Depth Interval "C" is 12-24"
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

**Hydrometrics, Inc.**
Consulting Scientists and Engineers
Helena, Montana 59601
3020 Bozeman Avenue
(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

# HIGHEST LEAD CONCENTRATIONS IN SHALLOW SOIL

DRAWING FILE NUMBER
1110813B009
AUTOCAD 2000 DRAWING (DWG)
FIGURE
5-2

UPDATE TIME: 8:29 AM
LTABORSKY\,BIL\,20140729\;I:\LAND PROJECTS\1110813\1110813B009.DWG

NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| 70N-SS-A | SOIL SAMPLING LOCATION |
| <11 | SAMPLING RESULT |
| ● | FOCUS AREA SAMPLING LOCATION |
| ■ ● | SAMPLING RESULT BELOW 100 MG/KG |
| ■ ● | SAMPLE RESULT ABOVE 100 MG/KG |
| ——— | ISOCONTOURS: Approximate Extent of Shallow Soil with Concentrations of C9-C10 VPH Aromatics above MDEQ Residential and Commercial RBSL for Surface Soils - 100 mg/kg |
| ——— | Higher Concentration Iso-Contours - >100 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Maximum Concentration Shown for Each Location with Corresponding Sample Depth Identified in the Sample ID as "A", "B", or "C".
3. Sample Depth Interval "A" is 0-6"
4. Sample Depth Interval "B" is 6-12"
5. Sample Depth Interval "C" is 12-24"
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

**Hydrometrics, Inc.**
Consulting Scientists and Engineers
Helena, Montana 59601
3020 Bozeman Avenue
(406) 443-4150

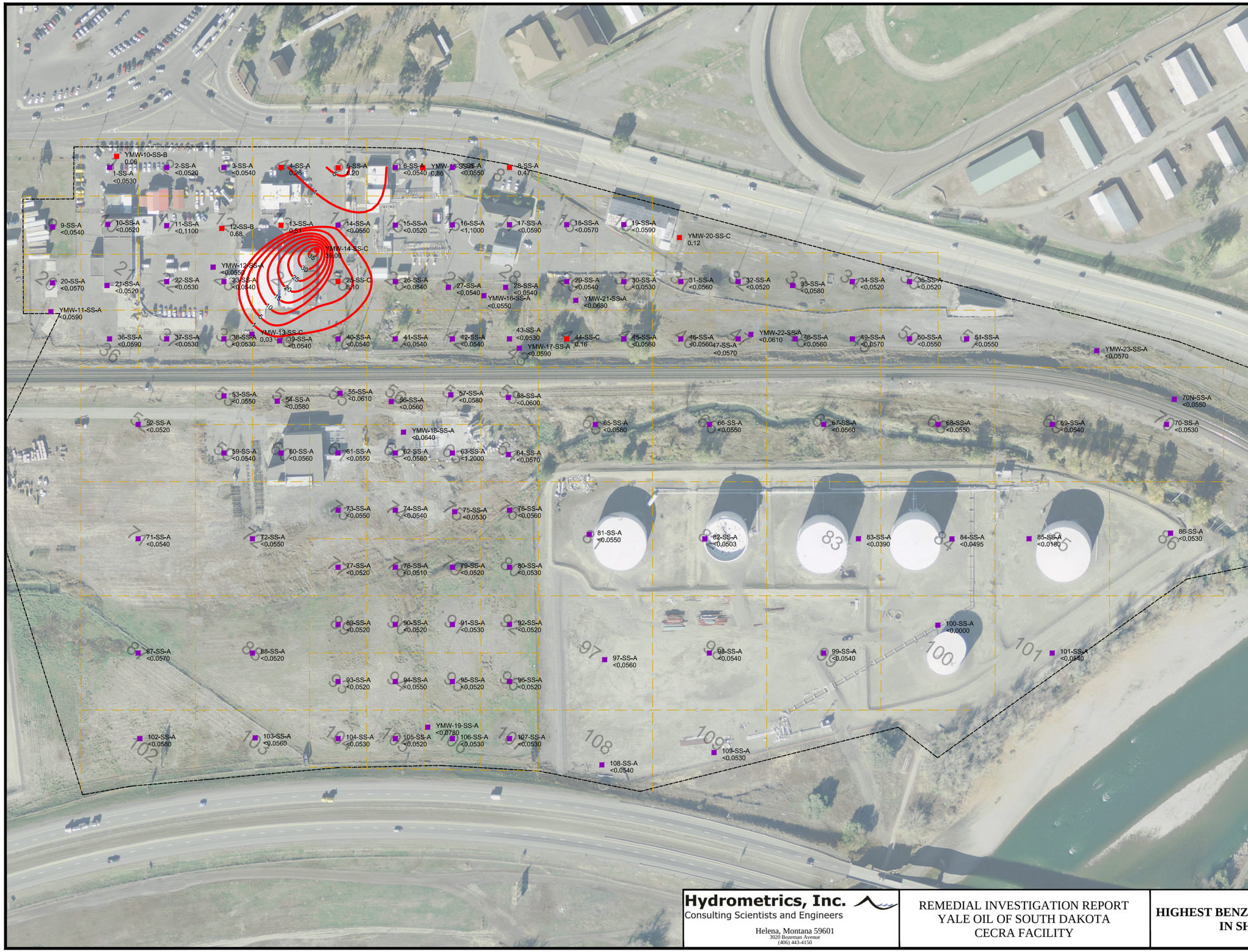
REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

# HIGHEST VPH C9-C10 AROMATICS CONCENTRATIONS IN SHALLOW SOIL

DRAWING FILE NUMBER
1110813B012
AUTOCAD 2000 DRAWING (DWG)

FIGURE
5-3

UPDATE TIME: 1:56 PM
LTABORSKY\BIL\20150309\I:\LAND PROJECTS\1110813\1110813B012.DWG




NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Maximum Concentration Shown for Each Location with Corresponding Sample Depth Identified in the Sample ID as "A", "B", or "C".
3. Sample Depth Interval "A" is 0-6"
4. Sample Depth Interval "B" is 6-12"
5. Sample Depth Interval "C" is 12-24"
6. The best achievable practical quantitation limit is greater than the RBSL. Therefore, an isocontour line representing the RBSL has not been included; however, higher concentrations isocontour lines are presented.
7. MDEQ - Montana Department of Environmental Quality
8. RSL - Regional Screening Level
9. RBSL - Risk Based Screening Level
10. Dashed Lines Where Inferred
11. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)


**Hydrometrics, Inc.**
Consulting Scientists and Engineers
Helena, Montana 59601
3020 Bozeman Avenue
(406) 443-4150


REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**HIGHEST BENZENE CONCENTRATIONS IN SHALLOW SOIL**

DRAWING FILE NUMBER
1110813B009
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-4**

UPDATE TIME: 10:43 AM
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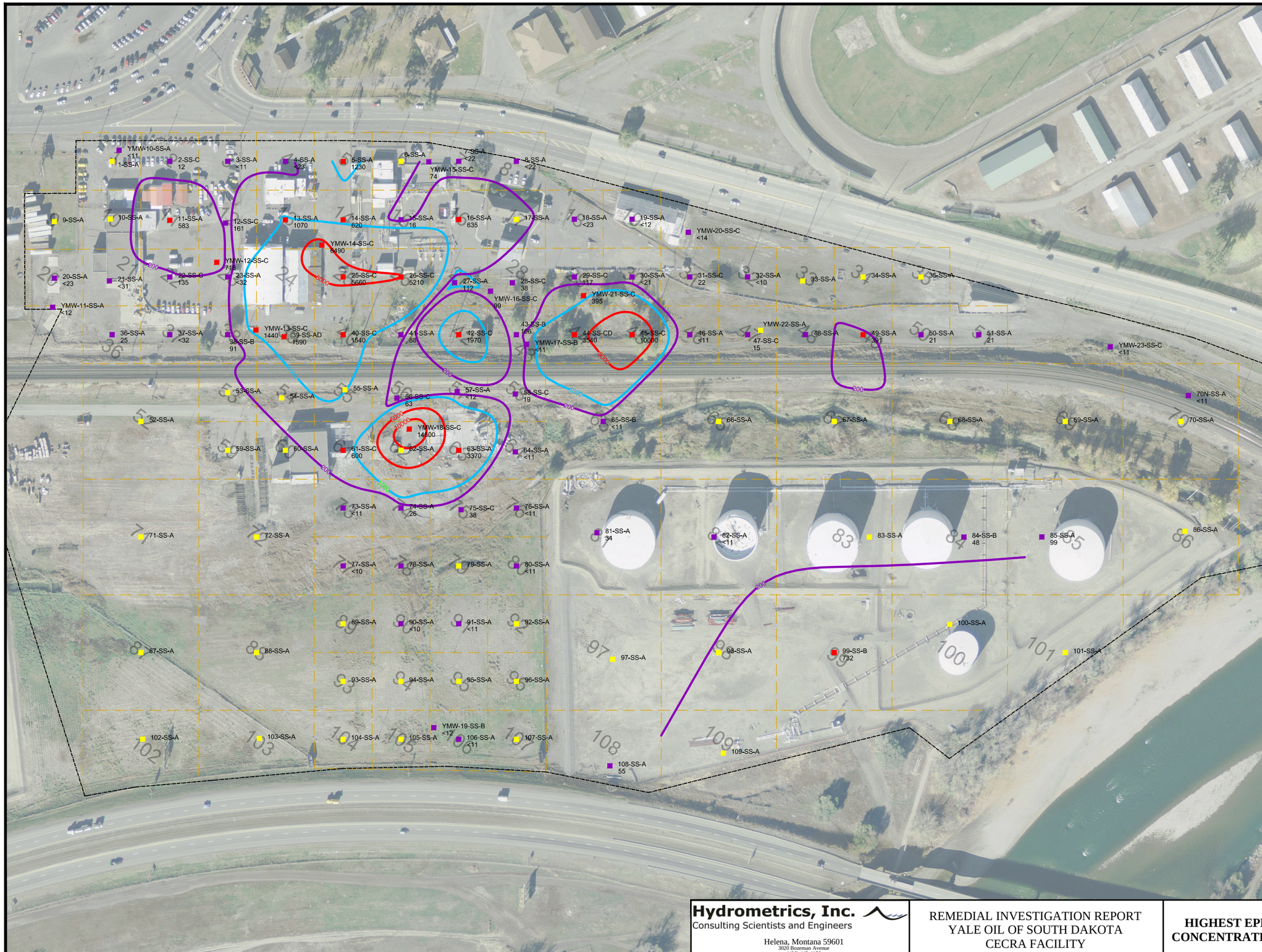


NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 70N-SS-A | SOIL SAMPLING LOCATION |
| <11 | SAMPLING RESULT |
| ● | FOCUS AREA SAMPLING LOCATION |
| ■ ● | SAMPLING RESULT BELOW 200 MG/KG |
| ■ ● | SAMPLE RESULT ABOVE 200 MG/KG |
| ■ | LOCATION NOT SAMPLED FOR THIS ANALYTE |
| | ISOCONTOURS: |
| | Approximate Extent of Shallow Soil with Concentrations of C9-C18 TEH Aliphatics above MDEQ Residential RBSL for Surface Soils - 200 mg/kg |
| | Approximate Extent of Shallow Soil with Concentrations of C9-C18 TEH Aliphatics above MDEQ Commercial RBSL for Surface Soils - 1,000 mg/kg |
| | Higher Concentration Iso-Contours - >1000 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Maximum Concentration Shown for Each Location with Corresponding Sample Depth Identified in the Sample ID as "A", "B", or "C".
3. Sample Depth Interval "A" is 0-6"
4. Sample Depth Interval "B" is 6-12"
5. Sample Depth Interval "C" is 12-24"
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

**Hydrometrics, Inc.**
Consulting Scientists and Engineers
Helena, Montana 59601
3020 Bozeman Avenue
(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

# HIGHEST EPH C9-C18 ALIPHATICS CONCENTRATIONS IN SHALLOW SOIL

DRAWING FILE NUMBER
1110813B012
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-5**

UPDATE TIME: 9:34 AM
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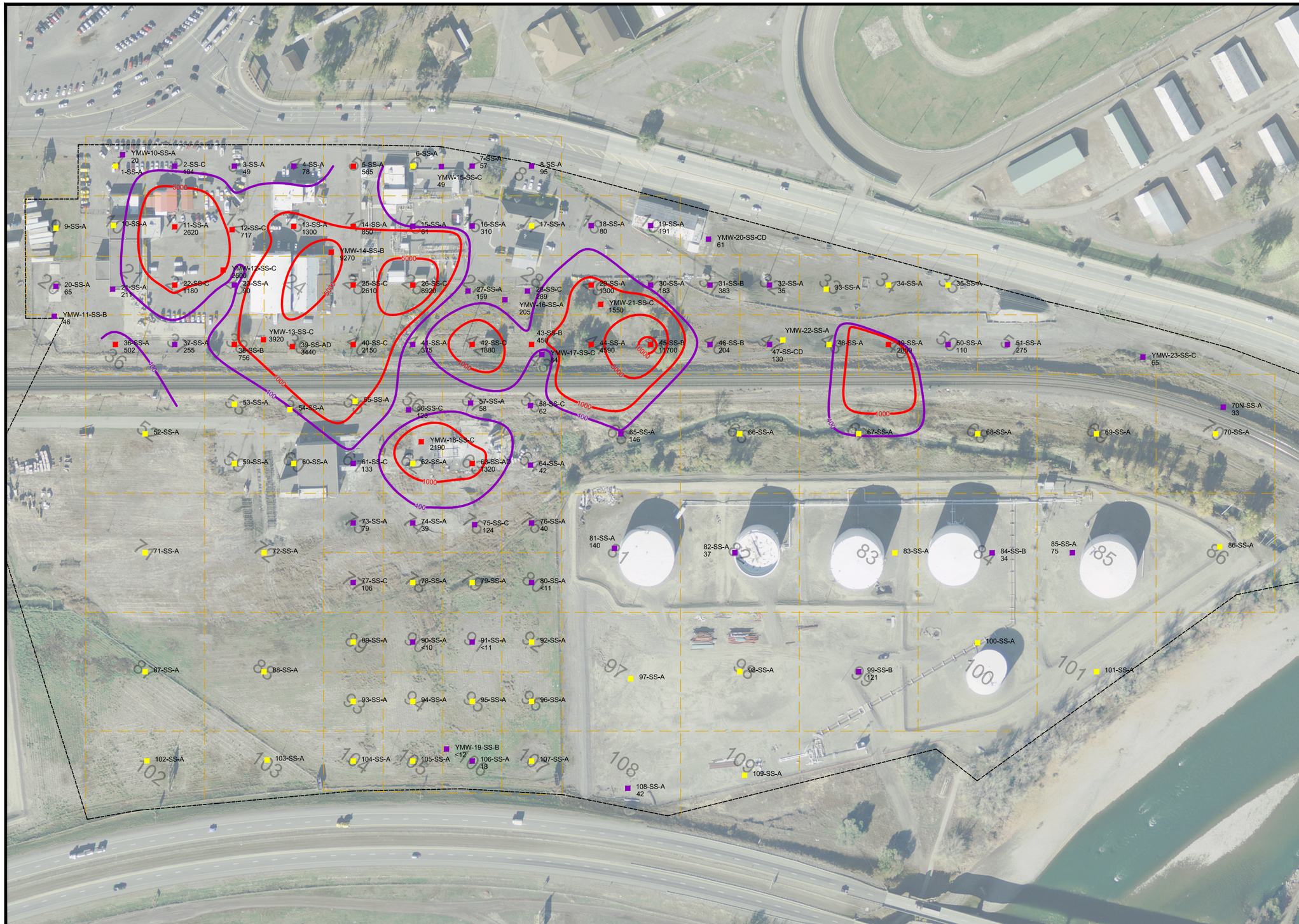



NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| 70N-SS-A | SOIL SAMPLING LOCATION |
| 33 | SAMPLING RESULT |
| | FOCUS AREA SAMPLING LOCATION |
| | SAMPLING RESULT BELOW 400 MG/KG |
| | SAMPLE RESULT ABOVE 400 MG/KG |
| | LOCATION NOT SAMPLED FOR THIS ANALYTE |
| | ISOCONTOURS: Approximate Extent of Shallow Soil with Concentrations of C11-C22 EPH Aromatics above MDEQ Residential and Commercial RBSL for Surface Soils - 400 mg/kg |
| | Higher Concentration Iso-Contours - >400 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Maximum Concentration Shown for Each Location with Corresponding Sample Depth Identified in the Sample ID as "A", "B", or "C".
3. Sample Depth Interval "A" is 0-6"
4. Sample Depth Interval "B" is 6-12"
5. Sample Depth Interval "C" is 12-24"
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

**Hydrometrics, Inc.**
Consulting Scientists and Engineers
Helena, Montana 59601
3020 Bozeman Avenue
(406) 443-4150

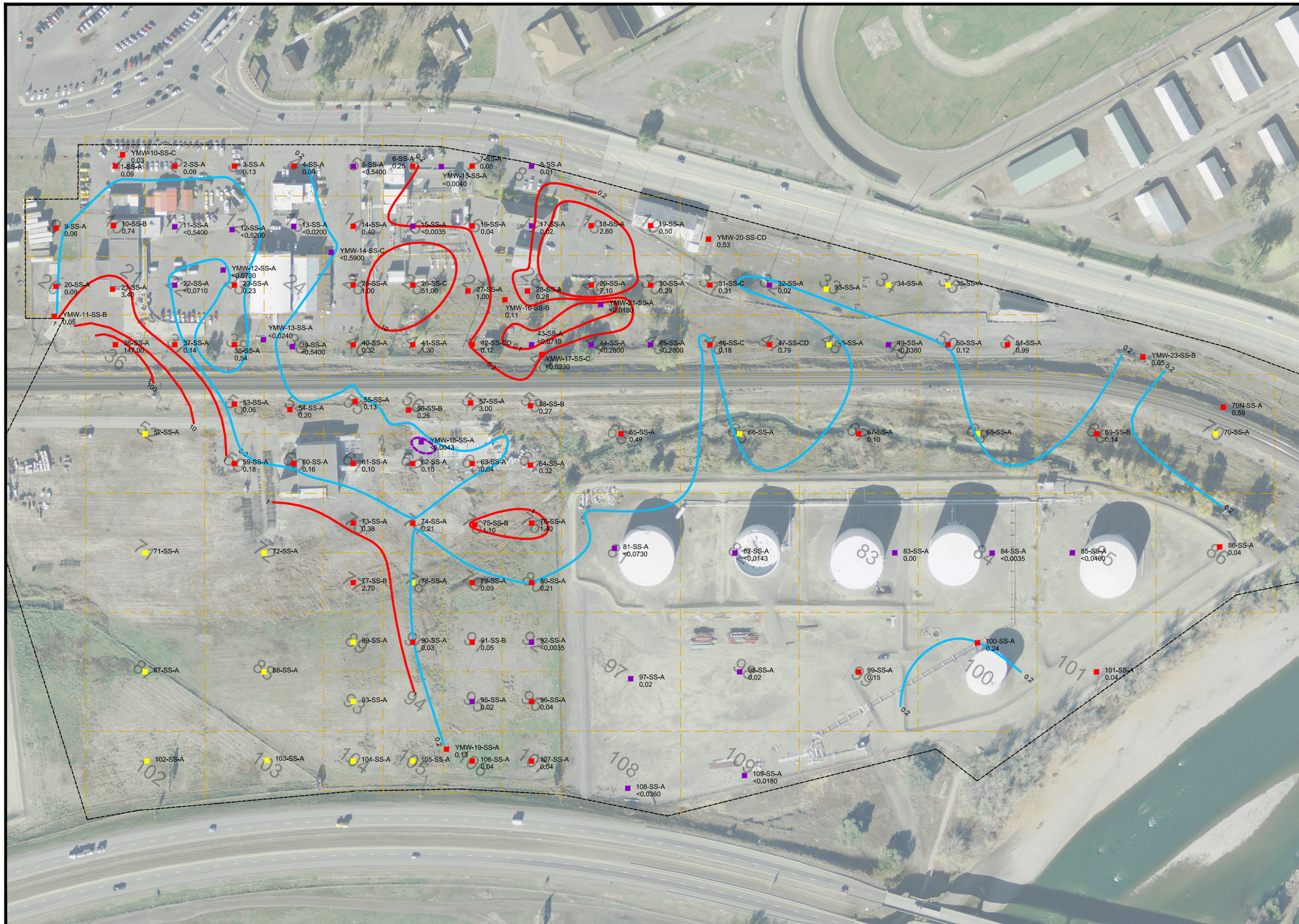
REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

# HIGHEST EPH C11-C22 AROMATICS CONCENTRATIONS IN SHALLOW SOIL

DRAWING FILE NUMBER
1110813B012
AUTOCAD 2000 DRAWING (DWG)

FIGURE
**5-6**

UPDATE TIME: 10:56 AM
LTABORSKY\BIL\20150309\I:\LAND PROJECTS\1110813\1110813B012.DWG




NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

- FACILITY BOUNDARY
- GRID BOUNDARY
- 70 — GRID NUMBER
- 70N-SS-A — SOIL SAMPLING LOCATION
- 0.59 — SAMPLING RESULT
- FOCUS AREA SAMPLING LOCATION
- SAMPLING RESULT BELOW 0.02 MG/KG
- SAMPLE RESULT ABOVE 0.02 MG/KG
- LOCATION NOT SAMPLED FOR THIS ANALYTE
- ISOCONTOURS: Approximate Extent of Subsurface Soil with Concentrations of Benzo(a)pyrene above MDEQ Residential RBSL for Surface Soils - 0.02 mg/kg
- Approximate Extent of Subsurface Soil with Concentrations of Benzo(a)pyrene above MDEQ Commercial RBSL for Surface Soils - 0.2 mg/kg
- Higher Concentration Iso-Contours - >0.2 mg/kg

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Maximum Concentration Shown for Each Location with Corresponding Sample Depth Identified in the Sample ID as "A", "B", or "C".
3. Sample Depth Interval "A" is 0-6"
4. Sample Depth Interval "B" is 6-12"
5. Sample Depth Interval "C" is 12-24"
6. The highest benzo(a)pyrene result in shallow soils is shown to represent polynuclear aromatic hydrocarbons (PAHs). PAHs exceeding RBSL's are generally co-located with benzo(a)pyrene with the exception of benzo(b)fluoranthene in grids 39, 43 and at YMW-14, and 2-methynaphthalene and naphthalene in grid 45.
7. MDEQ - Montana Department of Environmental Quality
8. RSL - Regional Screening Level
9. RBSL - Risk Based Screening Level
10. Dashed Lines Where Inferred
11. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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Consulting Scientists and Engineers
Helena, Montana 59601
3020 Bozeman Avenue
(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

# HIGHEST BENZO(A)PYRENE CONCENTRATIONS IN SHALLOW SOIL

DRAWING FILE NUMBER
1110813B009
AUTOCAD 2000 DRAWING (DWG)

FIGURE
5-7

UPDATE TIME: 4:47 PM
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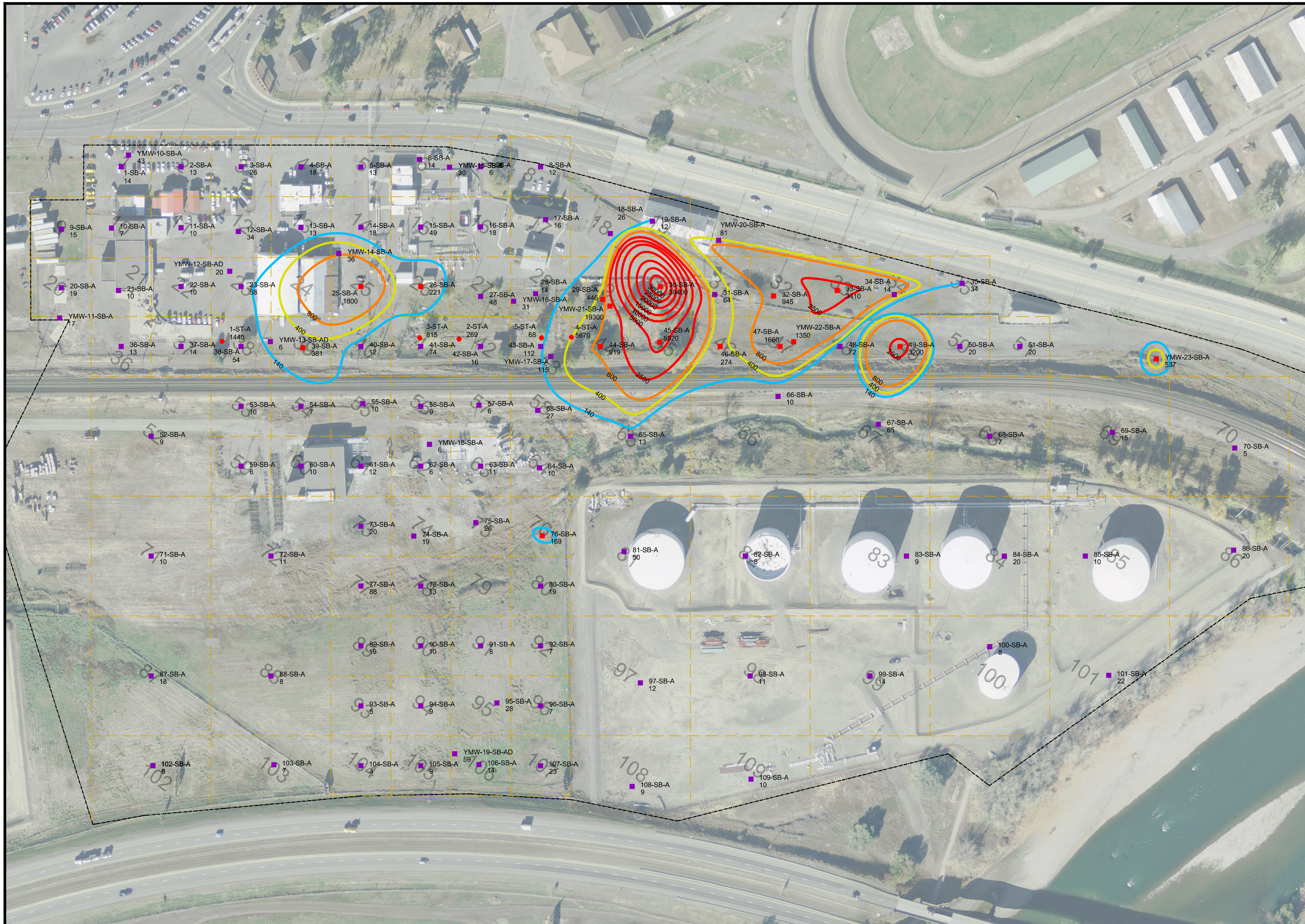


NORTH

SCALE
(In Feet)
100 0 100 200 300
(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 70-SB-A | SOIL SAMPLING LOCATION |
| ● 1-ST-A | OPPORTUNITY SAMPLE LOCATION |
| 5 | SAMPLING RESULT |
| ■ ● | SAMPLING RESULT BELOW 140 MG/KG |
| ■ ● | SAMPLE RESULT ABOVE 140 MG/KG |

ISOCONTOURS:

| | |
|---|---|
| (blue line) | Approximate Extent of Subsurface Soil with Concentrations of Lead above MDEQ Leaching to Groundwater Screening Level - 140 mg/kg |
| (yellow line) | Approximate Extent of Subsurface Soil with Concentrations of Lead above Direct Contact for Residential Soils RSL - 400 mg/kg |
| (orange line) | Approximate Extent of Subsurface Soil with Concentrations of Lead above Direct Contact for Commercial Soils RSL - 800 mg/kg |
| (red line) | Higher Concentration Iso-Contours - >800 mg/kg |

NOTES:
1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)


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Helena, Montana 59601
3020 Bozeman Avenue
(406) 443-4150


REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SUBSURFACE SOIL SAMPLE**
**"A" HORIZON**
**LEAD CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B011
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-8**

UPDATE TIME: 8:34 AM
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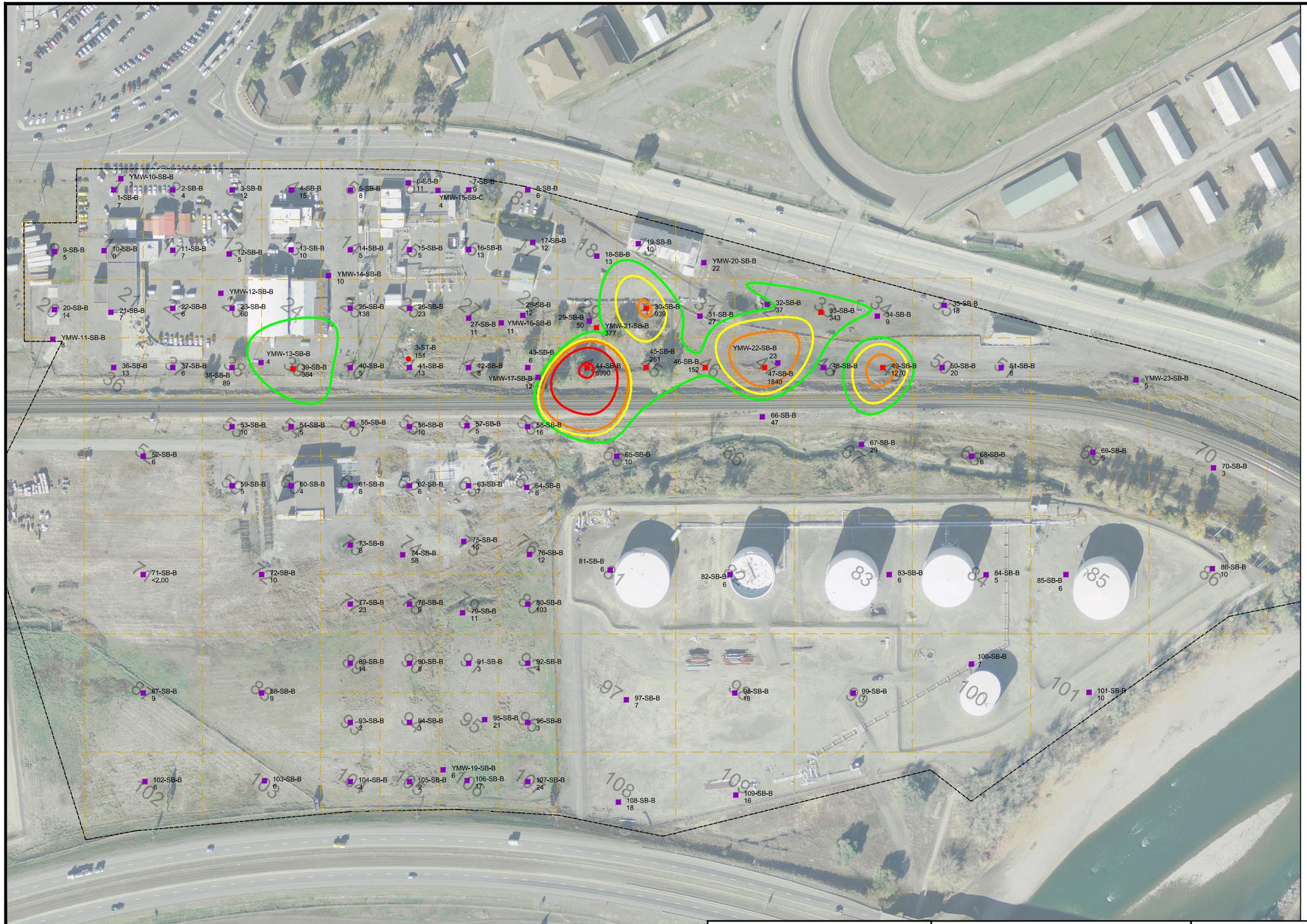


NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 70-SB-B | SOIL SAMPLING LOCATION |
| 3 | SAMPLING RESULT |
| ■ ● | SAMPLING RESULT BELOW 140 MG/KG |
| ■ ● | SAMPLE RESULT ABOVE 140 MG/KG |
| | ISOCONTOURS: |
| | Approximate Extent of Subsurface Soil with Concentrations of Lead above MDEQ Leaching to Groundwater Screening Level - 140 mg/kg |
| | Approximate Extent of Subsurface Soil with Concentrations of Lead above Direct Contact for Residential Soils RSL - 400 mg/kg |
| | Approximate Extent of Subsurface Soil with Concentrations of Lead above Direct Contact for Commercial Soils RSL - 800 mg/kg |
| | Higher Concentration Iso-Contours - >800 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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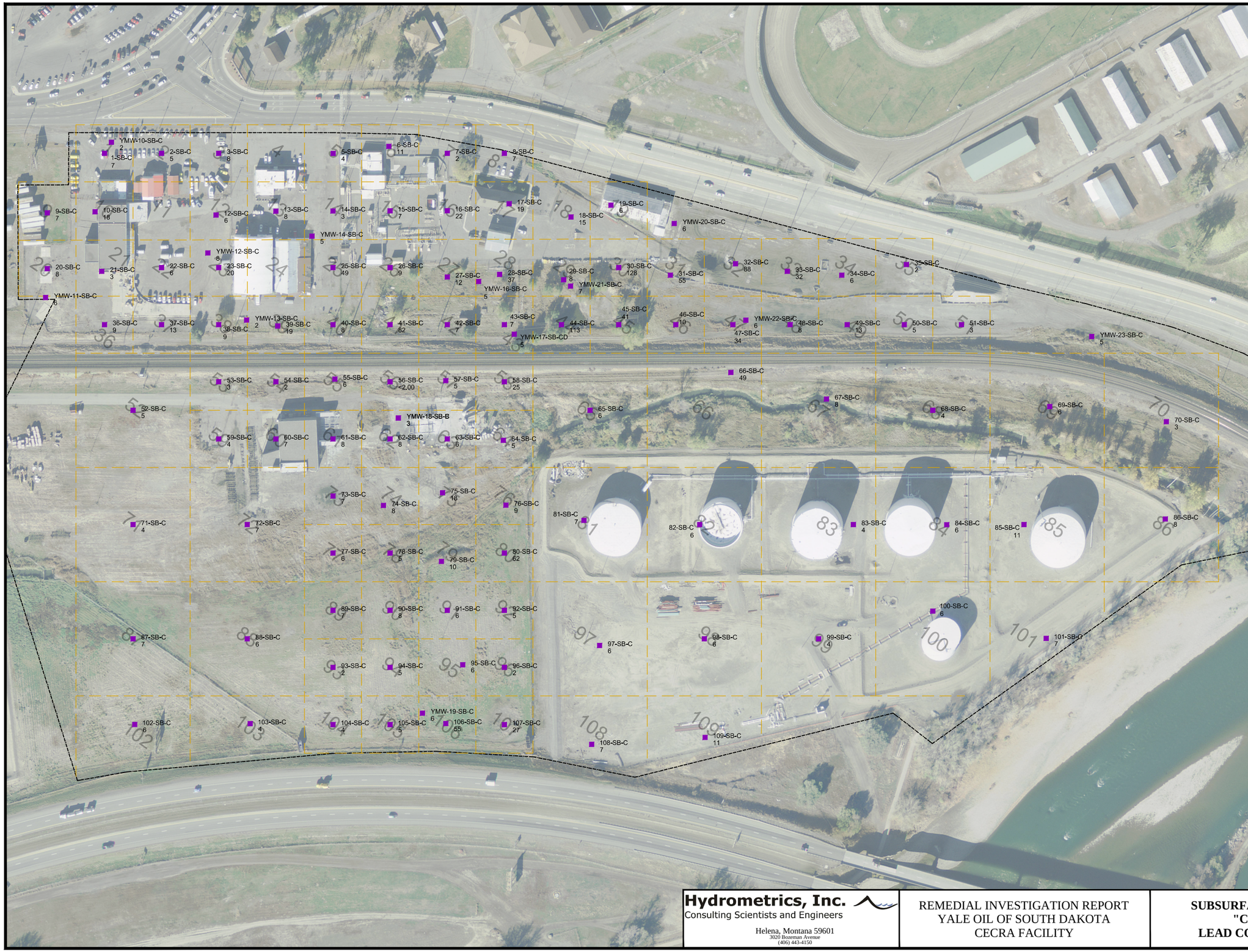
(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SUBSURFACE SOIL SAMPLE "B" HORIZON LEAD CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B011
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-9**

UPDATE TIME: 11:22 AM
LTABORSKY\BIL\20150306\I:\LAND PROJECTS\1110813\1110813B011.DWG




NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 70-SB-C | SOIL SAMPLING LOCATION |
| 3 | SAMPLING RESULT |
| ■ ● | ALL SAMPLING RESULT BELOW 140 MG/KG (MDEQ Lead Leaching to Groundwater Screening Level - 140 mg/kg) |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SUBSURFACE SOIL SAMPLE "C" HORIZON LEAD CONCENTRATIONS**

| DRAWING FILE NUMBER |
|---|
| 1110813B011 |
| AUTOCAD 2000 DRAWING (DWG) |
| FIGURE |
| **5-10** |

UPDATE TIME: 11:22 AM
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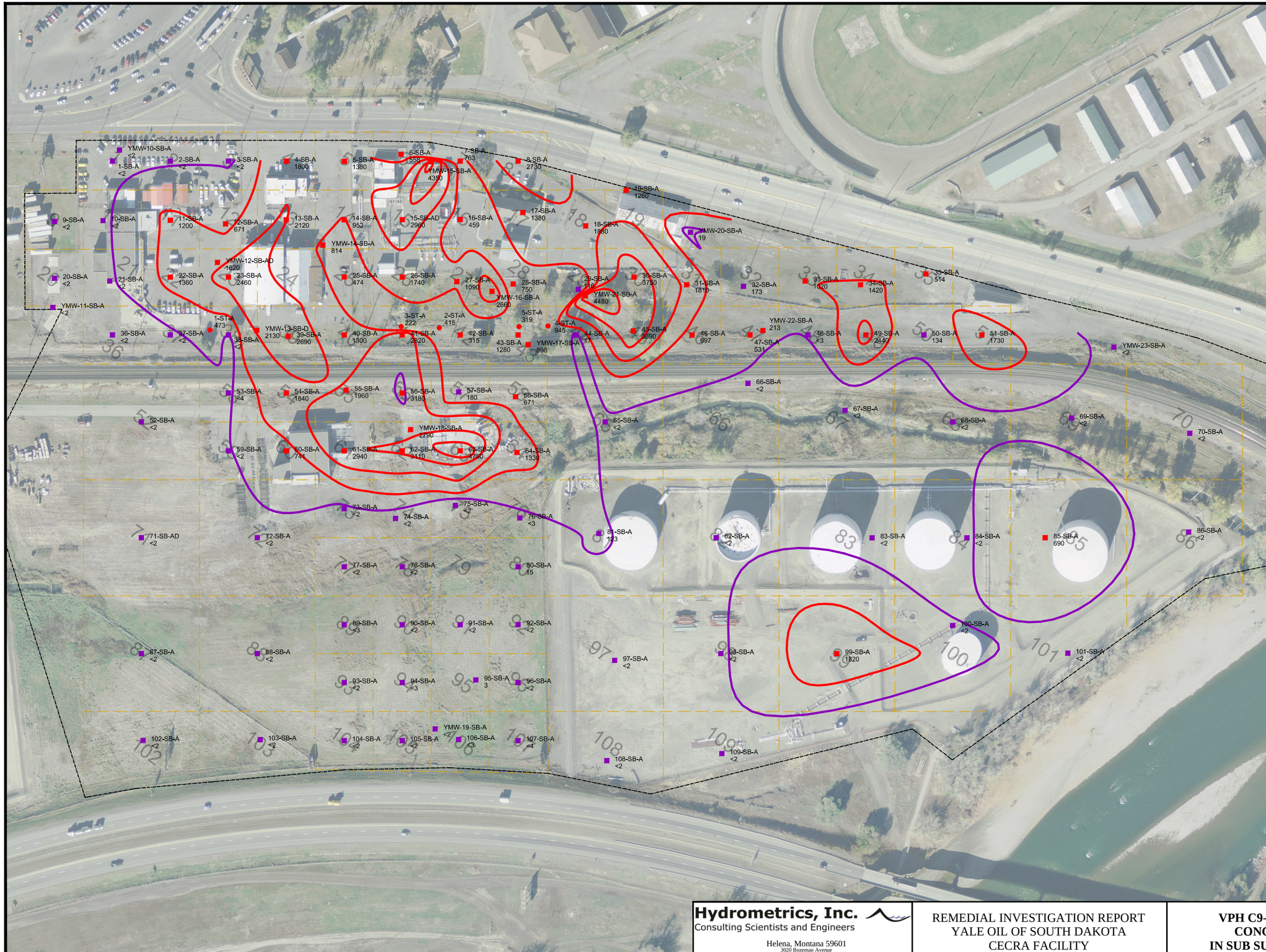


NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 69-SB-A | SOIL SAMPLING LOCATION |
| <2 | SAMPLING RESULT |
| ● | FOCUS AREA SAMPLING LOCATION |
| ■ ● | SAMPLING RESULT BELOW 100 MG/KG |
| ■ ● | SAMPLE RESULT ABOVE 100 MG/KG |
| ■ | |
| ━ | ISOCONTOURS: Approximate Extent of Shallow Soil with Concentrations of C9-C10 VPH Aromatics above MDEQ Residential and Commercial RBSL for Surface Soils - 100 mg/kg |
| ━ | Higher Concentration Iso-Contours - >100 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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Helena, Montana 59601
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(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**VPH C9-C10 AROMATICS CONCENTRATIONS IN SUB SURFACE "A" SOILS**

DRAWING FILE NUMBER
1110813B012
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-11**

UPDATE TIME: 11:07 AM
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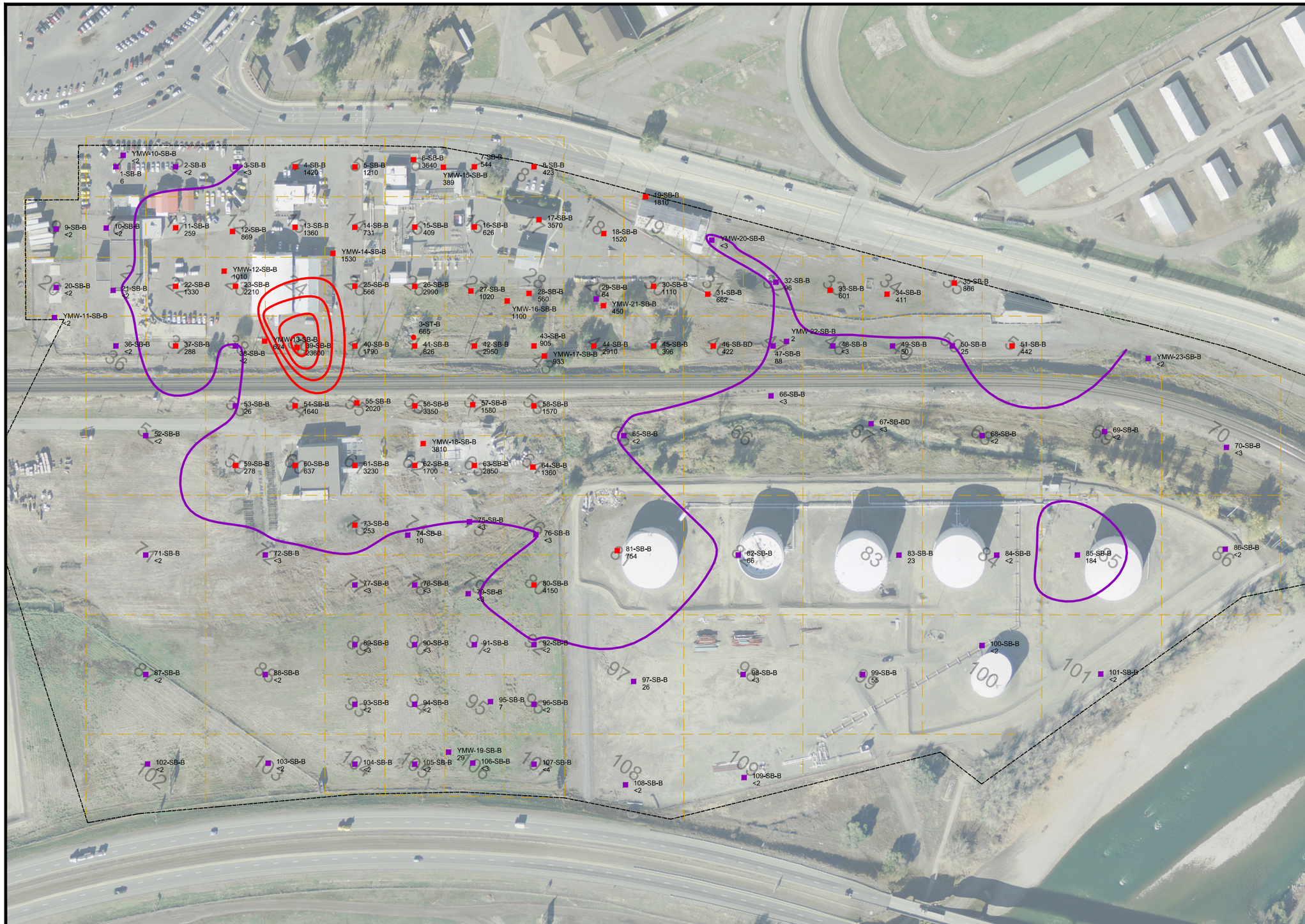


NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 69-SB-B | SOIL SAMPLING LOCATION |
| <2 | SAMPLING RESULT |
| ● | FOCUS AREA SAMPLING LOCATION |
| ■ ● | SAMPLING RESULT BELOW 100 MG/KG |
| ■ ● | SAMPLE RESULT ABOVE 100 MG/KG |
| ═══ | ISOCONTOURS: Approximate Extent of Shallow Soil with Concentrations of C9-C10 VPH Aromatics above MDEQ Residential and Commercial RBSL for Surface Soils - 100 mg/kg |
| ═══ | Higher Concentration Iso-Contours - >100 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**VPH C9-C10 AROMATICS CONCENTRATIONS IN SUB SURFACE "B" SOILS**

| DRAWING FILE NUMBER |
|---|
| 1110813B012 |
| AUTOCAD 2000 DRAWING (DWG) |
| FIGURE |
| **5-12** |

UPDATE TIME: 4:37 PM
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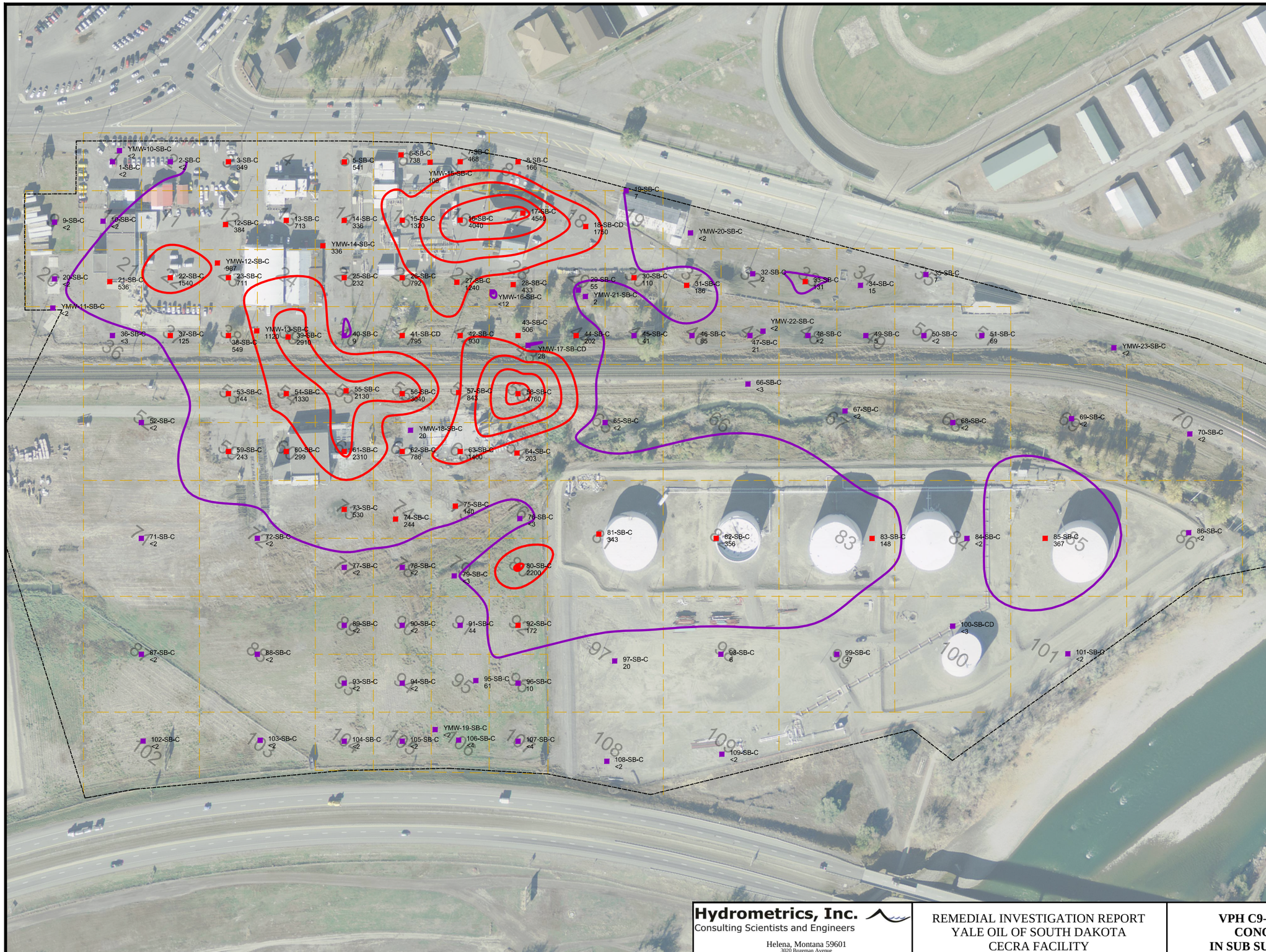


NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 69-SB-C | SOIL SAMPLING LOCATION |
| <2 | SAMPLING RESULT |
| ● | FOCUS AREA SAMPLING LOCATION |
| ■ ● | SAMPLING RESULT BELOW 100 MG/KG |
| ■ ● | SAMPLE RESULT ABOVE 100 MG/KG |
| ═══ | ISOCONTOURS: Approximate Extent of Shallow Soil with Concentrations of C9-C10 VPH Aromatics above MDEQ Residential and Commercial RBSL for Surface Soils - 100 mg/kg |
| ═══ | Higher Concentration Iso-Contours - >100 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**VPH C9-C10 AROMATICS CONCENTRATIONS IN SUB SURFACE "C" SOILS**

DRAWING FILE NUMBER
1110813B012
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-13**

UPDATE TIME: 4:37 PM
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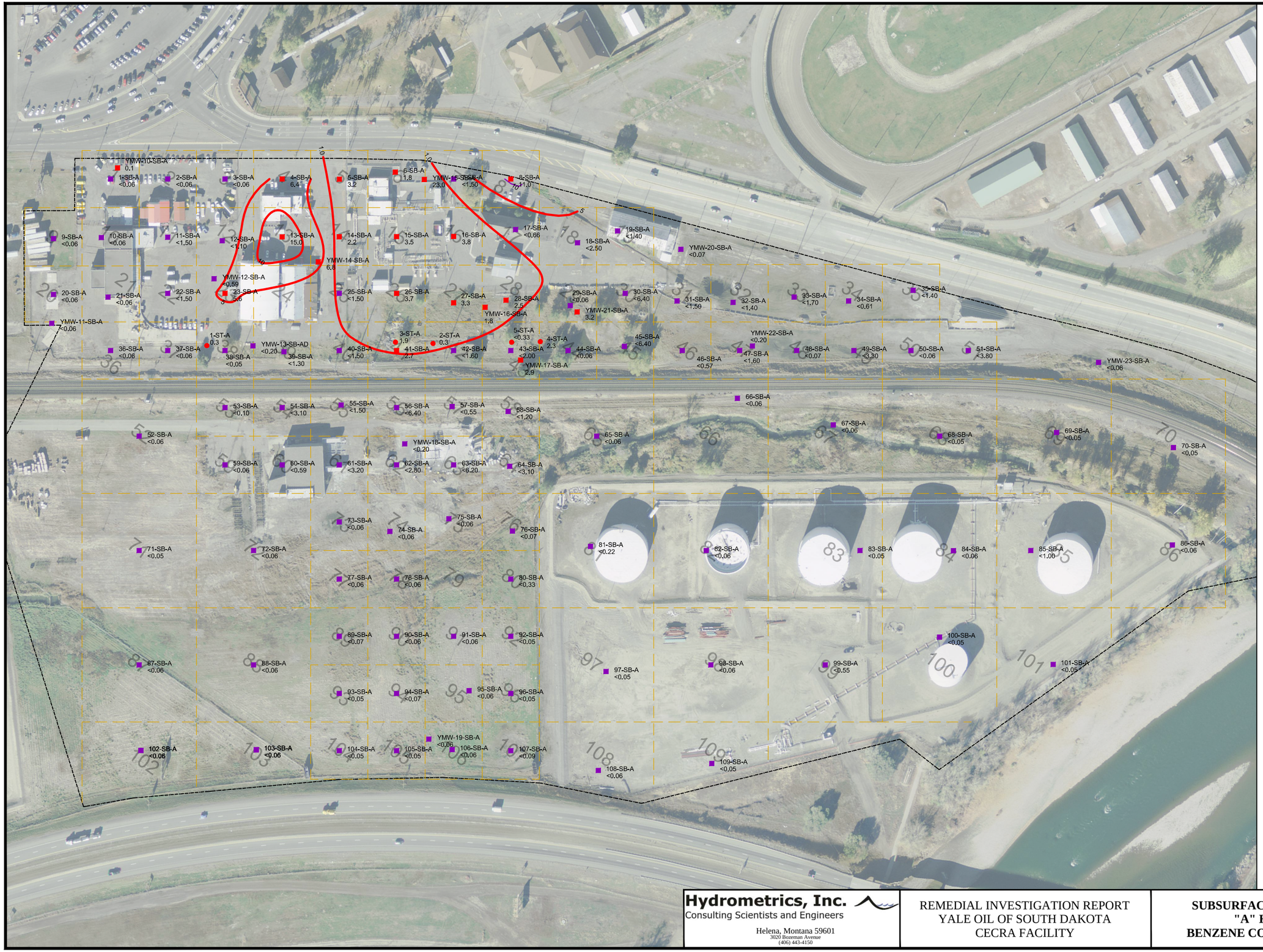


NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 70-SB-A | SOIL SAMPLING LOCATION |
| <0.05 | SAMPLING RESULT |
| ■ ● | SAMPLING RESULT BELOW 0.04 MG/KG OR NON DETECT |
| ■ ● | SAMPLE RESULT ABOVE 0.04 MG/KG |
| | ISOCONTOURS: |
| ═══ | Higher Concentration Iso-Contours than MDEQ Residential and Commercial RBSL for Subsurface Soils - 0.04 mg/kg. Note that non detect values were not contoured. |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. The best achievable practical quantitation limit is greater than the RBSL. Therefore, an isocontour line representing the RBSL has not been included; however, higher concentrations isocontour lines are presented.
7. MDEQ - Montana Department of Environmental Quality
8. RSL - Regional Screening Level
9. RBSL - Risk Based Screening Level
10. Dashed Lines Where Inferred
11. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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3020 Bozeman Avenue
(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SUBSURFACE SOIL SAMPLE "A" HORIZON BENZENE CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B011
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-14**

UPDATE TIME: 8:34 AM
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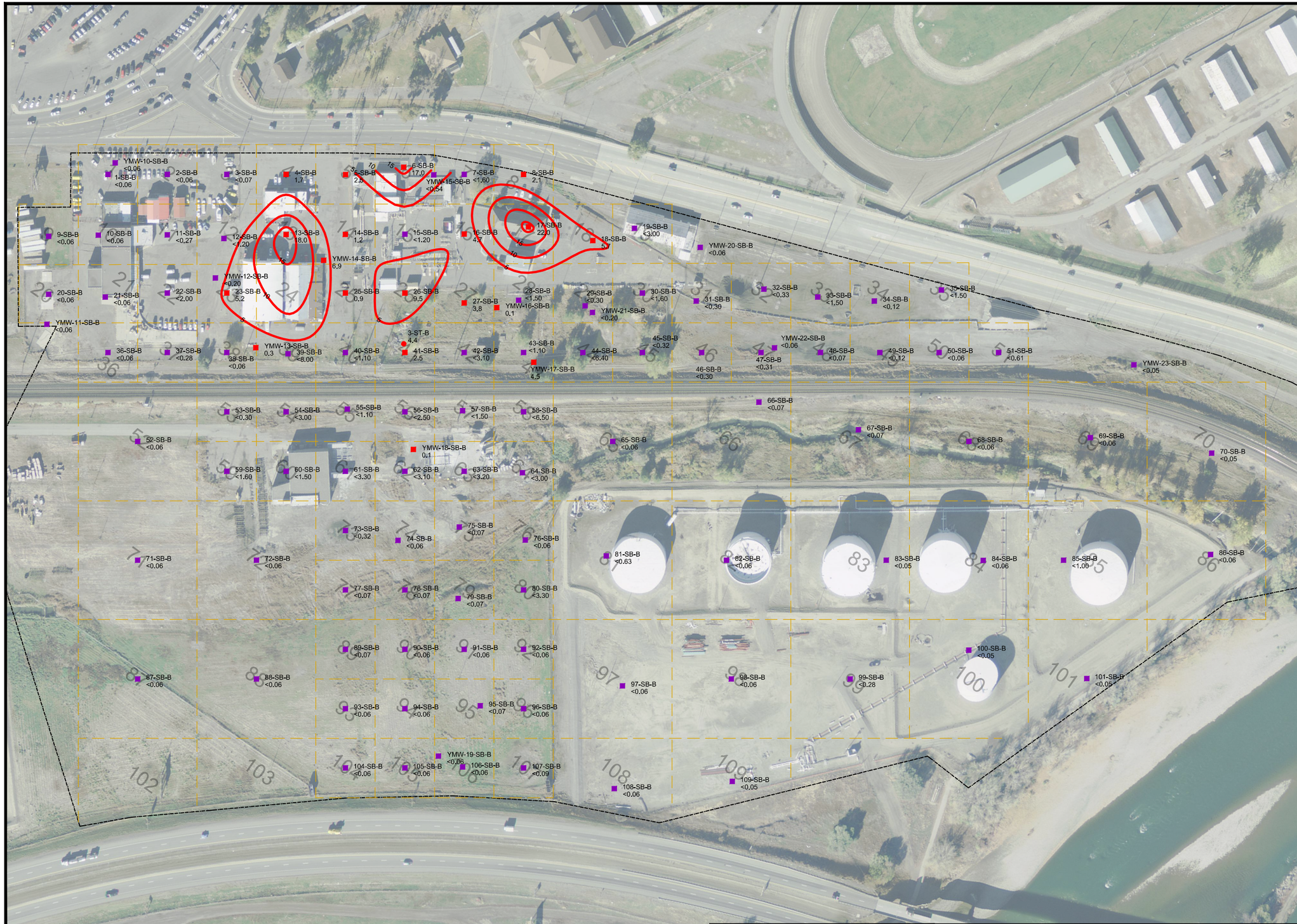


NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 70-SB-B | SOIL SAMPLING LOCATION |
| <0.05 | SAMPLING RESULT |
| ■ ● | SAMPLING RESULT BELOW 0.04 MG/KG OR NON DETECT |
| ■ ● | SAMPLE RESULT ABOVE 0.04 MG/KG |
| | ISOCONTOURS: |
| ——— | Higher Concentration Iso-Contours than MDEQ Residential and Commercial RBSL for Subsurface Soils - 0.04 mg/kg. Note that non detect values were not contoured. |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. The best achievable practical quantitation limit is greater than the RBSL. Therefore, an isocontour line representing the RBSL has not been included; however, higher concentrations isocontour lines are presented.
7. MDEQ - Montana Department of Environmental Quality
8. RSL - Regional Screening Level
9. RBSL - Risk Based Screening Level
10. Dashed Lines Where Inferred
11. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

**Hydrometrics, Inc.**
Consulting Scientists and Engineers
Helena, Montana 59601
3020 Bozeman Avenue
(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SUBSURFACE SOIL SAMPLE "B" HORIZON BENZENE CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B011
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-15**

UPDATE TIME: 8:34 AM
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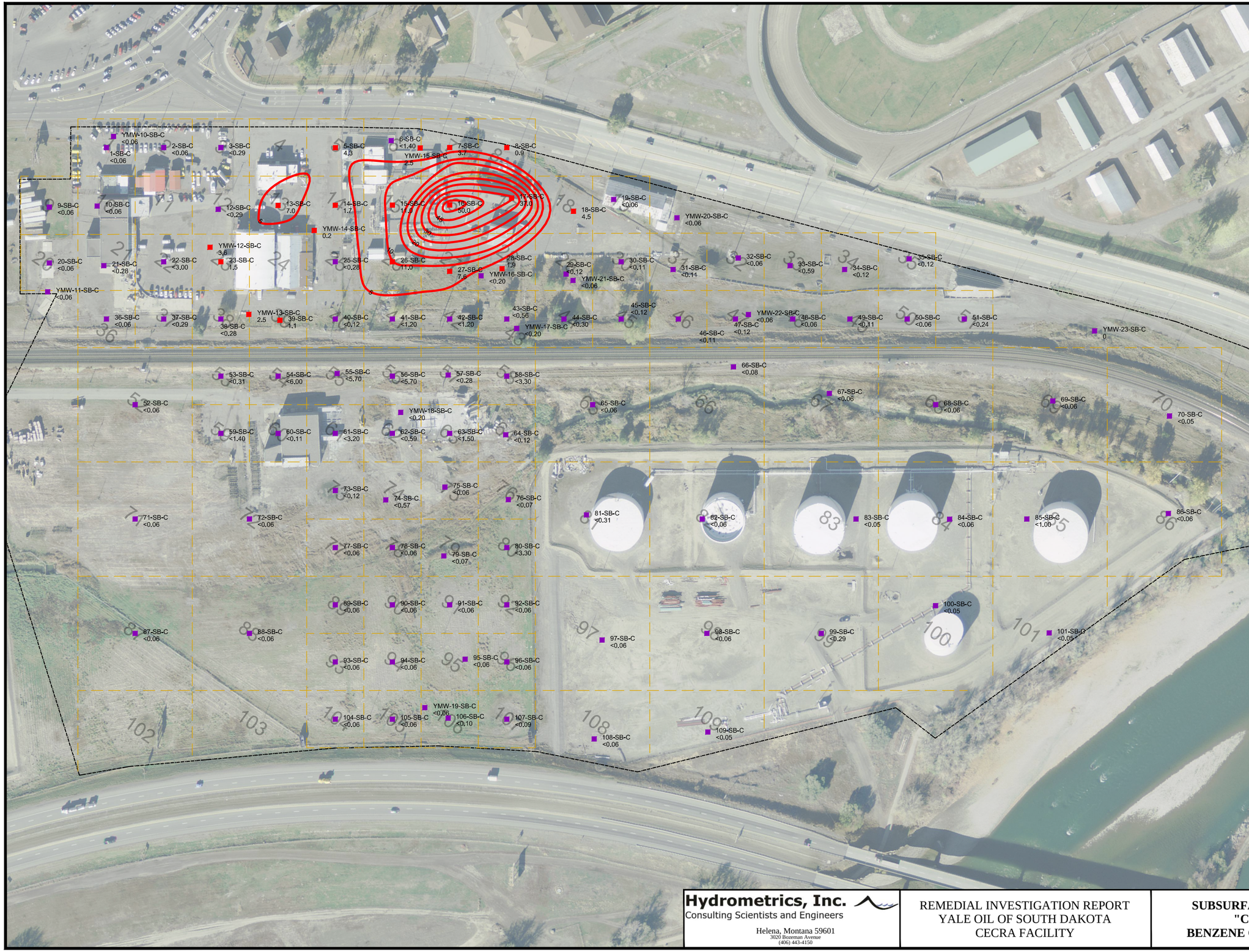


NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 70-SB-C | SOIL SAMPLING LOCATION |
| <0.05 | SAMPLING RESULT |
| ■ ● | SAMPLING RESULT BELOW 0.04 MG/KG OR NON DETECT |
| ■ ● | SAMPLE RESULT ABOVE 0.04 MG/KG |
| | ISOCONTOURS: |
| ═══ | Higher Concentration Iso-Contours than MDEQ Residential and Commercial RBSL for Subsurface Soils - 0.04 mg/kg. Note that non detect values were not contoured. |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. The best achievable practical quantitation limit is greater than the RBSL. Therefore, an isocontour line representing the RBSL has not been included; however, higher concentrations isocontour lines are presented.
7. MDEQ - Montana Department of Environmental Quality
8. RSL - Regional Screening Level
9. RBSL - Risk Based Screening Level
10. Dashed Lines Where Inferred
11. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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Consulting Scientists and Engineers
Helena, Montana 59601
3020 Bozeman Avenue
(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SUBSURFACE SOIL SAMPLE "C" HORIZON BENZENE CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B011
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-16**

UPDATE TIME: 8:34 AM
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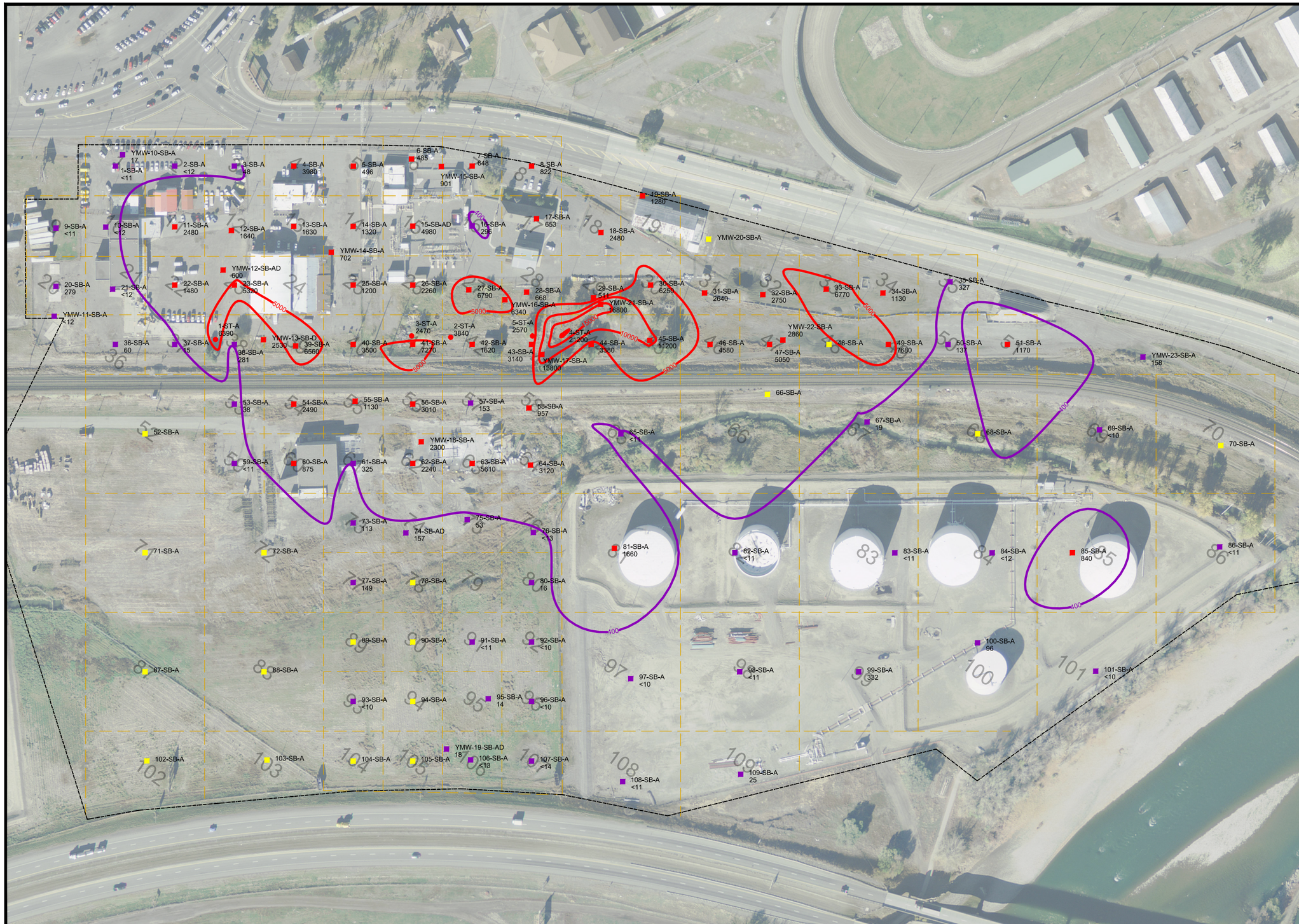


NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**EPH C11-C22 AROMATICS CONCENTRATIONS IN SUB SURFACE "A" SOILS**

DRAWING FILE NUMBER
1110813B012
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-17**

UPDATE TIME: 10:56 AM
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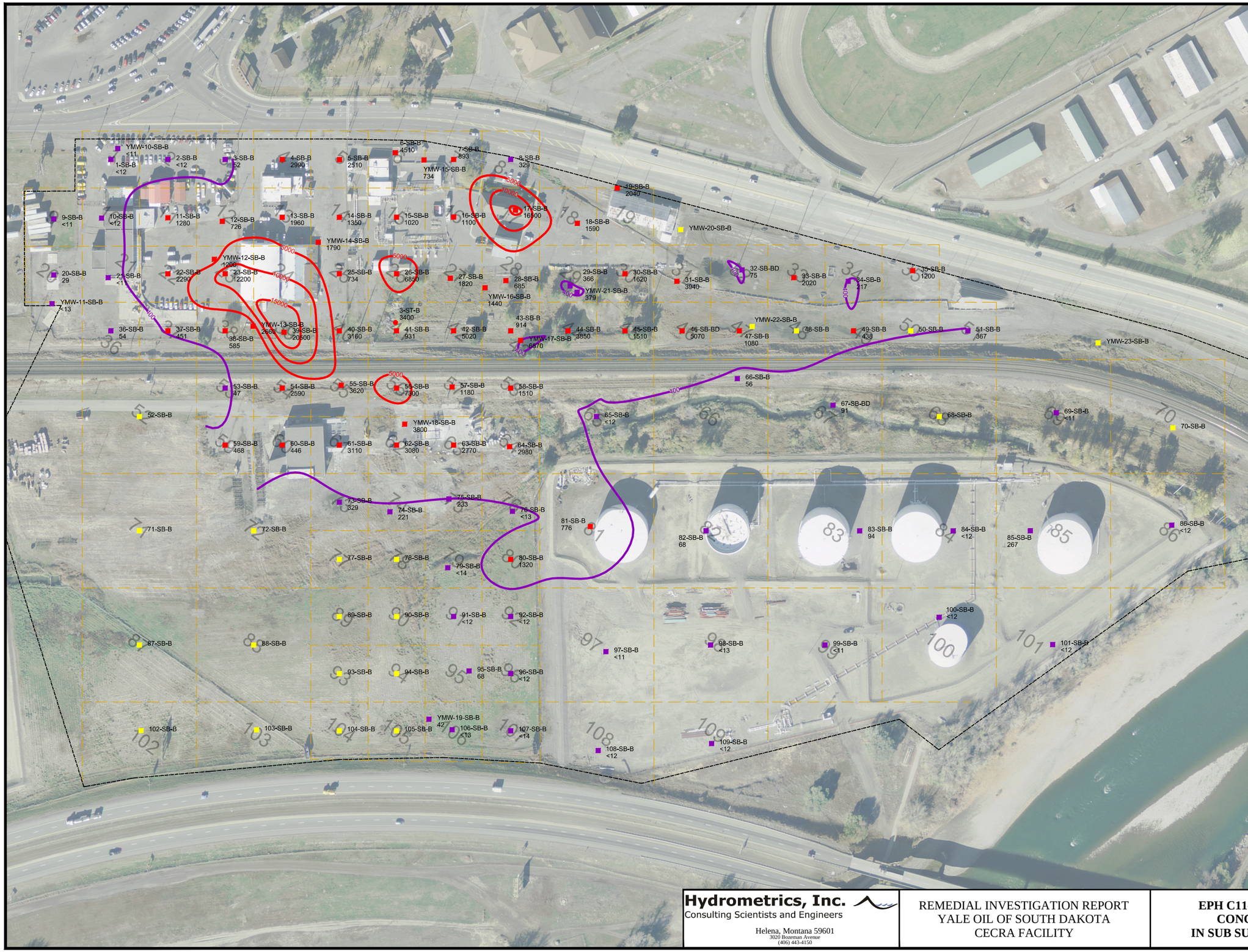


NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| 69-SB-B | SOIL SAMPLING LOCATION |
| <11 | SAMPLING RESULT |
| ● | FOCUS AREA SAMPLING LOCATION |
| ■ ● | SAMPLING RESULT BELOW 400 MG/KG |
| ■ ● | SAMPLE RESULT ABOVE 400 MG/KG |
| ■ | LOCATION NOT SAMPLED FOR THIS ANALYTE |
| ——— | ISOCONTOURS: Approximate Extent of Shallow Soil with Concentrations of C11-C22 EPH Aromatics above MDEQ Residential and Commercial RBSL for Surface Soils - 400 mg/kg |
| ——— | Higher Concentration Iso-Contours - >400 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**EPH C11-C22 AROMATICS CONCENTRATIONS IN SUB SURFACE "B" SOILS**

DRAWING FILE NUMBER
1110813B012
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-18**

UPDATE TIME: 10:56 AM
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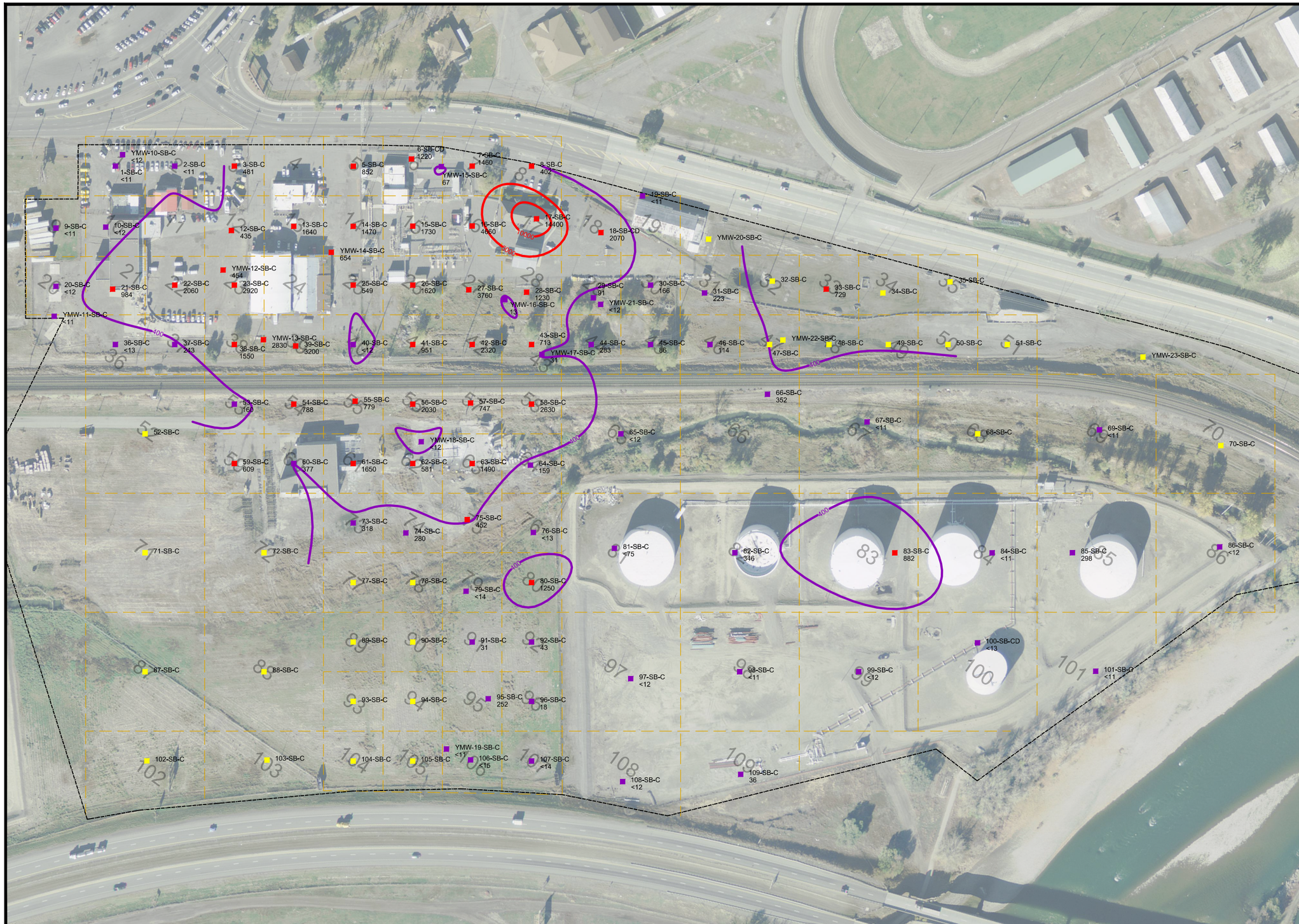


NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**EPH C11-C22 AROMATICS CONCENTRATIONS IN SUB SURFACE "C" SOILS**

DRAWING FILE NUMBER
1110813B012
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-19**

UPDATE TIME: 1:52 PM
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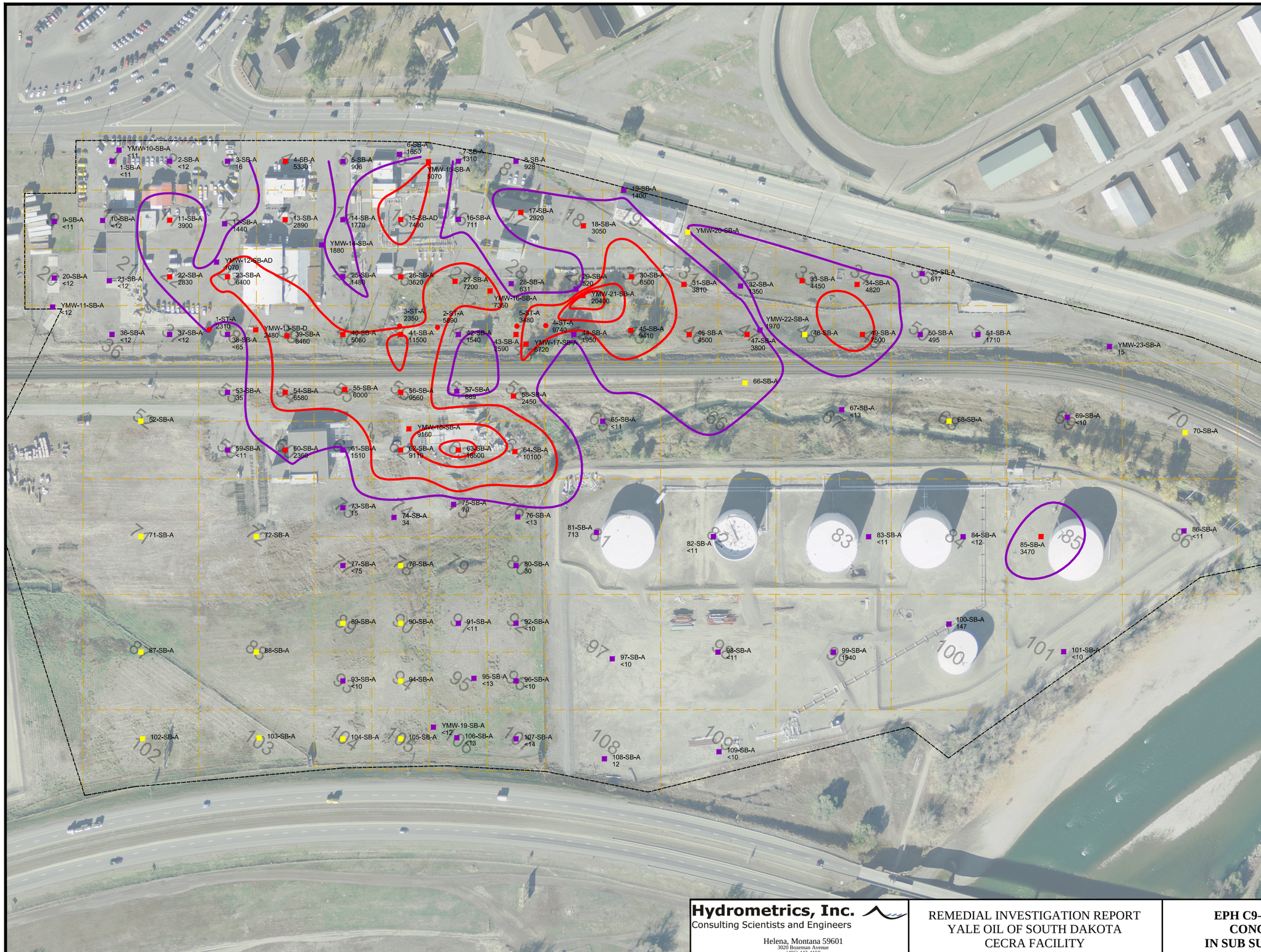


NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| 69-SB-A | SOIL SAMPLING LOCATION |
| <10 | SAMPLING RESULT |
| | FOCUS AREA SAMPLING LOCATION |
| | SAMPLING RESULT BELOW 2000 MG/KG |
| | SAMPLE RESULT ABOVE 2000 MG/KG |
| | LOCATION NOT SAMPLED FOR THIS ANALYTE |
| | ISOCONTOURS: Approximate Extent of Shallow Soil with Concentrations of C9-C18 EPH Aliphatics above MDEQ Residential and Commercial RBSL for Surface Soils - 2000 mg/kg |
| | Higher Concentration Iso-Contours - >2000 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**EPH C9-C18 ALIPHATICS CONCENTRATIONS IN SUB SURFACE "A" SOILS**

DRAWING FILE NUMBER
1110813B012
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-20**

UPDATE TIME: 9:49 AM
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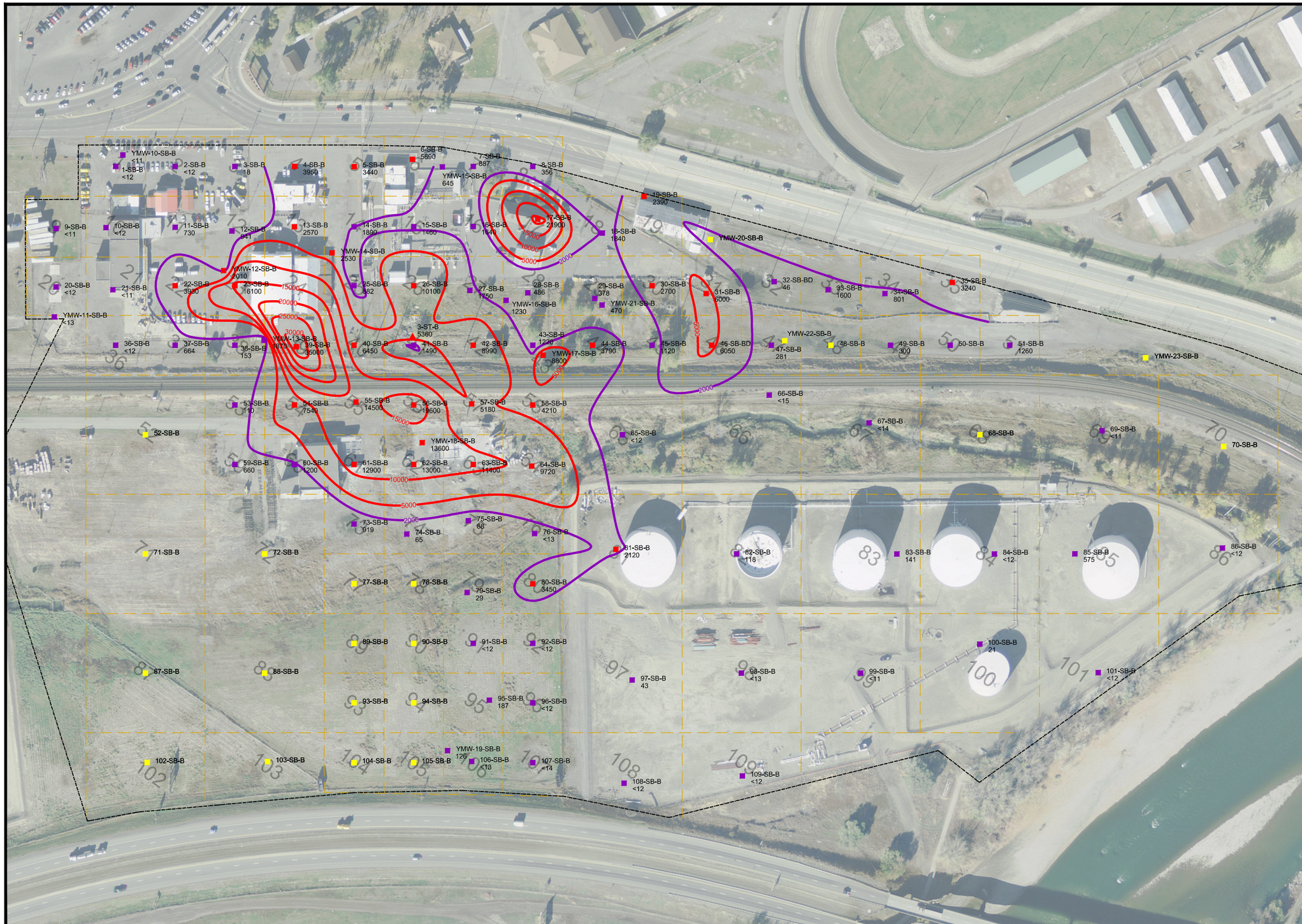


NORTH

SCALE
(In Feet)
100 0 100 200 300
(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| 69-SB-B | SOIL SAMPLING LOCATION |
| <11 | SAMPLING RESULT |
| | FOCUS AREA SAMPLING LOCATION |
| | SAMPLING RESULT BELOW 2000 MG/KG |
| | SAMPLE RESULT ABOVE 2000 MG/KG |
| | OPPORTUNITY SAMPLE LOCATION |
| | LOCATION NOT SAMPLED FOR THIS ANALYTE |
| | ISOCONTOURS: Approximate Extent of Shallow Soil with Concentrations of C9-C18 EPH Aliphatics above MDEQ Residential and Commercial RBSL for Surface Soils - 2000 mg/kg |
| | Higher Concentration Iso-Contours - >2000 mg/kg |

NOTES:
1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**EPH C9-C18 ALIPHATICS CONCENTRATIONS IN SUB SURFACE "B" SOILS**

DRAWING FILE NUMBER
1110813B012
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-21**

UPDATE TIME: 1:52 PM
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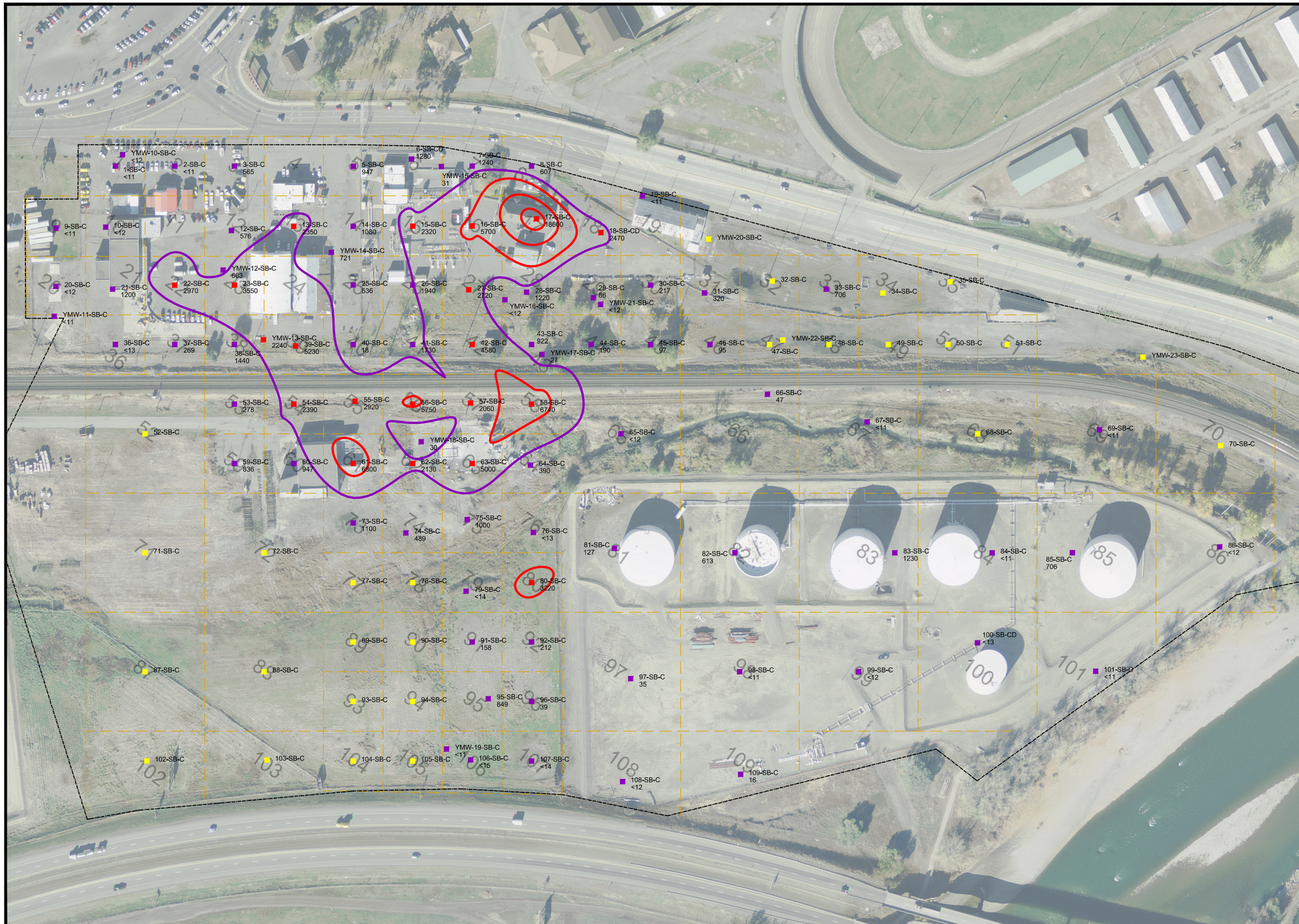


NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| 69-SB-C | SOIL SAMPLING LOCATION |
| <11 | SAMPLING RESULT |
| | FOCUS AREA SAMPLING LOCATION |
| | SAMPLING RESULT BELOW 2000 MG/KG |
| | SAMPLE RESULT ABOVE 2000 MG/KG |
| | LOCATION NOT SAMPLED FOR THIS ANALYTE |
| | ISOCONTOURS: Approximate Extent of Shallow Soil with Concentrations of C9-C18 EPH Aliphatics above MDEQ Residential and Commercial RBSL for Surface Soils - 2000 mg/kg |
| | Higher Concentration Iso-Contours - >2000 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
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US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**EPH C9-C18 ALIPHATICS CONCENTRATIONS IN SUB SURFACE "C" SOILS**

DRAWING FILE NUMBER
1110813B012
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-22**

UPDATE TIME: 10:56 AM
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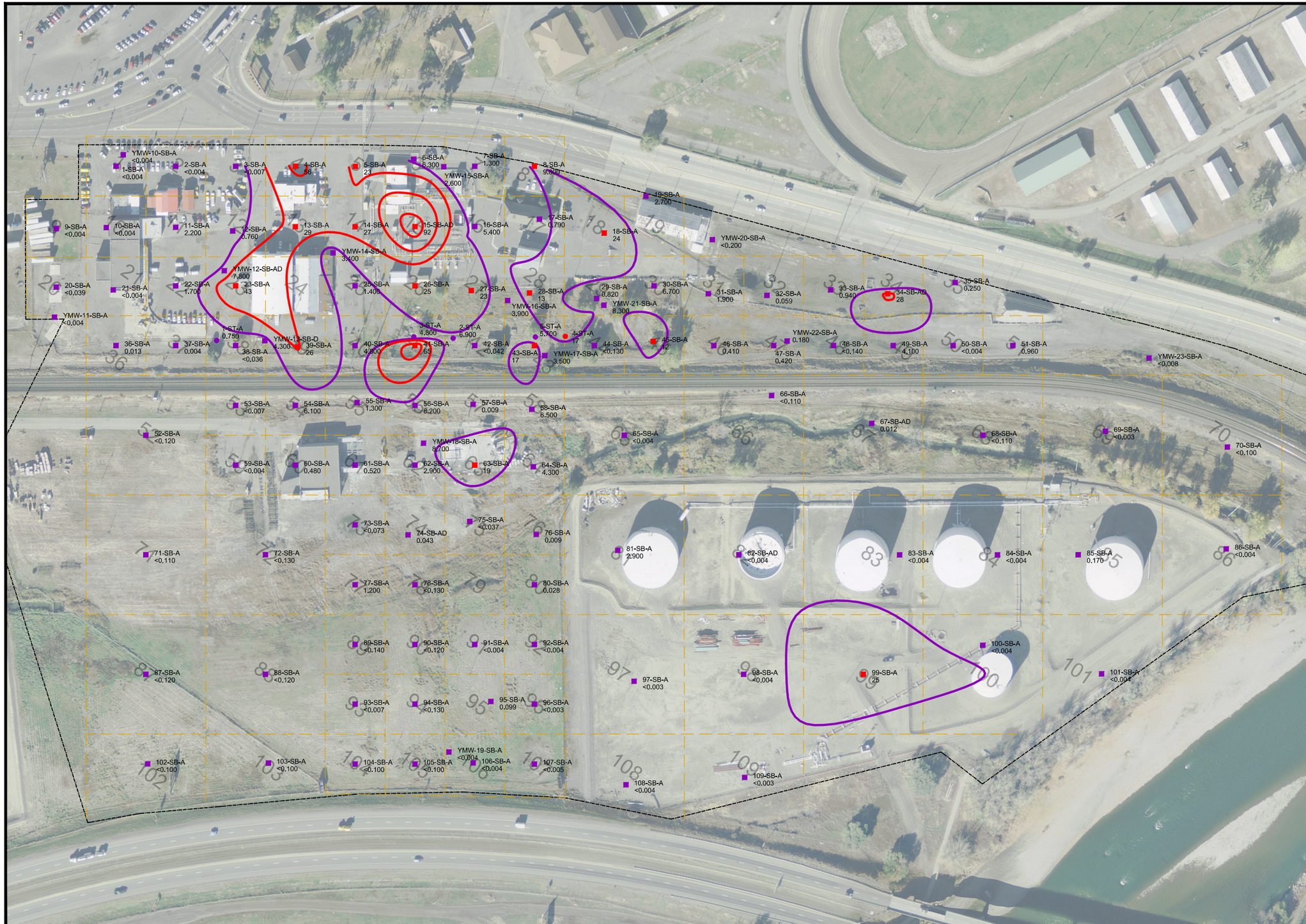


NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 70-SB-A | SOIL SAMPLING LOCATION |
| <0.100 | SAMPLING RESULT |
| ● | FOCUS AREA SAMPLING LOCATION |
| ■ ● | SAMPLING RESULT BELOW 9 MG/KG |
| ■ ● | SAMPLE RESULT ABOVE 9 MG/KG |
| ▬ | ISOCONTOURS: Approximate Extent of Shallow Soil with Concentrations of Naphthalene above MDEQ Residential and Commercial RBSL for Surface Soils - 9 mg/kg |
| ▬ | Higher Concentration Iso-Contours - >9 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SUBSURFACE SOIL SAMPLE "A" HORIZON NAPHTHALENE CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B013
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-23**

UPDATE TIME: 3:55 PM
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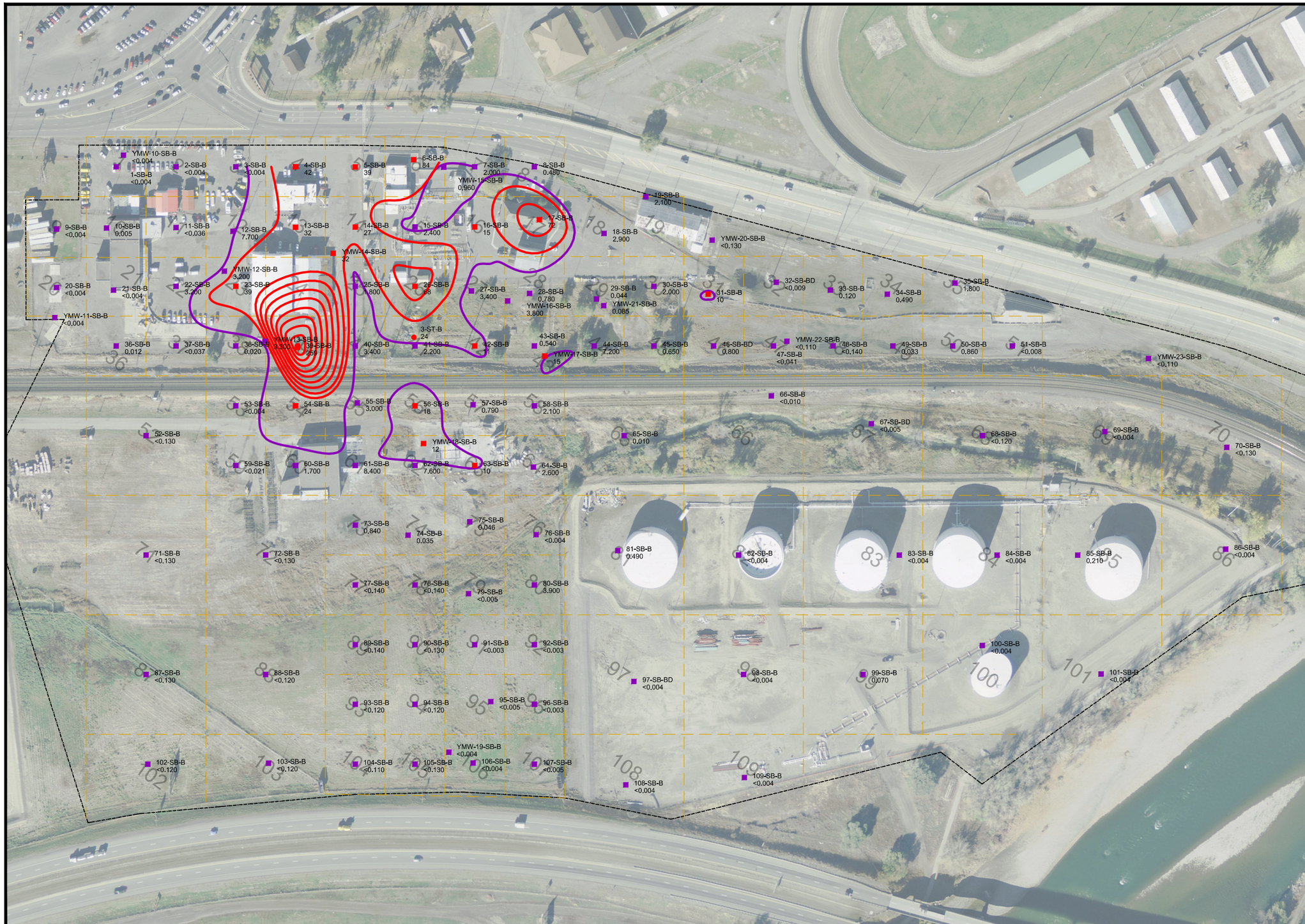



NORTH

## SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 70-SB-B | SOIL SAMPLING LOCATION |
| <0.130 | SAMPLING RESULT |
| ● | FOCUS AREA SAMPLING LOCATION |
| ■ ● | SAMPLING RESULT BELOW 9 MG/KG |
| ■ ● | SAMPLE RESULT ABOVE 9 MG/KG |
| ═══ | ISOCONTOURS: Approximate Extent of Shallow Soil with Concentrations of Naphthalene above MDEQ Residential and Commercial RBSL for Surface Soils - 9 mg/kg |
| ═══ | Higher Concentration Iso-Contours - >9 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

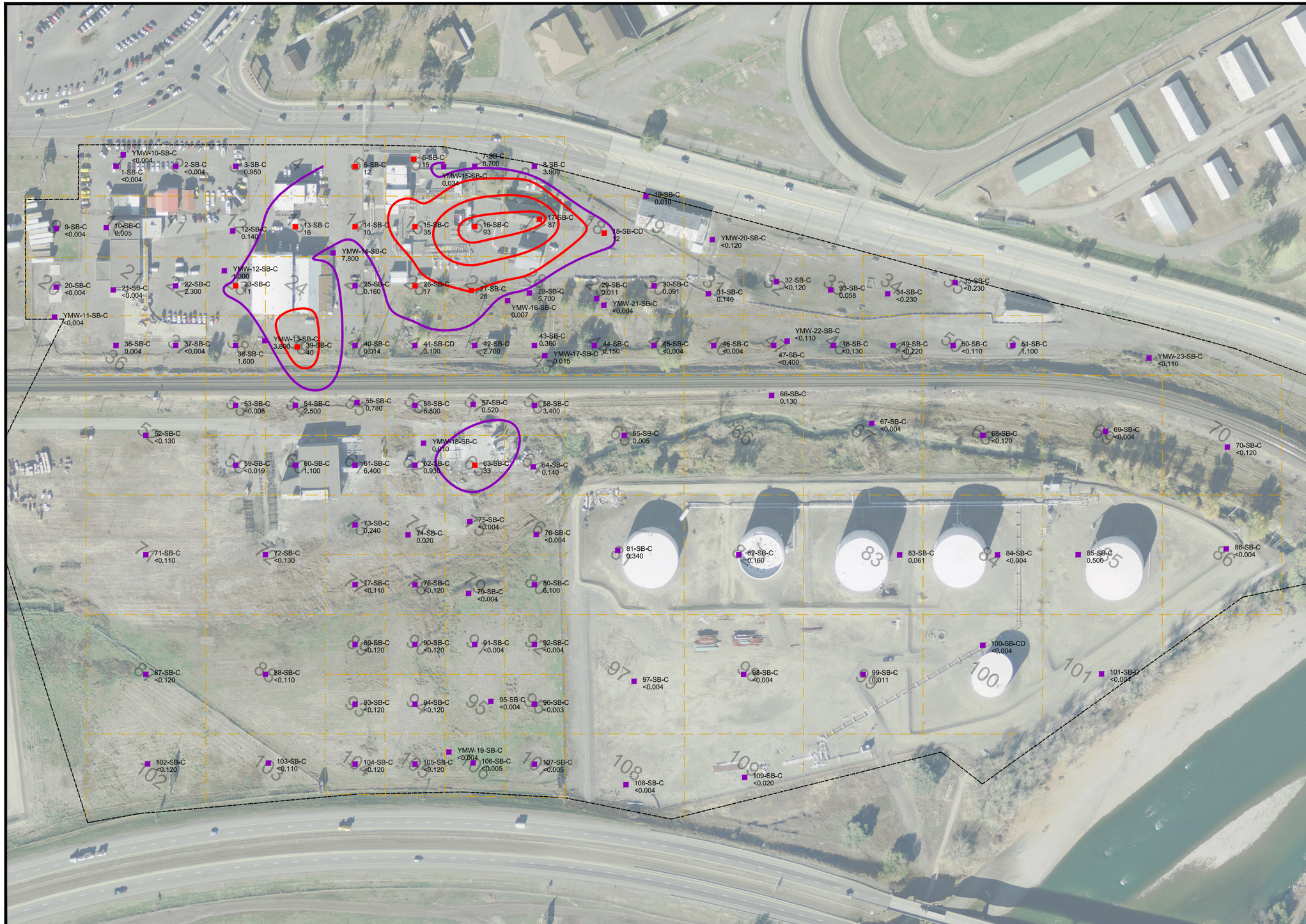
**Hydrometrics, Inc.**
Consulting Scientists and Engineers
Helena, Montana 59601
3020 Bozeman Avenue
(406) 443-4150

REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SUBSURFACE SOIL SAMPLE "B" HORIZON NAPHTHALENE CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B013
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-24**

UPDATE TIME: 2:25 PM
LTABORSKY\BIL\20140812\I:\LAND PROJECTS\1110813\1110813B013.DWG




NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

## LEGEND

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| — — — | GRID BOUNDARY |
| 70 | GRID NUMBER |
| ■ 70-SB-C | SOIL SAMPLING LOCATION |
| <0.120 | SAMPLING RESULT |
| ● | FOCUS AREA SAMPLING LOCATION |
| ■ ● | SAMPLING RESULT BELOW 9 MG/KG |
| ■ ● | SAMPLE RESULT ABOVE 9 MG/KG |
| ——— | ISOCONTOURS: Approximate Extent of Shallow Soil with Concentrations of Naphthalene above MDEQ Residential and Commercial RBSL for Surface Soils - 9 mg/kg |
| ——— | Higher Concentration Iso-Contours - >9 mg/kg |

NOTES:

1. All Results in Milligrams per Kilogram ( mg/kg). (Parts per Million)
2. Sample Depth Interval "A" is the highest Photo Ionic Dector (PID) reading on approximate two foot intervals between 2-10' or 2' to groundwater
3. Sample Depth Interval "B" is at groundwater level
4. Sample Depth Interval "C" is an interval below groundwater sample level
5. Sample Depth Intervals "A", "B", and "C" were advanced either by hand auger, Air Knife, and/or Geoprobe.
6. MDEQ - Montana Department of Environmental Quality
7. RSL - Regional Screening Level
8. RBSL - Risk Based Screening Level
9. Dashed Lines Where Inferred
10. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
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3020 Bozeman Avenue
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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**SUBSURFACE SOIL SAMPLE "C" HORIZON NAPHTHALENE CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B013
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-25**

UPDATE TIME: 2:31 PM
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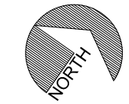


SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| ● YMW-11 | MONITORING WELL |
| 0.002 | SAMPLING RESULT |
| ● MW-1 | MONITORING WELL NOT SAMPLED |
| ● YMW-12 | MONITORING WELL NOT SAMPLED DUE TO PRESENCE OF PRODUCT |
| YD-1△ | SURFACE WATER MONITORING SITE |
| | ISOCONTOURS: Arsenic DEQ-7 Human Health Standards Groundwater - 0.01 mg/L |
| | Higher Concentration Iso-Contours |

NOTES:

1. All Results in Milligrams per Liter ( mg/L). (Parts per Million)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**2ND QUARTER GROUNDWATER & SURFACE WATER ARSENIC CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B004
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-26**

UPDATE TIME: 10:58 AM
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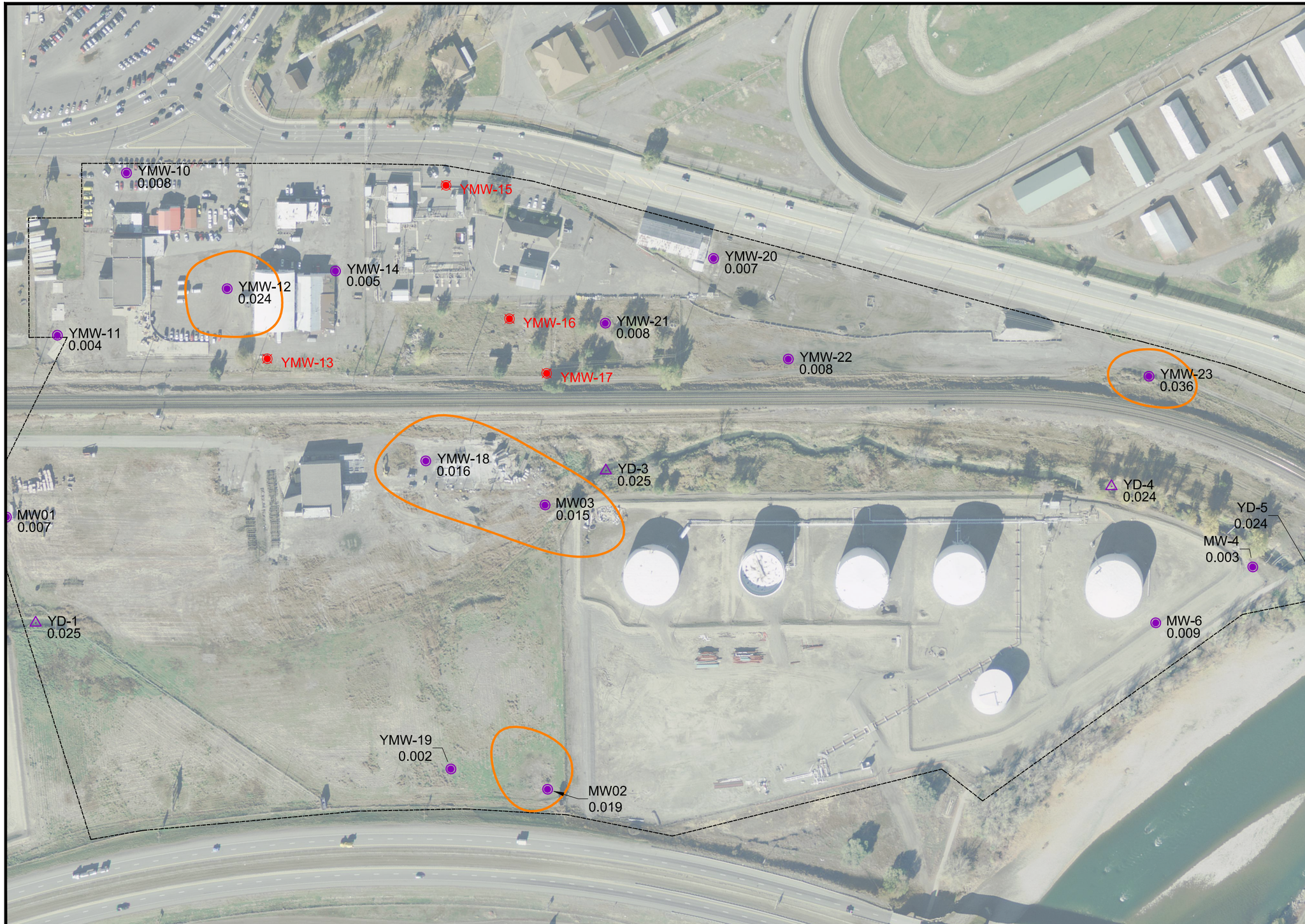


NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| ●YMW-11 | MONITORING WELL |
| 0.002 | SAMPLING RESULT |
| ●MW-1 | MONITORING WELL NOT SAMPLED |
| ●YMW-12 | MONITORING WELL NOT SAMPLED DUE TO PRESENCE OF PRODUCT |
| YD-1△ | SURFACE WATER MONITORING SITE |
| ═══ | ISOCONTOURS: Arsenic DEQ-7 Human Health Standards Groundwater - 0.01 mg/L |
| ═══ | Higher Concentration Iso-Contours |

NOTES:

1. All Results in Milligrams per Liter ( mg/L). (Parts per Million)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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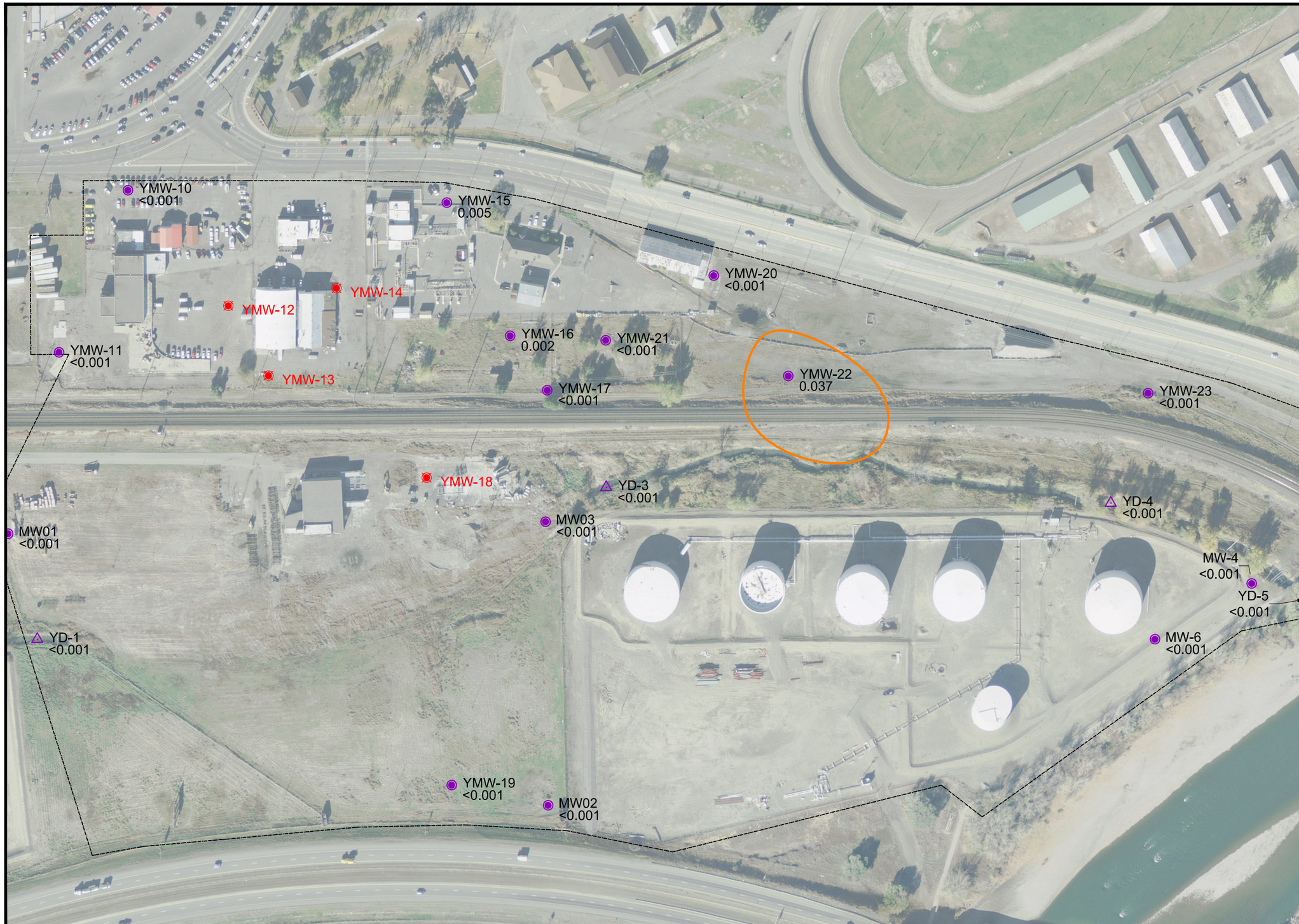
REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**3RD QUARTER GROUNDWATER & SURFACE WATER ARSENIC CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B004
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-27**

UPDATE TIME: 3:23 PM
LTABORSKY\,BIL\,20140812\:\:\,LAND PROJECTS\,1110813\,1110813B004.DWG




NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| ◉YMW-11 | MONITORING WELL |
| <0.001 | SAMPLING RESULT |
| ◉MW-1 | MONITORING WELL NOT SAMPLED |
| ◉YMW-12 | MONITORING WELL NOT SAMPLED DUE TO PRESENCE OF PRODUCT |
| YD-1△ | SURFACE WATER MONITORING SITE |
| | ISOCONTOURS: Lead DEQ-7 Human Health Standards for Groundwater - 0.015 mg/L |
| | Higher Concentration Iso-Contours |

NOTES:

1. All Results in Milligrams per Liter ( mg/L). (Parts per Million)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**2ND QUARTER GROUNDWATER & SURFACE WATER LEAD CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B004
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-28**

UPDATE TIME: 3:23 PM
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NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| ●YMW-11 | MONITORING WELL |
| <0.001 | SAMPLING RESULT |
| ●MW-1 | MONITORING WELL NOT SAMPLED |
| ●YMW-12 | MONITORING WELL NOT SAMPLED DUE TO PRESENCE OF PRODUCT |
| YD-1△ | SURFACE WATER MONITORING SITE |
| ═══ | ISOCONTOURS: Lead DEQ-7 Human Health Standards for Groundwater - 0.015 mg/L |
| ═══ | Higher Concentration Iso-Contours |

NOTES:

1. All Results in Milligrams per Liter ( mg/L). (Parts per Million)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**3RD QUARTER GROUNDWATER & SURFACE WATER LEAD CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B004
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-29**

UPDATE TIME: 3:23 PM
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NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| YMW-11 | MONITORING WELL |
| <20 | SAMPLING RESULT |
| MW-1 | MONITORING WELL NOT SAMPLED |
| YMW-12 | MONITORING WELL NOT SAMPLED DUE TO PRESENCE OF PRODUCT |
| YD-1△ | SURFACE WATER MONITORING SITE |
| | ISOCONTOURS: Total Purgable Hydrocarbons DEQ-7 Human Health Standards & MDEQ Groundwater RBSL - 1000 µg/L |
| | Higher Concentration Iso-Contours |

NOTES:

1. All Results in Micrograms per Liter ( µg/L). (Parts per Billion)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**2ND QUARTER GROUNDWATER & SURFACE WATER TOTAL PURGEABLE HYDROCARBONS CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B004
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-30**

UPDATE TIME: 3:23 PM
LTABORSKY\BIL\20140812\I:\LAND PROJECTS\1110813\1110813B004.DWG

NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| ●YMW-11 | MONITORING WELL |
| <20 | SAMPLING RESULT |
| ●MW-1 | MONITORING WELL NOT SAMPLED |
| ●YMW-12 | MONITORING WELL NOT SAMPLED DUE TO PRESENCE OF PRODUCT |
| YD-1△ | SURFACE WATER MONITORING SITE |
| | ISOCONTOURS: Total Purgable Hydrocarbons DEQ-7 Human Health Standards & MDEQ Groundwater RBSL - 1000 µg/L |
| | Higher Concentration Iso-Contours |

NOTES:

1. All Results in Micrograms per Liter ( µg/L). (Parts per Billion)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**3RD QUARTER GROUNDWATER & SURFACE WATER TOTAL PURGEABLE HYDROCARBONS CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B004
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-31**

UPDATE TIME: 3:23 PM
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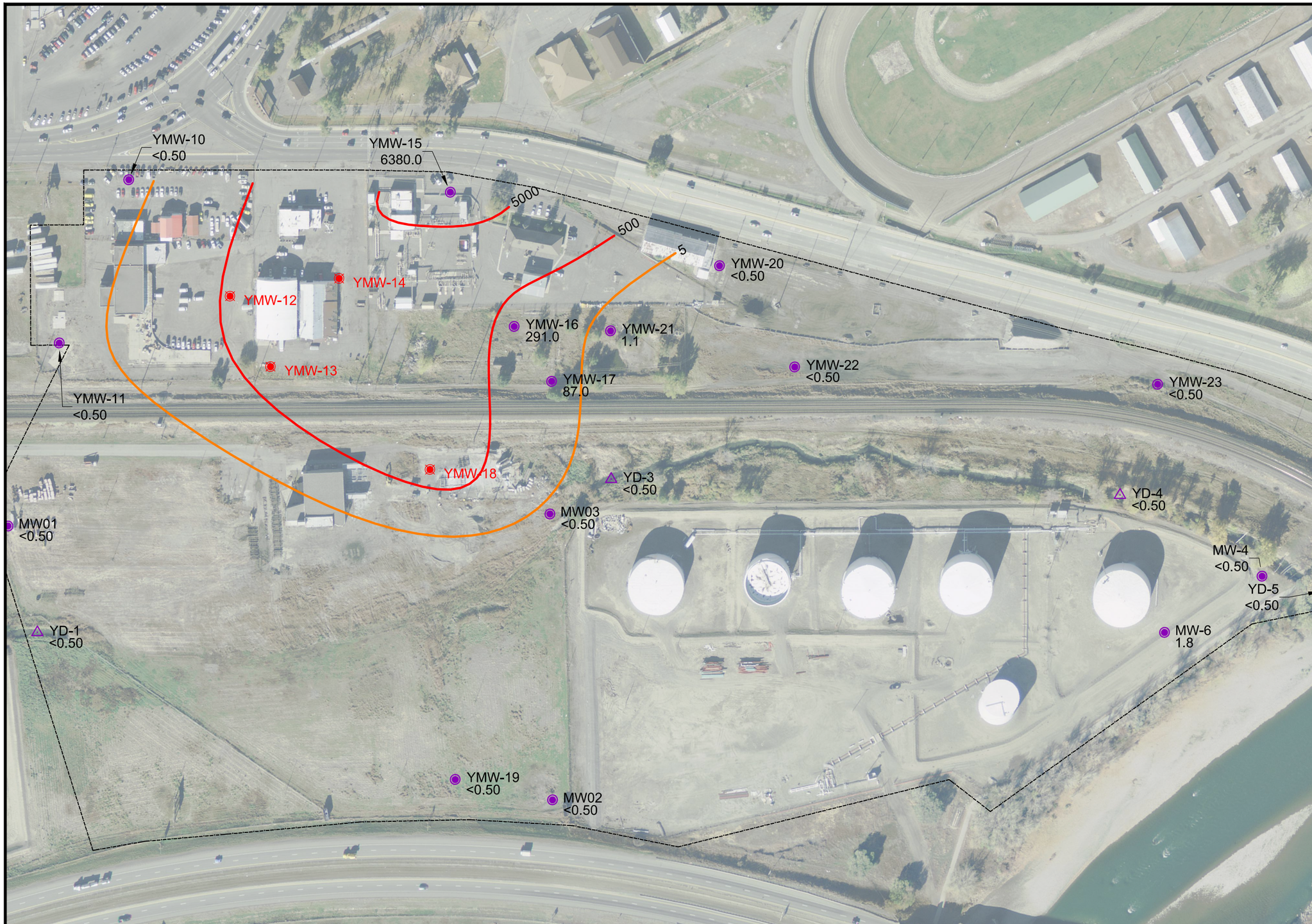


NORTH

SCALE
(In Feet)
100 0 100 200 300
(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| YMW-11 | MONITORING WELL |
| <0.50 | SAMPLING RESULT |
| MW-1 | MONITORING WELL NOT SAMPLED |
| YMW-12 | MONITORING WELL NOT SAMPLED DUE TO PRESENCE OF PRODUCT |
| YD-1△ | SURFACE WATER MONITORING SITE |
| | ISOCONTOURS: Benzene DEQ-7 Human Health Standards & MDEQ Groundwater RBSL - 5 ug/L |
| | Higher Concentration Iso-Contours |

NOTES:
1. All Results in Micrograms per Liter ( µg/L). (Parts per Billion)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**2ND QUARTER GROUNDWATER & SURFACE WATER BENZENE CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B004
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-32**

UPDATE TIME: 3:23 PM
LTABORSKY\BIL\20140812\I:\LAND PROJECTS\1110813\1110813B004.DWG

NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| ● YMW-11 | MONITORING WELL |
| <0.50 | SAMPLING RESULT |
| ● MW-1 | MONITORING WELL NOT SAMPLED |
| ● YMW-12 | MONITORING WELL NOT SAMPLED DUE TO PRESENCE OF PRODUCT |
| YD-1 △ | SURFACE WATER MONITORING SITE |
| ═══ | ISOCONTOURS: Benzene DEQ-7 Human Health Standards & MDEQ Groundwater RBSL - 5 µg/L |
| ═══ | Higher Concentration Iso-Contours |

NOTES:

1. All Results in Micrograms per Liter ( µg/L). (Parts per Billion)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**3RD QUARTER GROUNDWATER & SURFACE WATER BENZENE CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B004
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-33**

UPDATE TIME: 3:23 PM
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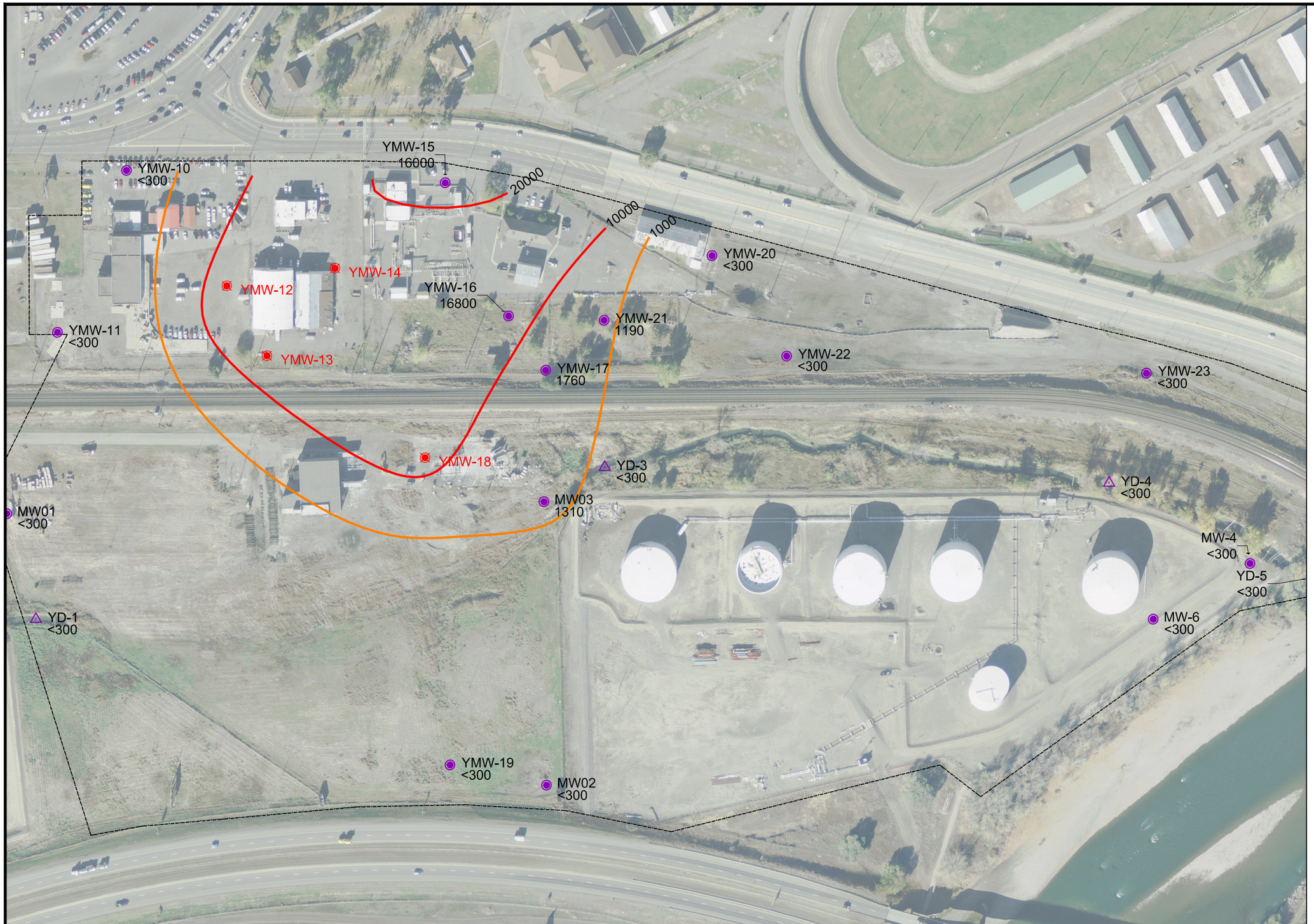


NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| ● YMW-11 | MONITORING WELL |
| <20 | SAMPLING RESULT |
| ● MW-1 | MONITORING WELL NOT SAMPLED |
| ● YMW-12 | MONITORING WELL NOT SAMPLED DUE TO PRESENCE OF PRODUCT |
| YD-1△ | SURFACE WATER MONITORING SITE |
| ▬ | ISOCONTOURS: Total Extractable Hydrocarbons DEQ-7 Human Health Standards & MDEQ Groundwater RBSL - 1000 µg/L |
| ▬ | Higher Concentration Iso-Contours |

NOTES:

1. All Results in Micrograms per Liter ( µg/L). (Parts per Billion)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
Interpreted from Analytical Results - Appendix
US Army Corps of Engineers Aerial Photo (2011)

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**2ND QUARTER GROUNDWATER & SURFACE WATER TOTAL EXTRACTABLE HYDROCARBONS CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B004
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-34**

UPDATE TIME: 10:58 AM
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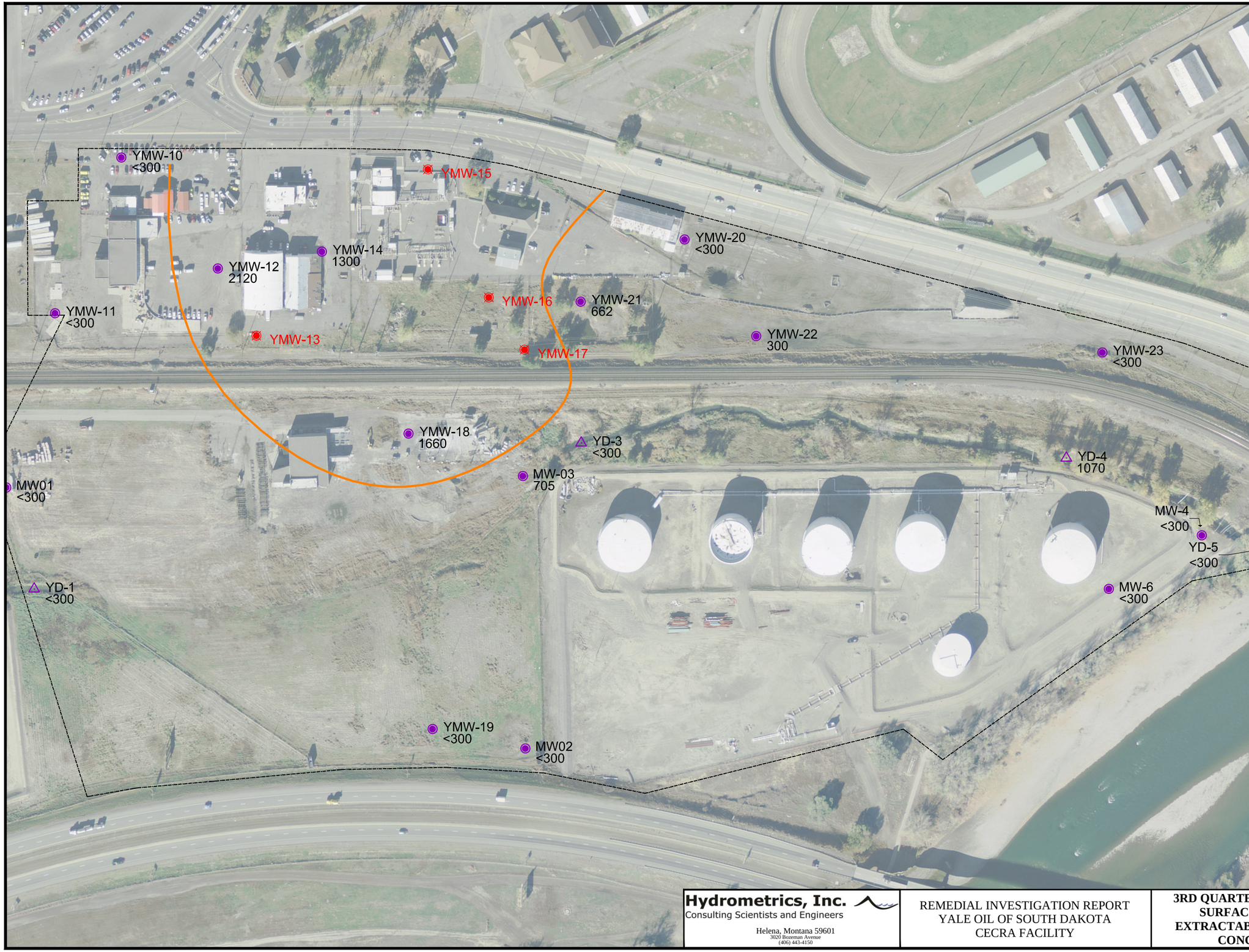


NORTH

SCALE
(In Feet)

100 0 100 200 300

(Approximate Only)

**LEGEND**

| | |
|---|---|
| — · — — | FACILITY BOUNDARY |
| ● YMW-11 | MONITORING WELL |
| <20 | SAMPLING RESULT |
| ● MW-1 | MONITORING WELL NOT SAMPLED |
| ● YMW-12 | MONITORING WELL NOT SAMPLED DUE TO PRESENCE OF PRODUCT |
| YD-1△ | SURFACE WATER MONITORING SITE |
| | ISOCONTOURS: Total Extractable Hydrocarbons DEQ-7 Human Health Standards & MDEQ Groundwater RBSL - 1000 µg/L |
| | Higher Concentration Iso-Contours |

NOTES:
1. All Results in Micrograms per Liter ( µg/L). (Parts per Billion)
2. MDEQ - Montana Department of Environmental Quality
3. RSL - Regional Screening Level
4. RBSL - Risk Based Screening Level
5. Dashed Lines Where Inferred
6. DEQ defines the facility as including any site or area where a hazardous or deleterious substance has been deposited, stored, disposed of, placed, or otherwise come to be located. CECRA further defines "hazardous or deleterious" substances as hazardous substances, hazardous wastes, or petroleum products that because of quantity, concentration, or physical, chemical, or infectious characteristics may pose an imminent and substantial threat to public health, safety, or welfare or the environment. MCA § 75-10-701(8). The facility will be further refined through completion of the RI.

SOURCE:
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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**3RD QUARTER GROUNDWATER & SURFACE WATER TOTAL EXTRACTABLE HYDROCARBONS CONCENTRATIONS**

DRAWING FILE NUMBER
1110813B004
AUTOCAD 2000 DRAWING (DWG)
FIGURE
**5-35**

UPDATE TIME: 3:23 PM
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# APPENDIX A

# GPS SAMPLE COORDINATES

# GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| 100-SB-A | 2230243 | 564685 | -108.47350 | 45.79402 |
| 100-SB-B | 2230243 | 564685 | -108.47350 | 45.79402 |
| 100-SB-C | 2230243 | 564685 | -108.47350 | 45.79402 |
| 100-SS-A | 2230278 | 564636 | -108.47336 | 45.79389 |
| 101-SB-A | 2230478 | 564777 | -108.47257 | 45.79427 |
| 101-SB-B | 2230478 | 564777 | -108.47257 | 45.79427 |
| 101-SB-C | 2230478 | 564777 | -108.47257 | 45.79427 |
| 101-SS-A | 2230480 | 564778 | -108.47256 | 45.79427 |
| 102-SB-A | 2228971 | 563495 | -108.47854 | 45.79080 |
| 102-SB-B | 2228971 | 563495 | -108.47854 | 45.79080 |
| 102-SB-C | 2228971 | 563495 | -108.47854 | 45.79080 |
| 102-SS-A | 2228971 | 563495 | -108.47854 | 45.79080 |
| 102-SS-B | 2228971 | 563495 | -108.47854 | 45.79080 |
| 102-SS-C | 2228971 | 563495 | -108.47854 | 45.79080 |
| 103-SB-A | 2229174 | 563640 | -108.47774 | 45.79119 |
| 103-SB-B | 2229174 | 563640 | -108.47774 | 45.79119 |
| 103-SB-C | 2229174 | 563640 | -108.47774 | 45.79119 |
| 103-SS-A | 2229174 | 563640 | -108.47774 | 45.79119 |
| 104-SB-A | 2229322 | 563741 | -108.47715 | 45.79146 |
| 104-SB-B | 2229322 | 563741 | -108.47715 | 45.79146 |
| 104-SB-C | 2229322 | 563741 | -108.47715 | 45.79146 |
| 104-SS-A | 2229322 | 563741 | -108.47715 | 45.79146 |
| 105-SB-A | 2229423 | 563812 | -108.47675 | 45.79165 |
| 105-SB-B | 2229423 | 563812 | -108.47675 | 45.79165 |
| 105-SB-C | 2229423 | 563812 | -108.47675 | 45.79165 |
| 105-SS-A | 2229423 | 563812 | -108.47675 | 45.79165 |
| 106-SB-A | 2229520 | 563882 | -108.47637 | 45.79185 |
| 106-SB-B | 2229520 | 563882 | -108.47637 | 45.79185 |
| 106-SB-C | 2229520 | 563882 | -108.47637 | 45.79185 |
| 106-SS-A | 2229524 | 563882 | -108.47635 | 45.79185 |
| 107-SB-A | 2229625 | 563953 | -108.47595 | 45.79204 |
| 107-SB-B | 2229625 | 563953 | -108.47595 | 45.79204 |
| 107-SB-C | 2229625 | 563953 | -108.47595 | 45.79204 |
| 107-SS-A | 2229625 | 563953 | -108.47595 | 45.79204 |
| 108-SB-A | 2229805 | 564026 | -108.47525 | 45.79223 |
| 108-SB-B | 2229805 | 564026 | -108.47525 | 45.79223 |
| 108-SB-C | 2229805 | 564026 | -108.47525 | 45.79223 |
| 108-SS-A | 2229822 | 564021 | -108.47518 | 45.79222 |
| 109-SB-A | 2229997 | 564179 | -108.47449 | 45.79264 |
| 109-SB-B | 2229997 | 564179 | -108.47449 | 45.79264 |
| 109-SB-C | 2229997 | 564179 | -108.47449 | 45.79264 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| 109-SS-A | 2230005 | 564182 | -108.47446 | 45.79265 |
| 10-SB-A | 2228266 | 564354 | -108.48127 | 45.79318 |
| 10-SB-B | 2228266 | 564354 | -108.48127 | 45.79318 |
| 10-SB-C | 2228266 | 564354 | -108.48127 | 45.79318 |
| 10-SS-A | 2228277 | 564366 | -108.48122 | 45.79322 |
| 10-SS-B | 2228277 | 564366 | -108.48122 | 45.79322 |
| 10-SS-C | 2228277 | 564366 | -108.48122 | 45.79322 |
| 11-SB-A | 2228383 | 564437 | -108.48080 | 45.79341 |
| 11-SB-B | 2228383 | 564437 | -108.48080 | 45.79341 |
| 11-SS-A | 2228383 | 564437 | -108.48080 | 45.79341 |
| 12-SB-A | 2228484 | 564498 | -108.48040 | 45.79357 |
| 12-SB-B | 2228484 | 564498 | -108.48040 | 45.79357 |
| 12-SB-C | 2228484 | 564498 | -108.48040 | 45.79357 |
| 12-SS-A | 2228484 | 564500 | -108.48040 | 45.79358 |
| 12-SS-B | 2228484 | 564500 | -108.48040 | 45.79358 |
| 12-SS-C | 2228484 | 564500 | -108.48040 | 45.79358 |
| 13-SB-A | 2228585 | 564579 | -108.48000 | 45.79379 |
| 13-SB-B | 2228585 | 564579 | -108.48000 | 45.79379 |
| 13-SB-C | 2228585 | 564579 | -108.48000 | 45.79379 |
| 13-SS-A | 2228585 | 564579 | -108.48000 | 45.79379 |
| 14-SB-A | 2228686 | 564650 | -108.47960 | 45.79398 |
| 14-SB-B | 2228686 | 564650 | -108.47960 | 45.79398 |
| 14-SB-C | 2228686 | 564650 | -108.47960 | 45.79398 |
| 14-SS-A | 2228686 | 564650 | -108.47960 | 45.79398 |
| 15-SB-A | 2228787 | 564721 | -108.47920 | 45.79417 |
| 15-SB-B | 2228787 | 564721 | -108.47920 | 45.79417 |
| 15-SB-C | 2228787 | 564721 | -108.47920 | 45.79417 |
| 15-SS-A | 2228787 | 564721 | -108.47920 | 45.79417 |
| 16-SB-A | 2228888 | 564792 | -108.47881 | 45.79436 |
| 16-SB-B | 2228888 | 564792 | -108.47881 | 45.79436 |
| 16-SB-C | 2228888 | 564792 | -108.47881 | 45.79436 |
| 16-SS-A | 2228888 | 564792 | -108.47881 | 45.79436 |
| 17-SB-A | 2228989 | 564881 | -108.47840 | 45.79460 |
| 17-SB-B | 2228989 | 564881 | -108.47840 | 45.79460 |
| 17-SB-C | 2228989 | 564881 | -108.47840 | 45.79460 |
| 17-SS-A | 2228989 | 564863 | -108.47841 | 45.79455 |
| 18-SB-A | 2229114 | 564934 | -108.47791 | 45.79474 |
| 18-SB-B | 2229114 | 564934 | -108.47791 | 45.79474 |
| 18-SB-C | 2229114 | 564934 | -108.47791 | 45.79474 |
| 18-SS-A | 2229089 | 564934 | -108.47801 | 45.79475 |
| 19-SB-A | 2229170 | 565005 | -108.47768 | 45.79494 |
| 19-SB-B | 2228756 | 564550 | -108.47933 | 45.79370 |
| 19-SB-C | 2228756 | 564550 | -108.47933 | 45.79370 |
| 19-SS-A | 2229190 | 565005 | -108.47761 | 45.79494 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| 1-SB-A | 2228210 | 564469 | -108.48148 | 45.79350 |
| 1-SB-B | 2228210 | 564469 | -108.48148 | 45.79350 |
| 1-SB-C | 2228210 | 564469 | -108.48148 | 45.79350 |
| 1-SS-A | 2228210 | 564469 | -108.48148 | 45.79350 |
| 1-ST-A | 2228586 | 564293 | -108.48001 | 45.79301 |
| 20-SB-A | 2228252 | 564194 | -108.48133 | 45.79274 |
| 20-SB-B | 2228252 | 564194 | -108.48133 | 45.79274 |
| 20-SB-C | 2228252 | 564194 | -108.48133 | 45.79274 |
| 20-SS-A | 2228252 | 564194 | -108.48133 | 45.79274 |
| 20-SS-B | 2228252 | 564194 | -108.48133 | 45.79274 |
| 20-SS-C | 2228252 | 564194 | -108.48133 | 45.79274 |
| 21-SB-A | 2228351 | 564257 | -108.48094 | 45.79291 |
| 21-SB-B | 2228351 | 564257 | -108.48094 | 45.79291 |
| 21-SB-C | 2228351 | 564257 | -108.48094 | 45.79291 |
| 21-SS-A | 2228351 | 564257 | -108.48094 | 45.79291 |
| 21-SS-B | 2228351 | 564257 | -108.48094 | 45.79291 |
| 21-SS-C | 2228351 | 564257 | -108.48094 | 45.79291 |
| 22-SB-A | 2228452 | 564337 | -108.48054 | 45.79313 |
| 22-SB-B | 2228452 | 564337 | -108.48054 | 45.79313 |
| 22-SB-C | 2228452 | 564337 | -108.48054 | 45.79313 |
| 22-SS-A | 2228452 | 564337 | -108.48054 | 45.79313 |
| 22-SS-B | 2228452 | 564337 | -108.48054 | 45.79313 |
| 22-SS-C | 2228452 | 564337 | -108.48054 | 45.79313 |
| 23-SB-A | 2228553 | 564408 | -108.48013 | 45.79332 |
| 23-SB-B | 2228553 | 564408 | -108.48013 | 45.79332 |
| 23-SB-C | 2228553 | 564408 | -108.48013 | 45.79332 |
| 23-SS-A | 2228553 | 564408 | -108.48013 | 45.79332 |
| 25-SB-A | 2228756 | 564550 | -108.47933 | 45.79370 |
| 25-SB-B | 2228756 | 564550 | -108.47933 | 45.79370 |
| 25-SB-C | 2228756 | 564550 | -108.47933 | 45.79370 |
| 25-SS-A | 2228756 | 564550 | -108.47933 | 45.79370 |
| 25-SS-B | 2228756 | 564550 | -108.47933 | 45.79370 |
| 25-SS-C | 2228756 | 564550 | -108.47933 | 45.79370 |
| 26-SB-A | 2228857 | 564621 | -108.47893 | 45.79389 |
| 26-SB-B | 2228857 | 564621 | -108.47893 | 45.79389 |
| 26-SB-C | 2228857 | 564621 | -108.47893 | 45.79389 |
| 26-SS-A | 2228857 | 564621 | -108.47893 | 45.79389 |
| 26-SS-B | 2228857 | 564621 | -108.47893 | 45.79389 |
| 26-SS-C | 2228857 | 564621 | -108.47893 | 45.79389 |
| 27-SB-A | 2228958 | 564679 | -108.47854 | 45.79405 |
| 27-SB-B | 2228958 | 564679 | -108.47854 | 45.79405 |
| 27-SB-C | 2228958 | 564612 | -108.47854 | 45.79387 |
| 27-SS-A | 2228958 | 564676 | -108.47854 | 45.79404 |
| 28-SB-A | 2229059 | 564744 | -108.47814 | 45.79423 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| 28-SB-B | 2229059 | 564744 | -108.47814 | 45.79423 |
| 28-SB-C | 2229059 | 564744 | -108.47814 | 45.79423 |
| 28-SS-A | 2229059 | 564747 | -108.47814 | 45.79423 |
| 28-SS-B | 2229059 | 564747 | -108.47814 | 45.79423 |
| 28-SS-C | 2229059 | 564747 | -108.47814 | 45.79423 |
| 29-SB-A | 2229179 | 564814 | -108.47766 | 45.79441 |
| 29-SB-B | 2229179 | 564814 | -108.47766 | 45.79441 |
| 29-SB-C | 2229179 | 564814 | -108.47766 | 45.79441 |
| 29-SS-A | 2229160 | 564833 | -108.47773 | 45.79447 |
| 29-SS-B | 2229160 | 564833 | -108.47773 | 45.79447 |
| 29-SS-C | 2229160 | 564833 | -108.47773 | 45.79447 |
| 2-SB-A | 2228311 | 564540 | -108.48108 | 45.79369 |
| 2-SB-B | 2228311 | 564540 | -108.48108 | 45.79369 |
| 2-SB-C | 2228311 | 564540 | -108.48108 | 45.79369 |
| 2-SS-A | 2228311 | 564540 | -108.48108 | 45.79369 |
| 2-SS-B | 2228311 | 564540 | -108.48108 | 45.79369 |
| 2-SS-C | 2228311 | 564540 | -108.48108 | 45.79369 |
| 2-ST-A | 2228984 | 564577 | -108.47844 | 45.79377 |
| 30-SB-A | 2229261 | 564904 | -108.47733 | 45.79466 |
| 30-SB-B | 2229261 | 564904 | -108.47733 | 45.79466 |
| 30-SB-C | 2229261 | 564904 | -108.47733 | 45.79466 |
| 30-SS-A | 2229261 | 564904 | -108.47733 | 45.79466 |
| 31-SB-A | 2229362 | 564955 | -108.47693 | 45.79479 |
| 31-SB-B | 2229362 | 564955 | -108.47693 | 45.79479 |
| 31-SB-C | 2229362 | 564955 | -108.47693 | 45.79479 |
| 31-SS-A | 2229362 | 564975 | -108.47693 | 45.79485 |
| 31-SS-B | 2229362 | 564975 | -108.47693 | 45.79485 |
| 31-SS-C | 2229362 | 564975 | -108.47693 | 45.79485 |
| 32-SB-A | 2229464 | 565021 | -108.47653 | 45.79497 |
| 32-SB-B | 2229464 | 565055 | -108.47653 | 45.79507 |
| 32-SB-C | 2229464 | 565055 | -108.47653 | 45.79507 |
| 32-SS-A | 2229464 | 565045 | -108.47653 | 45.79504 |
| 33-SB-A | 2229565 | 565106 | -108.47613 | 45.79520 |
| 33-SB-B | 2229565 | 565106 | -108.47613 | 45.79520 |
| 33-SB-C | 2229565 | 565106 | -108.47613 | 45.79520 |
| 33-SS-A | 2229565 | 565106 | -108.47613 | 45.79520 |
| 34-SB-A | 2229666 | 565167 | -108.47573 | 45.79536 |
| 34-SB-B | 2229666 | 565167 | -108.47573 | 45.79536 |
| 34-SB-C | 2229666 | 565167 | -108.47573 | 45.79536 |
| 34-SS-A | 2229666 | 565187 | -108.47573 | 45.79542 |
| 35-SB-A | 2229767 | 565266 | -108.47533 | 45.79563 |
| 35-SB-B | 2229767 | 565266 | -108.47533 | 45.79563 |
| 35-SB-C | 2229767 | 565266 | -108.47533 | 45.79563 |
| 35-SS-A | 2229767 | 565258 | -108.47533 | 45.79561 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| 36-SB-A | 2228422 | 564165 | -108.48066 | 45.79266 |
| 36-SB-B | 2228422 | 564165 | -108.48066 | 45.79266 |
| 36-SB-C | 2228422 | 564165 | -108.48066 | 45.79266 |
| 36-SS-A | 2228422 | 564165 | -108.48066 | 45.79266 |
| 36-SS-B | 2228422 | 564165 | -108.48066 | 45.79266 |
| 36-SS-C | 2228422 | 564165 | -108.48066 | 45.79266 |
| 37-SB-A | 2228523 | 564236 | -108.48026 | 45.79285 |
| 37-SB-B | 2228523 | 564236 | -108.48026 | 45.79285 |
| 37-SB-C | 2228523 | 564236 | -108.48026 | 45.79285 |
| 37-SS-A | 2228523 | 564236 | -108.48026 | 45.79285 |
| 38-SB-A | 2228624 | 564307 | -108.47986 | 45.79304 |
| 38-SB-B | 2228624 | 564307 | -108.47986 | 45.79304 |
| 38-SB-C | 2228624 | 564307 | -108.47986 | 45.79304 |
| 38-SS-A | 2228624 | 564307 | -108.47986 | 45.79304 |
| 38-SS-B | 2228624 | 564307 | -108.47986 | 45.79304 |
| 38-SS-C | 2228624 | 564307 | -108.47986 | 45.79304 |
| 39-SB-A | 2228730 | 564378 | -108.47944 | 45.79323 |
| 39-SB-B | 2228730 | 564378 | -108.47944 | 45.79323 |
| 39-SB-C | 2228730 | 564378 | -108.47944 | 45.79323 |
| 39-SS-A | 2228725 | 564373 | -108.47946 | 45.79322 |
| 3-SB-A | 2228412 | 564610 | -108.48068 | 45.79388 |
| 3-SB-B | 2228412 | 564610 | -108.48068 | 45.79388 |
| 3-SB-C | 2228412 | 564610 | -108.48068 | 45.79388 |
| 3-SS-A | 2228412 | 564610 | -108.48068 | 45.79388 |
| 3-ST-A | 2228916 | 564533 | -108.47871 | 45.79365 |
| 3-ST-B | 2228916 | 564533 | -108.47871 | 45.79365 |
| 40-SB-A | 2228826 | 564449 | -108.47906 | 45.79342 |
| 40-SB-B | 2228826 | 564449 | -108.47906 | 45.79342 |
| 40-SB-C | 2228826 | 564449 | -108.47906 | 45.79342 |
| 40-SS-A | 2228826 | 564449 | -108.47906 | 45.79342 |
| 40-SS-B | 2228826 | 564449 | -108.47906 | 45.79342 |
| 40-SS-C | 2228826 | 564449 | -108.47906 | 45.79342 |
| 41-SB-A | 2228928 | 564519 | -108.47866 | 45.79361 |
| 41-SB-B | 2228928 | 564519 | -108.47866 | 45.79361 |
| 41-SB-C | 2228928 | 564519 | -108.47866 | 45.79361 |
| 41-SS-A | 2228928 | 564519 | -108.47866 | 45.79361 |
| 42-SB-A | 2229029 | 564590 | -108.47826 | 45.79380 |
| 42-SB-B | 2229029 | 564590 | -108.47826 | 45.79380 |
| 42-SB-C | 2229029 | 564590 | -108.47826 | 45.79380 |
| 42-SS-A | 2229029 | 564590 | -108.47826 | 45.79380 |
| 42-SS-B | 2229029 | 564590 | -108.47826 | 45.79380 |
| 42-SS-C | 2229029 | 564590 | -108.47826 | 45.79380 |
| 43-SB-A | 2229130 | 564661 | -108.47786 | 45.79400 |
| 43-SB-B | 2229130 | 564661 | -108.47786 | 45.79400 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| 43-SB-C | 2229130 | 564661 | -108.47786 | 45.79400 |
| 43-SS-A | 2229130 | 564661 | -108.47786 | 45.79400 |
| 43-SS-B | 2229130 | 564661 | -108.47786 | 45.79400 |
| 43-SS-C | 2229130 | 564661 | -108.47786 | 45.79400 |
| 44-SB-A | 2229231 | 564732 | -108.47746 | 45.79419 |
| 44-SB-B | 2229231 | 564732 | -108.47746 | 45.79419 |
| 44-SB-C | 2229231 | 564732 | -108.47746 | 45.79419 |
| 44-SS-A | 2229231 | 564732 | -108.47746 | 45.79419 |
| 44-SS-B | 2229231 | 564732 | -108.47746 | 45.79419 |
| 44-SS-C | 2229231 | 564732 | -108.47746 | 45.79419 |
| 45-SB-A | 2229326 | 564809 | -108.47709 | 45.79439 |
| 45-SB-B | 2229332 | 564803 | -108.47706 | 45.79438 |
| 45-SB-C | 2229332 | 564803 | -108.47706 | 45.79438 |
| 45-SS-A | 2229332 | 564803 | -108.47706 | 45.79438 |
| 45-SS-B | 2229332 | 564803 | -108.47706 | 45.79438 |
| 45-SS-C | 2229332 | 564803 | -108.47706 | 45.79438 |
| 46-SB-A | 2229332 | 564803 | -108.47706 | 45.79438 |
| 46-SB-B | 2229332 | 564803 | -108.47706 | 45.79438 |
| 46-SB-C | 2229332 | 564803 | -108.47706 | 45.79438 |
| 46-SS-A | 2229433 | 564873 | -108.47666 | 45.79457 |
| 46-SS-B | 2229433 | 564873 | -108.47666 | 45.79457 |
| 46-SS-C | 2229433 | 564873 | -108.47666 | 45.79457 |
| 47-SB-A | 2229534 | 564944 | -108.47626 | 45.79476 |
| 47-SB-B | 2229534 | 564944 | -108.47626 | 45.79476 |
| 47-SB-C | 2229534 | 564944 | -108.47626 | 45.79476 |
| 47-SS-A | 2229534 | 564944 | -108.47626 | 45.79476 |
| 47-SS-B | 2229534 | 564944 | -108.47626 | 45.79476 |
| 47-SS-C | 2229534 | 564944 | -108.47626 | 45.79476 |
| 48-SB-A | 2229635 | 565015 | -108.47586 | 45.79495 |
| 48-SB-B | 2229635 | 565015 | -108.47586 | 45.79495 |
| 48-SB-C | 2229635 | 565015 | -108.47586 | 45.79495 |
| 48-SS-A | 2229635 | 565015 | -108.47586 | 45.79495 |
| 49-SB-A | 2229737 | 565086 | -108.47546 | 45.79514 |
| 49-SB-B | 2229737 | 565086 | -108.47546 | 45.79514 |
| 49-SB-C | 2229737 | 565086 | -108.47546 | 45.79514 |
| 49-SS-A | 2229737 | 565086 | -108.47546 | 45.79514 |
| 4-SB-A | 2228513 | 564681 | -108.48028 | 45.79407 |
| 4-SB-B | 2228513 | 564681 | -108.48028 | 45.79407 |
| 4-SS-A | 2228513 | 564681 | -108.48028 | 45.79407 |
| 4-ST-A | 2229171 | 564713 | -108.47770 | 45.79414 |
| 50-SB-A | 2229838 | 565157 | -108.47506 | 45.79533 |
| 50-SB-B | 2229838 | 565157 | -108.47506 | 45.79533 |
| 50-SB-C | 2229838 | 565157 | -108.47506 | 45.79533 |
| 50-SS-A | 2229838 | 565157 | -108.47506 | 45.79533 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| 51-SB-A | 2229939 | 565227 | -108.47466 | 45.79552 |
| 51-SB-B | 2229939 | 565227 | -108.47466 | 45.79552 |
| 51-SB-C | 2229939 | 565227 | -108.47466 | 45.79552 |
| 51-SS-A | 2229939 | 565227 | -108.47466 | 45.79552 |
| 52-SB-A | 2228579 | 564049 | -108.48005 | 45.79234 |
| 52-SB-B | 2228579 | 564049 | -108.48005 | 45.79234 |
| 52-SB-C | 2228579 | 564049 | -108.48005 | 45.79234 |
| 52-SS-A | 2228579 | 564049 | -108.48005 | 45.79234 |
| 53-SB-A | 2228695 | 564206 | -108.47959 | 45.79276 |
| 53-SB-B | 2228695 | 564206 | -108.47959 | 45.79276 |
| 53-SB-C | 2228695 | 564206 | -108.47959 | 45.79276 |
| 53-SS-A | 2228695 | 564206 | -108.47959 | 45.79276 |
| 54-SB-A | 2228796 | 564277 | -108.47919 | 45.79295 |
| 54-SB-B | 2228796 | 564277 | -108.47919 | 45.79295 |
| 54-SB-C | 2228796 | 564277 | -108.47919 | 45.79295 |
| 54-SS-A | 2228796 | 564263 | -108.47919 | 45.79291 |
| 54-SS-B | 2228796 | 564263 | -108.47919 | 45.79291 |
| 54-SS-C | 2228796 | 564263 | -108.47919 | 45.79291 |
| 55-SB-A | 2228897 | 564355 | -108.47879 | 45.79316 |
| 55-SB-B | 2228897 | 564355 | -108.47879 | 45.79316 |
| 55-SB-C | 2228897 | 564355 | -108.47879 | 45.79316 |
| 55-SS-A | 2228897 | 564355 | -108.47879 | 45.79316 |
| 56-SB-A | 2228998 | 564418 | -108.47839 | 45.79333 |
| 56-SB-B | 2228998 | 564418 | -108.47839 | 45.79333 |
| 56-SB-C | 2228998 | 564418 | -108.47839 | 45.79333 |
| 56-SS-A | 2228998 | 564403 | -108.47839 | 45.79329 |
| 56-SS-B | 2228998 | 564403 | -108.47839 | 45.79329 |
| 56-SS-C | 2228998 | 564403 | -108.47839 | 45.79329 |
| 57-SB-A | 2229096 | 564489 | -108.47801 | 45.79352 |
| 57-SB-B | 2229096 | 564489 | -108.47801 | 45.79352 |
| 57-SB-C | 2229096 | 564489 | -108.47801 | 45.79352 |
| 57-SS-A | 2229096 | 564489 | -108.47801 | 45.79352 |
| 58-SB-A | 2229201 | 564550 | -108.47759 | 45.79369 |
| 58-SB-B | 2229201 | 564560 | -108.47759 | 45.79372 |
| 58-SB-C | 2229201 | 564560 | -108.47759 | 45.79372 |
| 58-SS-A | 2229201 | 564556 | -108.47759 | 45.79370 |
| 58-SS-B | 2229201 | 564556 | -108.47759 | 45.79370 |
| 58-SS-C | 2229201 | 564556 | -108.47759 | 45.79370 |
| 59-SB-A | 2228766 | 564105 | -108.47932 | 45.79248 |
| 59-SB-B | 2228766 | 564105 | -108.47932 | 45.79248 |
| 59-SB-C | 2228766 | 564105 | -108.47932 | 45.79248 |
| 59-SS-A | 2228766 | 564105 | -108.47932 | 45.79248 |
| 5-SB-A | 2228614 | 564752 | -108.47988 | 45.79426 |
| 5-SB-B | 2228614 | 564752 | -108.47988 | 45.79426 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| 5-SB-C | 2228614 | 564752 | -108.47988 | 45.79426 |
| 5-SS-A | 2228614 | 564752 | -108.47988 | 45.79426 |
| 5-ST-A | 2229121 | 564677 | -108.47790 | 45.79404 |
| 60-SB-A | 2228867 | 564176 | -108.47892 | 45.79267 |
| 60-SB-B | 2228867 | 564176 | -108.47892 | 45.79267 |
| 60-SB-C | 2228867 | 564176 | -108.47892 | 45.79267 |
| 60-SS-A | 2228867 | 564176 | -108.47892 | 45.79267 |
| 61-SB-A | 2228968 | 564246 | -108.47852 | 45.79286 |
| 61-SB-B | 2228968 | 564246 | -108.47852 | 45.79286 |
| 61-SB-C | 2228968 | 564246 | -108.47852 | 45.79286 |
| 61-SS-A | 2228968 | 564246 | -108.47852 | 45.79286 |
| 61-SS-B | 2228968 | 564246 | -108.47852 | 45.79286 |
| 61-SS-C | 2228968 | 564246 | -108.47852 | 45.79286 |
| 62-SB-A | 2229069 | 564317 | -108.47812 | 45.79305 |
| 62-SB-B | 2229069 | 564317 | -108.47812 | 45.79305 |
| 62-SB-C | 2229069 | 564317 | -108.47812 | 45.79305 |
| 62-SS-A | 2229069 | 564317 | -108.47812 | 45.79305 |
| 63-SB-A | 2229170 | 564388 | -108.47772 | 45.79324 |
| 63-SB-B | 2229170 | 564388 | -108.47772 | 45.79324 |
| 63-SB-C | 2229170 | 564388 | -108.47772 | 45.79324 |
| 63-SS-A | 2229170 | 564388 | -108.47772 | 45.79324 |
| 64-SB-A | 2229271 | 564455 | -108.47732 | 45.79342 |
| 64-SB-B | 2229271 | 564455 | -108.47732 | 45.79342 |
| 64-SB-C | 2229271 | 564455 | -108.47732 | 45.79342 |
| 64-SS-A | 2229271 | 564455 | -108.47732 | 45.79342 |
| 65-SB-A | 2229388 | 564616 | -108.47685 | 45.79386 |
| 65-SB-B | 2229388 | 564616 | -108.47685 | 45.79386 |
| 65-SB-C | 2229388 | 564616 | -108.47685 | 45.79386 |
| 65-SS-A | 2229388 | 564616 | -108.47685 | 45.79386 |
| 65-SS-B | 2229388 | 564616 | -108.47685 | 45.79386 |
| 65-SS-C | 2229388 | 564616 | -108.47685 | 45.79386 |
| 66-SB-A | 2229590 | 564857 | -108.47605 | 45.79452 |
| 66-SB-B | 2229590 | 564857 | -108.47605 | 45.79452 |
| 66-SB-C | 2229590 | 564857 | -108.47605 | 45.79452 |
| 66-SS-A | 2229590 | 564757 | -108.47605 | 45.79424 |
| 67-SB-A | 2229792 | 564929 | -108.47525 | 45.79471 |
| 67-SB-B | 2229792 | 564929 | -108.47525 | 45.79471 |
| 67-SB-C | 2229792 | 564929 | -108.47525 | 45.79471 |
| 67-SS-A | 2229792 | 564899 | -108.47525 | 45.79462 |
| 67-SS-B | 2229792 | 564899 | -108.47525 | 45.79462 |
| 67-SS-C | 2229792 | 564899 | -108.47525 | 45.79462 |
| 68-SB-A | 2229994 | 565040 | -108.47445 | 45.79500 |
| 68-SB-B | 2229994 | 565040 | -108.47445 | 45.79500 |
| 68-SB-C | 2229994 | 565040 | -108.47445 | 45.79500 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| 68-SS-A | 2229994 | 565040 | -108.47445 | 45.79500 |
| 69-SB-A | 2230197 | 565192 | -108.47365 | 45.79541 |
| 69-SB-B | 2230197 | 565192 | -108.47365 | 45.79541 |
| 69-SB-C | 2230197 | 565192 | -108.47365 | 45.79541 |
| 69-SS-A | 2230197 | 565182 | -108.47365 | 45.79539 |
| 69-SS-B | 2230197 | 565182 | -108.47365 | 45.79539 |
| 69-SS-C | 2230197 | 565182 | -108.47365 | 45.79539 |
| 6-SB-A | 2228705 | 564833 | -108.47952 | 45.79448 |
| 6-SB-B | 2228705 | 564833 | -108.47952 | 45.79448 |
| 6-SB-C | 2228705 | 564833 | -108.47952 | 45.79448 |
| 6-SS-A | 2228715 | 564823 | -108.47948 | 45.79445 |
| 70N-SS-A | 2230399 | 565334 | -108.47285 | 45.79579 |
| 70-SB-A | 2230422 | 565310 | -108.47276 | 45.79573 |
| 70-SB-B | 2230422 | 565310 | -108.47276 | 45.79573 |
| 70-SB-C | 2230422 | 565310 | -108.47276 | 45.79573 |
| 70-SS-A | 2230399 | 565324 | -108.47285 | 45.79577 |
| 71-SB-A | 2228720 | 563847 | -108.47951 | 45.79178 |
| 71-SB-B | 2228720 | 563847 | -108.47951 | 45.79178 |
| 71-SB-C | 2228720 | 563847 | -108.47951 | 45.79178 |
| 71-SS-A | 2228720 | 563847 | -108.47951 | 45.79178 |
| 71-SS-B | 2228720 | 563847 | -108.47951 | 45.79178 |
| 71-SS-C | 2228720 | 563847 | -108.47951 | 45.79178 |
| 72-SB-A | 2228923 | 563989 | -108.47871 | 45.79216 |
| 72-SB-B | 2228923 | 563989 | -108.47871 | 45.79216 |
| 72-SB-C | 2228923 | 563989 | -108.47871 | 45.79216 |
| 72-SS-A | 2228923 | 563989 | -108.47871 | 45.79216 |
| 73-SB-A | 2229039 | 564145 | -108.47824 | 45.79258 |
| 73-SB-B | 2229039 | 564145 | -108.47824 | 45.79258 |
| 73-SB-C | 2229039 | 564145 | -108.47824 | 45.79258 |
| 73-SS-A | 2229039 | 564145 | -108.47824 | 45.79258 |
| 74-SB-A | 2229140 | 564191 | -108.47785 | 45.79271 |
| 74-SB-B | 2229140 | 564191 | -108.47785 | 45.79271 |
| 74-SB-C | 2229140 | 564191 | -108.47785 | 45.79271 |
| 74-SS-A | 2229140 | 564216 | -108.47784 | 45.79277 |
| 75-SB-A | 2229229 | 564287 | -108.47749 | 45.79297 |
| 75-SB-B | 2229229 | 564287 | -108.47749 | 45.79297 |
| 75-SB-C | 2229229 | 564287 | -108.47749 | 45.79297 |
| 75-SS-A | 2229247 | 564287 | -108.47742 | 45.79296 |
| 75-SS-B | 2229247 | 564287 | -108.47742 | 45.79296 |
| 75-SS-C | 2229247 | 564287 | -108.47742 | 45.79296 |
| 76-SB-A | 2229356 | 564344 | -108.47699 | 45.79312 |
| 76-SB-B | 2229356 | 564344 | -108.47699 | 45.79312 |
| 76-SB-C | 2229356 | 564344 | -108.47699 | 45.79312 |
| 76-SS-A | 2229342 | 564358 | -108.47704 | 45.79316 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| 77-SB-A | 2229110 | 564044 | -108.47797 | 45.79230 |
| 77-SB-B | 2229110 | 564044 | -108.47797 | 45.79230 |
| 77-SB-C | 2229110 | 564044 | -108.47797 | 45.79230 |
| 77-SS-A | 2229110 | 564044 | -108.47797 | 45.79230 |
| 77-SS-B | 2229110 | 564044 | -108.47797 | 45.79230 |
| 77-SS-C | 2229110 | 564044 | -108.47797 | 45.79230 |
| 78-SB-A | 2229211 | 564115 | -108.47757 | 45.79249 |
| 78-SB-B | 2229211 | 564115 | -108.47757 | 45.79249 |
| 78-SB-C | 2229211 | 564115 | -108.47757 | 45.79249 |
| 78-SS-A | 2229211 | 564115 | -108.47757 | 45.79249 |
| 79-SB-B | 2229312 | 564164 | -108.47717 | 45.79262 |
| 79-SB-C | 2229312 | 564164 | -108.47717 | 45.79262 |
| 79-SS-A | 2229312 | 564186 | -108.47717 | 45.79269 |
| 7-SB-A | 2228816 | 564894 | -108.47908 | 45.79464 |
| 7-SB-B | 2228816 | 564894 | -108.47908 | 45.79464 |
| 7-SB-C | 2228816 | 564894 | -108.47908 | 45.79464 |
| 7-SS-A | 2228816 | 564894 | -108.47908 | 45.79464 |
| 80-SB-A | 2229413 | 564257 | -108.47677 | 45.79288 |
| 80-SB-B | 2229413 | 564257 | -108.47677 | 45.79288 |
| 80-SB-C | 2229413 | 564257 | -108.47677 | 45.79288 |
| 80-SS-A | 2229413 | 564257 | -108.47677 | 45.79288 |
| 81-SB-A | 2229513 | 564413 | -108.47637 | 45.79330 |
| 81-SB-B | 2229513 | 564413 | -108.47637 | 45.79330 |
| 81-SB-C | 2229513 | 564413 | -108.47637 | 45.79330 |
| 81-SS-A | 2229513 | 564413 | -108.47637 | 45.79330 |
| 82-SB-A | 2229723 | 564549 | -108.47554 | 45.79367 |
| 82-SB-B | 2229723 | 564549 | -108.47554 | 45.79367 |
| 82-SB-C | 2229723 | 564549 | -108.47554 | 45.79367 |
| 82-SS-A | 2229740 | 564555 | -108.47548 | 45.79368 |
| 82-SS-B | 2229740 | 564555 | -108.47548 | 45.79368 |
| 82-SS-C | 2229740 | 564555 | -108.47548 | 45.79368 |
| 83-SB-A | 2229995 | 564740 | -108.47446 | 45.79418 |
| 83-SB-B | 2229995 | 564740 | -108.47446 | 45.79418 |
| 83-SB-C | 2229995 | 564740 | -108.47446 | 45.79418 |
| 83-SS-A | 2229934 | 564696 | -108.47471 | 45.79406 |
| 84-SB-A | 2230161 | 564855 | -108.47381 | 45.79449 |
| 84-SB-B | 2230161 | 564855 | -108.47381 | 45.79449 |
| 84-SB-C | 2230161 | 564855 | -108.47381 | 45.79449 |
| 84-SS-A | 2230146 | 564838 | -108.47387 | 45.79444 |
| 84-SS-B | 2230146 | 564838 | -108.47387 | 45.79444 |
| 84-SS-C | 2230146 | 564838 | -108.47387 | 45.79444 |
| 85-SB-A | 2230297 | 564951 | -108.47327 | 45.79475 |
| 85-SB-B | 2230297 | 564951 | -108.47327 | 45.79475 |
| 85-SB-C | 2230297 | 564951 | -108.47327 | 45.79475 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| 85-SS-A | 2230338 | 564980 | -108.47311 | 45.79483 |
| 86-SB-A | 2230541 | 565136 | -108.47231 | 45.79525 |
| 86-SB-B | 2230541 | 565136 | -108.47231 | 45.79525 |
| 86-SB-C | 2230541 | 565136 | -108.47231 | 45.79525 |
| 86-SS-A | 2230541 | 565136 | -108.47231 | 45.79525 |
| 87-SB-A | 2228862 | 563645 | -108.47896 | 45.79122 |
| 87-SB-B | 2228862 | 563645 | -108.47896 | 45.79122 |
| 87-SB-C | 2228862 | 563645 | -108.47896 | 45.79122 |
| 87-SS-A | 2228862 | 563645 | -108.47896 | 45.79122 |
| 88-SB-A | 2229064 | 563786 | -108.47816 | 45.79160 |
| 88-SB-B | 2229064 | 563786 | -108.47816 | 45.79160 |
| 88-SB-C | 2229064 | 563786 | -108.47816 | 45.79160 |
| 88-SS-A | 2229064 | 563786 | -108.47816 | 45.79160 |
| 89-SB-A | 2229181 | 563943 | -108.47770 | 45.79202 |
| 89-SB-B | 2229181 | 563943 | -108.47770 | 45.79202 |
| 89-SB-C | 2229181 | 563943 | -108.47770 | 45.79202 |
| 89-SS-A | 2229181 | 563943 | -108.47770 | 45.79202 |
| 8-SB-A | 2228917 | 564964 | -108.47868 | 45.79484 |
| 8-SB-B | 2228917 | 564964 | -108.47868 | 45.79484 |
| 8-SB-C | 2228917 | 564964 | -108.47868 | 45.79484 |
| 8-SS-A | 2228917 | 564964 | -108.47868 | 45.79484 |
| 90-SB-A | 2229282 | 564014 | -108.47730 | 45.79221 |
| 90-SB-B | 2229282 | 564014 | -108.47730 | 45.79221 |
| 90-SB-C | 2229282 | 564014 | -108.47730 | 45.79221 |
| 90-SS-A | 2229282 | 564014 | -108.47730 | 45.79221 |
| 91-SB-A | 2229383 | 564085 | -108.47690 | 45.79241 |
| 91-SB-B | 2229383 | 564085 | -108.47690 | 45.79241 |
| 91-SB-C | 2229383 | 564085 | -108.47690 | 45.79241 |
| 91-SS-A | 2229383 | 564085 | -108.47690 | 45.79241 |
| 91-SS-B | 2229383 | 564085 | -108.47690 | 45.79241 |
| 91-SS-C | 2229383 | 564085 | -108.47690 | 45.79241 |
| 92-SB-A | 2229484 | 564155 | -108.47650 | 45.79260 |
| 92-SB-B | 2229484 | 564155 | -108.47650 | 45.79260 |
| 92-SB-C | 2229484 | 564155 | -108.47650 | 45.79260 |
| 92-SS-A | 2229484 | 564155 | -108.47650 | 45.79260 |
| 93-SB-A | 2229251 | 563842 | -108.47743 | 45.79174 |
| 93-SB-B | 2229251 | 563842 | -108.47743 | 45.79174 |
| 93-SB-C | 2229251 | 563842 | -108.47743 | 45.79174 |
| 93-SS-A | 2229251 | 563842 | -108.47743 | 45.79174 |
| 93-SS-B | 2229251 | 563842 | -108.47743 | 45.79174 |
| 93-SS-C | 2229251 | 563842 | -108.47743 | 45.79174 |
| 94-SB-A | 2229352 | 563913 | -108.47703 | 45.79193 |
| 94-SB-B | 2229352 | 563913 | -108.47703 | 45.79193 |
| 94-SB-C | 2229352 | 563913 | -108.47703 | 45.79193 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| 94-SS-A | 2229352 | 563913 | -108.47703 | 45.79193 |
| 95-SB-A | 2229478 | 564008 | -108.47653 | 45.79219 |
| 95-SB-B | 2229478 | 564008 | -108.47653 | 45.79219 |
| 95-SB-C | 2229478 | 564008 | -108.47653 | 45.79219 |
| 95-SS-A | 2229454 | 563984 | -108.47663 | 45.79213 |
| 96-SB-A | 2229555 | 564054 | -108.47623 | 45.79232 |
| 96-SB-B | 2229555 | 564054 | -108.47623 | 45.79232 |
| 96-SB-C | 2229555 | 564054 | -108.47623 | 45.79232 |
| 96-SS-A | 2229555 | 564054 | -108.47623 | 45.79232 |
| 97-SB-A | 2229696 | 564211 | -108.47567 | 45.79274 |
| 97-SB-B | 2229696 | 564211 | -108.47567 | 45.79274 |
| 97-SB-C | 2229696 | 564211 | -108.47567 | 45.79274 |
| 97-SS-A | 2229696 | 564211 | -108.47567 | 45.79274 |
| 97-SS-B | 2229696 | 564211 | -108.47567 | 45.79274 |
| 97-SS-C | 2229696 | 564211 | -108.47567 | 45.79274 |
| 98-SB-A | 2229873 | 564353 | -108.47496 | 45.79312 |
| 98-SB-B | 2229873 | 564353 | -108.47496 | 45.79312 |
| 98-SB-C | 2229873 | 564353 | -108.47496 | 45.79312 |
| 98-SS-A | 2229873 | 564353 | -108.47496 | 45.79312 |
| 99-SB-A | 2230075 | 564494 | -108.47416 | 45.79350 |
| 99-SB-B | 2230075 | 564494 | -108.47416 | 45.79350 |
| 99-SB-C | 2230075 | 564494 | -108.47416 | 45.79350 |
| 99-SS-A | 2230075 | 564494 | -108.47416 | 45.79350 |
| 99-SS-B | 2230075 | 564494 | -108.47416 | 45.79350 |
| 99-SS-C | 2230075 | 564494 | -108.47416 | 45.79350 |
| 9-SB-A | 2228182 | 564293 | -108.48160 | 45.79302 |
| 9-SB-B | 2228182 | 564293 | -108.48160 | 45.79302 |
| 9-SB-C | 2228182 | 564293 | -108.48160 | 45.79302 |
| 9-SS-A | 2228182 | 564293 | -108.48160 | 45.79302 |
| 9-SS-B | 2228182 | 564293 | -108.48160 | 45.79302 |
| 9-SS-C | 2228182 | 564293 | -108.48160 | 45.79302 |
| MW-01 | 2228413 | 563772 | -108.48072 | 45.79158 |
| MW-02 | 2229655 | 563953 | -108.47584 | 45.79203 |
| MW-03 | 2229313 | 564432 | -108.47716 | 45.79336 |
| MW-4 | 2230587 | 565167 | -108.47212 | 45.79533 |
| MW-6 | 2230489 | 564957 | -108.47252 | 45.79476 |
| PS10-SS-A | 2228280 | 564264 | -108.48122 | 45.79294 |
| PS11-SS-A | 2228296 | 564275 | -108.48115 | 45.79297 |
| PS11-SS-B | 2228296 | 564275 | -108.48115 | 45.79297 |
| PS11-SS-C | 2228296 | 564275 | -108.48115 | 45.79297 |
| PS12-SS-A | 2228274 | 564229 | -108.48124 | 45.79284 |
| PS13-SS-A | 2228294 | 564243 | -108.48116 | 45.79288 |
| PS14-SS-A | 2228314 | 564258 | -108.48108 | 45.79292 |
| PS15-SS-A | 2228335 | 564272 | -108.48100 | 45.79296 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| PS16-SS-A | 2228319 | 564230 | -108.48107 | 45.79284 |
| PS17-SS-A | 2228335 | 564241 | -108.48100 | 45.79287 |
| PS18-SS-A | 2228355 | 564256 | -108.48092 | 45.79291 |
| PS19-SS-A | 2228374 | 564269 | -108.48085 | 45.79295 |
| PS1-SS-A | 2228231 | 564290 | -108.48141 | 45.79301 |
| PS20-SS-A | 2228333 | 564210 | -108.48101 | 45.79279 |
| PS21-SS-A | 2228349 | 564221 | -108.48095 | 45.79282 |
| PS22-SS-A | 2228369 | 564235 | -108.48087 | 45.79285 |
| PS22-SS-B | 2228369 | 564235 | -108.48087 | 45.79285 |
| PS22-SS-C | 2228369 | 564235 | -108.48087 | 45.79285 |
| PS23-SS-A | 2228390 | 564249 | -108.48078 | 45.79289 |
| PS24-SS-A | 2228347 | 564189 | -108.48095 | 45.79273 |
| PS25-SS-A | 2228363 | 564200 | -108.48089 | 45.79276 |
| PS26-SS-A | 2228384 | 564215 | -108.48081 | 45.79280 |
| PS27-SS-A | 2228404 | 564229 | -108.48073 | 45.79284 |
| PS28-SS-A | 2228362 | 564169 | -108.48090 | 45.79267 |
| PS29-SS-A | 2228378 | 564180 | -108.48084 | 45.79270 |
| PS29-SS-B | 2228378 | 564180 | -108.48084 | 45.79270 |
| PS29-SS-C | 2228378 | 564180 | -108.48084 | 45.79270 |
| PS2-SS-A | 2228251 | 564305 | -108.48133 | 45.79305 |
| PS2-SS-B | 2228251 | 564305 | -108.48133 | 45.79305 |
| PS2-SS-C | 2228251 | 564305 | -108.48133 | 45.79305 |
| PS30-SS-A | 2228398 | 564194 | -108.48076 | 45.79274 |
| PS31-SS-A | 2228419 | 564209 | -108.48067 | 45.79278 |
| PS32-SS-A | 2228386 | 564155 | -108.48080 | 45.79263 |
| PS33-SS-A | 2228407 | 564170 | -108.48072 | 45.79267 |
| PS34-SS-A | 2228427 | 564184 | -108.48064 | 45.79271 |
| PS35-SS-A | 2228448 | 564198 | -108.48056 | 45.79275 |
| PS3-SS-A | 2228271 | 564319 | -108.48125 | 45.79309 |
| PS4-SS-A | 2228292 | 564333 | -108.48116 | 45.79313 |
| PS5-SS-A | 2228245 | 564270 | -108.48135 | 45.79295 |
| PS6-SS-A | 2228265 | 564284 | -108.48127 | 45.79299 |
| PS7-SS-A | 2228286 | 564299 | -108.48119 | 45.79303 |
| PS8-SS-A | 2228306 | 564313 | -108.48111 | 45.79307 |
| PS9-SS-A | 2228259 | 564250 | -108.48130 | 45.79290 |
| TEL10-SS-A | 2229142 | 564751 | -108.47781 | 45.79424 |
| TEL10-SS-B | 2229142 | 564751 | -108.47781 | 45.79424 |
| TEL10-SS-C | 2229142 | 564751 | -108.47781 | 45.79424 |
| TEL11-SS-A | 2229075 | 564673 | -108.47808 | 45.79403 |
| TEL12-SS-A | 2229100 | 564683 | -108.47798 | 45.79406 |
| TEL13-SS-A | 2229116 | 564702 | -108.47792 | 45.79411 |
| TEL14-SS-A | 2229136 | 564716 | -108.47783 | 45.79415 |
| TEL15-SS-A | 2229157 | 564731 | -108.47775 | 45.79419 |
| TEL16-SS-A | 2229089 | 564653 | -108.47802 | 45.79397 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| TEL17-SS-A | 2229109 | 564667 | -108.47794 | 45.79401 |
| TEL18-SS-A | 2229130 | 564681 | -108.47786 | 45.79405 |
| TEL19-SS-A | 2229153 | 564693 | -108.47777 | 45.79408 |
| TEL1-SS-A | 2229046 | 564714 | -108.47819 | 45.79414 |
| TEL20-SS-A | 2229171 | 564710 | -108.47770 | 45.79413 |
| TEL21-SS-A | 2229103 | 564632 | -108.47797 | 45.79392 |
| TEL22-SS-A | 2229124 | 564647 | -108.47789 | 45.79396 |
| TEL22-SS-B | 2229124 | 564647 | -108.47789 | 45.79396 |
| TEL22-SS-C | 2229124 | 564647 | -108.47789 | 45.79396 |
| TEL23-SS-A | 2229144 | 564661 | -108.47781 | 45.79399 |
| TEL24-SS-A | 2229165 | 564675 | -108.47772 | 45.79403 |
| TEL25-SS-A | 2229185 | 564690 | -108.47764 | 45.79407 |
| TEL2-SS-A | 2229066 | 564729 | -108.47811 | 45.79418 |
| TEL3-SSS-A | 2229087 | 564743 | -108.47803 | 45.79422 |
| TEL4-SS-A | 2229107 | 564757 | -108.47794 | 45.79426 |
| TEL5-SS-A | 2229128 | 564772 | -108.47786 | 45.79430 |
| TEL6-SS-A | 2229060 | 564694 | -108.47813 | 45.79409 |
| TEL6-SS-B | 2229060 | 564694 | -108.47813 | 45.79409 |
| TEL6-SS-C | 2229060 | 564694 | -108.47813 | 45.79409 |
| TEL7-SS-A | 2229081 | 564708 | -108.47805 | 45.79413 |
| TEL8-SS-A | 2229101 | 564722 | -108.47797 | 45.79416 |
| TEL9-SS-A | 2229122 | 564737 | -108.47789 | 45.79420 |
| YD-1 | 2228588 | 563627 | -108.48004 | 45.79118 |
| YD-3 | 2229375 | 564563 | -108.47691 | 45.79372 |
| YD-4 | 2230252 | 565137 | -108.47344 | 45.79526 |
| YD-5 | 2230712 | 565220 | -108.47163 | 45.79547 |
| YMW-10 | 2228208 | 564498 | -108.48148 | 45.79358 |
| YMW-10-SB-A | 2228208 | 564497 | -108.48148 | 45.79358 |
| YMW-10-SB-B | 2228208 | 564497 | -108.48148 | 45.79358 |
| YMW-10-SB-C | 2228208 | 564497 | -108.48148 | 45.79358 |
| YMW-10-SS-A | 2228208 | 564497 | -108.48148 | 45.79358 |
| YMW-10-SS-B | 2228208 | 564497 | -108.48148 | 45.79358 |
| YMW-10-SS-C | 2228208 | 564497 | -108.48148 | 45.79358 |
| YMW-11 | 2228284 | 564140 | -108.48121 | 45.79260 |
| YMW-11-SB-A | 2228284 | 564141 | -108.48120 | 45.79260 |
| YMW-11-SB-B | 2228284 | 564141 | -108.48120 | 45.79260 |
| YMW-11-SB-C | 2228208 | 564497 | -108.48148 | 45.79358 |
| YMW-11-SS-A | 2228284 | 564141 | -108.48120 | 45.79260 |
| YMW-11-SS-B | 2228284 | 564141 | -108.48120 | 45.79260 |
| YMW-11-SS-C | 2228284 | 564141 | -108.48120 | 45.79260 |
| YMW-12 | 2228516 | 564421 | -108.48028 | 45.79336 |
| YMW-12-SB-A | 2228516 | 564420 | -108.48028 | 45.79336 |
| YMW-12-SB-B | 2228516 | 564420 | -108.48028 | 45.79336 |
| YMW-12-SB-C | 2228516 | 564420 | -108.48028 | 45.79336 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| YMW-12-SS-A | 2228516 | 564420 | -108.48028 | 45.79336 |
| YMW-12-SS-B | 2228516 | 564420 | -108.48028 | 45.79336 |
| YMW-12-SS-C | 2228516 | 564420 | -108.48028 | 45.79336 |
| YMW-13 | 2228668 | 56350 | -108.50500 | 44.39997 |
| YMW-13-SB-A | 2228668 | 564350 | -108.47969 | 45.79316 |
| YMW-13-SB-B | 2228668 | 564350 | -108.47969 | 45.79316 |
| YMW-13-SB-C | 2228668 | 564350 | -108.47969 | 45.79316 |
| YMW-13-SS-A | 2228668 | 564350 | -108.47969 | 45.79316 |
| YMW-13-SS-B | 2228668 | 564350 | -108.47969 | 45.79316 |
| YMW-13-SS-C | 2228668 | 564350 | -108.47969 | 45.79316 |
| YMW-14 | 2228679 | 564580 | -108.47963 | 45.79379 |
| YMW-14-SB-A | 2228680 | 564579 | -108.47963 | 45.79379 |
| YMW-14-SB-B | 2228680 | 564579 | -108.47963 | 45.79379 |
| YMW-14-SB-C | 2228680 | 564579 | -108.47963 | 45.79379 |
| YMW-14-SS-A | 2228680 | 564579 | -108.47963 | 45.79379 |
| YMW-14-SS-B | 2228680 | 564579 | -108.47963 | 45.79379 |
| YMW-14-SS-C | 2228680 | 564579 | -108.47963 | 45.79379 |
| YMW-15 | 2228765 | 564856 | -108.47928 | 45.79454 |
| YMW-15-SB-A | 2228764 | 564856 | -108.47928 | 45.79454 |
| YMW-15-SB-B | 2228764 | 564856 | -108.47928 | 45.79454 |
| YMW-15-SB-C | 2228764 | 564856 | -108.47928 | 45.79454 |
| YMW-15-SS-A | 2228764 | 564856 | -108.47928 | 45.79454 |
| YMW-15-SS-B | 2228764 | 564856 | -108.47928 | 45.79454 |
| YMW-15-SS-C | 2228764 | 564856 | -108.47928 | 45.79454 |
| YMW-16 | 2229031 | 564705 | -108.47825 | 45.79412 |
| YMW-16-SB-A | 2229031 | 564705 | -108.47825 | 45.79412 |
| YMW-16-SB-B | 2229031 | 564705 | -108.47825 | 45.79412 |
| YMW-16-SB-C | 2229031 | 564705 | -108.47825 | 45.79412 |
| YMW-16-SS-A | 2229031 | 564705 | -108.47825 | 45.79412 |
| YMW-16-SS-B | 2229031 | 564705 | -108.47825 | 45.79412 |
| YMW-16-SS-C | 2229031 | 564705 | -108.47825 | 45.79412 |
| YMW-17 | 2229159 | 564656 | -108.47775 | 45.79398 |
| YMW-17-SB-A | 2229159 | 564656 | -108.47775 | 45.79398 |
| YMW-17-SB-B | 2229159 | 564656 | -108.47775 | 45.79398 |
| YMW-17-SB-C | 2229159 | 564656 | -108.47775 | 45.79398 |
| YMW-17-SS-A | 2229159 | 564656 | -108.47775 | 45.79398 |
| YMW-17-SS-B | 2229159 | 564656 | -108.47775 | 45.79398 |
| YMW-17-SS-C | 2229159 | 564656 | -108.47775 | 45.79398 |
| YMW-18 | 2229058 | 564365 | -108.47816 | 45.79319 |
| YMW-18-SB-A | 2229058 | 564364 | -108.47816 | 45.79318 |
| YMW-18-SB-B | 2229058 | 564364 | -108.47816 | 45.79318 |
| YMW-18-SB-C | 2228764 | 564856 | -108.47928 | 45.79454 |
| YMW-18-SS-A | 2229058 | 564364 | -108.47816 | 45.79318 |
| YMW-18-SS-B | 2229058 | 564364 | -108.47816 | 45.79318 |

## GPS SAMPLE LOCATION COORDINATES

| | US SP MT 2500 | | NAD83 | |
|---|---|---|---|---|
| Sample ID | Easting (Feet) | Northing (Feet) | Longitude (Degrees) | Latitude (Degrees) |
| YMW-18-SS-C | 2229058 | 564364 | -108.47816 | 45.79318 |
| YMW-19 | 2229466 | 563872 | -108.47658 | 45.79182 |
| YMW-19-SB-A | 2229466 | 563872 | -108.47658 | 45.79182 |
| YMW-19-SB-B | 2229466 | 563872 | -108.47658 | 45.79182 |
| YMW-19-SB-C | 2229466 | 563872 | -108.47658 | 45.79182 |
| YMW-19-SS-A | 2229466 | 563872 | -108.47658 | 45.79182 |
| YMW-19-SS-B | 2229466 | 563872 | -108.47658 | 45.79182 |
| YMW-19-SS-C | 2229466 | 563872 | -108.47658 | 45.79182 |
| YMW-20 | 2229305 | 565051 | -108.47715 | 45.79506 |
| YMW-20-SB-A | 2229305 | 565051 | -108.47715 | 45.79506 |
| YMW-20-SB-B | 2229305 | 565051 | -108.47715 | 45.79506 |
| YMW-20-SB-C | 2229305 | 565051 | -108.47715 | 45.79506 |
| YMW-20-SS-A | 2229305 | 565051 | -108.47715 | 45.79506 |
| YMW-20-SS-B | 2229305 | 565051 | -108.47715 | 45.79506 |
| YMW-20-SS-C | 2229305 | 565051 | -108.47715 | 45.79506 |
| YMW-21 | 2229199 | 564811 | -108.47758 | 45.79441 |
| YMW-21-SB-A | 2229199 | 564811 | -108.47758 | 45.79441 |
| YMW-21-SB-B | 2229199 | 564811 | -108.47758 | 45.79441 |
| YMW-21-SB-C | 2229199 | 564811 | -108.47758 | 45.79441 |
| YMW-21-SS-A | 2229199 | 564811 | -108.47758 | 45.79441 |
| YMW-21-SS-B | 2229199 | 564811 | -108.47758 | 45.79441 |
| YMW-21-SS-C | 2229199 | 564811 | -108.47758 | 45.79441 |
| YMW-22 | 2229552 | 564968 | -108.47619 | 45.79482 |
| YMW-22-SB-A | 2229552 | 564968 | -108.47619 | 45.79482 |
| YMW-22-SB-B | 2229552 | 564968 | -108.47619 | 45.79482 |
| YMW-22-SB-C | 2229552 | 564968 | -108.47619 | 45.79482 |
| YMW-22-SS-A | 2229552 | 564968 | -108.47619 | 45.79482 |
| YMW-22-SS-B | 2229552 | 564968 | -108.47619 | 45.79482 |
| YMW-22-SS-C | 2229552 | 564968 | -108.47619 | 45.79482 |
| YMW-23 | 2230184 | 565368 | -108.47369 | 45.79590 |
| YMW-23-SB-A | 2230184 | 565368 | -108.47369 | 45.79590 |
| YMW-23-SB-B | 2230184 | 565368 | -108.47369 | 45.79590 |
| YMW-23-SB-C | 2230184 | 565368 | -108.47369 | 45.79590 |
| YMW-23-SS-A | 2230184 | 565368 | -108.47369 | 45.79590 |
| YMW-23-SS-B | 2230184 | 565368 | -108.47369 | 45.79590 |
| YMW-23-SS-C | 2230184 | 565368 | -108.47369 | 45.79590 |

# APPENDIX B

# FIELD NOTES AND FORMS

# SURFACE SOIL SAMPLING FORM

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 1

5 pt

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 1 -SS-A | NE | | N/N | gravel | | Sandy silt w/ gravel brown | |
| Date 11/7/12 | NW | | N/N | gravel/fill | | Sandy silt w/ gravel brown | |
| Time 16:27 | C | | N/N | gravel | | Sandy silt w/ gravel brown | |
| | SW | | N/N | gravel/fill | | Sandy silt w/ gravel light brown | in roadway |
| | SE | | N/N | gravel/fill | | Sandy silt w/ roadway brown @ depth change to silty sand | dk brw |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number ~~2C~~ 2 KA
Spt

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 2 -SS-A | NE | | N/N | Gravel | | Silty Sand gravel gray brown | |
| Date 11/7/12 | NW | | N/N | Gravel/weeds | | Silty Sand gravel gray/brown | |
| Time 14:33 KA | C | | N/N | Gravel | | Silty sand gravel grey/brown | |
| | SW | | N/N | Gravel | | Silty Sand gravel gray brown | |
| | SE | | N/N | Gravel | | Silty sand gravel grey brown | |
| 2 -SS-B | NE | | N/N | Gravel | | as above | |
| Date 11/7/12 | NW | | N/N | aa | | as above | |
| Time ~~13:13~~ 1513 KA | C | | N/N | aa | | as above | |
| | SW | | N/N | aa | | as above | |
| | SE | | N/Y | aa | | as above | odor @ bottom of hole (12") |
| 2 -SS-C | NE | | No No | — | | 1" as above, >13"-24" Clay, olive brown, silty sand at bottom | |
| Date 11/7/12 | NW | | No No | ~~No/No~~ | | Gravel w/ silty sand matrix, 1" aa, olive brown | |
| Time 1541 KA | C | | Yes/No | ~~No/No~~ | (A) | as above w/ sandy clay (dark) after 2" olive brown - back to aa | |
| | ~~SW~~ SE | | Yes/Yes | — | | 1" as above, >13" - Clay, blu-black, dense, sticky | |
| | ~~SE~~ SW | | No/No | — | | 12"-14 as above, 14-24" Clay sandy, olv brown, orange mottling | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) 2" olv brown, 2" black, 8" olv brow w/ increase clay content

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 3

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 3 -SS-A | SE (B) | 15'E | Yes/Yes | 6" asphalt | | Sandy Gravel w/ silty, hlu-gray, damp | |
| Date 11/7/12 | NW | 4' N | No/No | weathered gravel | | Same as 'C' grid loc. | dry greyish olv brown |
| Time 1609 | C | 2' N | No/No | weathered gravel | | Gravel (≤1") loose, damp, dk olv brown, sandy matrix | |
| | SW | 4' NE | No/Yes | weathered gravel | | Same as NW grid loc, sli damp | sli darker |
| | NE (A) | 15'E | Yes/Yes | 9" asphalt | | Gravel w/silty sand matrix, mod blu-gray clay w/ depth, strong odor & stain | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) start sample 6" below asphalt here — sample from ~~16"-A~~ 15"-21" below asphalt surface

(B) " " " " " " — sample from 12"-24" " " "

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 4
5 pt. Composite

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 4 -SS-A | C | 0 | Yes/Yes | ① | — | Silty sand, grayish black | - sample 6"-12" |
| Date 10/30/2012 | NW | 0 | Yes | ③ | — | Sandy clayey, grayish black | - sample 6"-12" |
| Time 1252 | NE | 1' W | Yes Yes | ② | — | Clayey sand, grayish black | - sample 6"-12" |
| | SW | 0 | No/? | ④ | — | Clinker (2"), Sandy clay - brown, wet | |
| | SE | 0 | | ④ | — | same as loc 'SW' | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① Asphalt 8", Base coarse - sandy gravel 2", silty sand 4".
② Asphalt 6" Base coarse - sandy gravel 3", silty sand 3".
③ Asphalt 9" Base coarse - sandy gravel 3", clay, sandy 3"
④ Landscape rock (clinker 2" w/ plastic sheeting)

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 5

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 5 -SS-A | NE | 0' | minor odor | Sandy Gravel | — | Sandy gravel, dk brown (3"); Silty Sand grnish yellow (3") | |
| Date 10/30/2012 | NW (2) | 1' | both strong | Asphalt | — | (2) Silty sand w/ minor gravel, blue-gray | |
| Time 1146 | C | 1.5' S | Yes/Yes | (1) | — | Sandy gravel, black | |
| | SW | 0' | Yes/Yes | 5" asphalt | — | (3) Sandy-silty gravel & fire brick, black-cream yellow | |
| | SE | 20' W | No/No | (4) | — | (4) Silty w/ sandy; occ. fine 'pea' gravel; grayish- | bra |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Asphalt ~10", base course gravel (sandy) for ~~to~~ 6" below asphalt. Asphalt base to 6" grnish-brown sandy clayey gravel

(2) Asphalt ~8", base course gravel (sandy) for 6". Sample 6"-12" below asphalt

(3) Sample 6"-12" below asphalt. Encountered fire brick @ 6" below asphalt; ~~break~~ break out w/ spud bar

(4) Access to grid loc N/A due to locked gate. Surface at correct location inside ppl fence and surface is clean washed gravel. Moved sample 12' West into parking lot of 600 ~~1st~~ 1st Av. N. surface also washed gravel and silty sandy

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 6

5 pt. Composites

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 6 -SS-A | SW ~~NE~~ (C) | 8' NW | No/No | See Soil | — | Same as 'C' location (see below) | |
| Date 10/30/2012 | NW (B) | 10' W | No/No | (2) | — | Sandy-clayey gravel, brown | |
| Time 1103 | C (A) | 2' N | No/No | See Soil | — | Clean loose gravel 2', plastic sheeting 4" sandy-clay gravel, dk brn | |
| | NE ~~SW~~ | 2' N | Yes/Yes | (1) | — | Sandy-clayey gravel, black (4"), Upper Part 2" silty sand | |
| | ~~SE~~ | 2' SE | No/No | See Soil | — | Same as 'C' location (see above) | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) Location inside YPL fenced pipeline pumping facility

(1) Asphalt 4", ~~Sandy~~ Silty sand, grnish brown. 6". Sample 6" to 12" below asphalt

(2) No asphalt cap Sample 0-6"

(B) 10' ft W from city water valve & pipeline

(C) 8' NW of green tag. Green tag 20' from survey location centered over bldg.

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 7
4 pt. Composite

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 7 -SS-A | NE | | | | | | |
| Date 10/30/12 | SW | 2' N | stain odor | (3) | — | Black, Clayey - Sandy Gravel | |
| Time 1029 | C | 0' | No stn minor odor | (1) | — | Clayey gravel w/ minor sandy, greenish gray | |
| | NW | 0' | stain odor | (2) | — | Sand, Clayey w/ minor gravel, greenish-gray, yellow mottling | |
| | SE (A) | 0' | No/No | (4) | — | Gravel, sandy w/clay matrix, dk brown | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

NE: No location. Would be in middle US highway.
(1) Asphalt to 4", sandy gravel to 6" below Asphalt. Sample from 6" to 12" below asphalt
(2) " 4" " " 4", Sandy w/ clay 2" Sample from 6" to 12" below asphalt
(3) " ~5", black (stained) sandy gravel 1". Sample from 6" to 12" below asphalt
(A) Locate inside YPL fenced pumping station
(4) Loose, washed gravel 0-6". Clay sand matrix

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 8
3 pt. Composite

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 8 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 10/30/2012 | ① C | 0' | YES | ① | — | Clayey Silty Sand w/minor gravel, blue-gray | |
| Time 0945 | ② SW | 1' SW | Yes! | ② | — | Gravel, Sandy w/ clay matrix, blue gray | |
| | ③ SE | 0' | YES | ③ | — | Gravel, sandy w/ clay matrix, blue-gray | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① Asphalt 3" with gravel sub-base 2". Sample from 6" below base of asphalt to 12" depth.

② Asphalt 6" w/ sandy gravel sub-base 6" Sample from 6" below asphalt base to 12".

③ Asphalt 4" w/ sandy gravel sub-base to 6". Sample from 6" below asphalt to ___".

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 9

5 pt

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 9 -SS-A | NE | | N/N | Sandy silt weeds | | Sandy silt / gravel brown | |
| Date 11/7/12 | ~~NW~~ SW | | N/N | gravel | | Sand silt / gravel grey brown | |
| Time 10:33 | C | | N/N | weeds silty sand | | Sandy silt / some gravel brown + grey brown ~5" | |
| | ~~SW~~ NW | | N/N | weeds silty sand | | Sandy silt / gravel grey brown | roots |
| | SE | | N/N | Weeds silty sand | | Sand silt / gravel grey brown | |
| 9 -SS-B | NE | | N/N | aa | | Silt grey | |
| Date 11/7/12 | NW | | N/N | aa | | Silt w/pebbles grey | |
| Time 11:04 | C | | N/N | aa | | Silt w/ pebbles grey | |
| | SW | | N/N | aa | | Silt w/gravel hard packed | pipe/wood @ 10" |
| | SE | | N/N | aa | | Sandy silt grey/brown | |
| 9 -SS-C | NE | | N/N | aa | | Silt grey brown | |
| Date 11/7/12 | NW | | N/N | aa | | Silt grey brown | |
| Time 12:02 | C | | N/N | aa | | Silt grey brown | |
| | SW | | N/N | aa | | Silt hard packed grey brown | |
| | SE | | N/N | aa | | Sandy silt grey brown | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 10

3 pt Composite

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 10 -SS-A | NE | N/A | | | | | |
| Date 10/19/2012 | NW | 5' W | No | gravel | — | Surface fill gravel (<1") sandy dry | (1"-3") |
| Time 1336 | ① C | 5' W | No | gravel | — | surface fill gravel (<1") sandy, dry, | |
| | SW | 1' W | No | 1" gravel | — | same loc "C" | |
| | SE | N/A | | | | | |
| 10 -SS-B | NE | N/A | | | | | |
| Date 10/19/2012 | NW | as above A | No | see soil | — | same as 'A' horizon w/ broken concrete block | |
| Time 1403 | C | as above A | No | see soil | — | same as 'A' horizon, dark stain 6"-7" | |
| | SW | as above A | No | see soil | — | same as 'A' horizon, asphalt chunk @ 10"-11" | |
| | SE | N/A | | | | | |
| 10 -SS-C | NE | N/A | | | | | |
| Date 10/19/2012 | NW | as above A | No | — | — | Same as horizon A till 18", 18"-24" clayey sand with Pebbles; Brick | |
| Time 1435 | C | as above A | No | — | — | Hit dirt above soils @ 12", silty clay dark stains 13"-15", some brick chunks | |
| | SW | as above A | No | — | — | Same as C loc 14"-24", sandy gravel 12"-14" | |
| | SE | N/A | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

NE & SE grid location centered within buildings — No locations

① offset buried natural gas line

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 11

Duplicate Collected 11-SS-Ad 13:45

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 11 -SS-A | NE | 0 | No/No | Gravel | — | Gravel, sandy w/silt, dry | 1 bolt |
| Date 10/30/2012 | SW | 0 | Yes Yes | Gravel | — | Same as loc "C" (see below) | |
| Time 1343 | C | 0 | Yes/Yes | 3" Asphalt | — | ① Sandy Gravel w/ clay - black, moist | |
| | NW | 0 | No No | Gravel | — | Same as 'NW' loc - no bolt | |
| | SE | 0 | No/No | Gravel | — | Silty gravel w/ sand, dry, lt. brown | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① Clayey Sandy Gravel as base course below asphalt to 6". Sample 6"-12" below asphalt.

Note NE and NW samples are thicker than the top of the adjacent asphalt at 'C' loc.

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 12

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 12 -SS-A | NE (2) | 4' SW | No/No | Gravel (A) | — | Gravel w/ silty sand matrix, dry | (A) lt. brown |
| Date 10/30/12 | NW | 0' | No/No | Gravel (A) | — | (A) same as loc 'NE' above, | brown damp |
| Time 1411 | C (1) | 8' south | Yes/Yes | Gravel (A) | — | Gravel, sandy w/ silt, dry, | black |
| | SW | 2' south | No/No | Gravel (A) | — | (A) Gravel fill – ~~Sand~~ Silty Sandy Gravel, moist, | brown |
| | SE (B) | 2' West | No/No | Gravel (A) | — | Silty Sand w/ minor gravel, | greenish brown |
| 12 -SS-B | NE | | No/No | | — | 6"-12" same as 'SE' location (below) | |
| Date 10/30/12 | NW | Same as "A" | No/No | Same as "A" | — | Gravel w/ silty sand matrix, dry | lt. brown |
| Time 1503 | C | | Yes/Yes | | — | 6"-12": Clayey Gravel, | blu-black (air knife excavation) |
| | SW | | Yes/Yes | | — | 6"-12" (air knife): | same as 'C' location above |
| | SE | | No/No | | — | 6"-12" silty sand w/ minor gravel – | greenish brown |
| 12 -SS-C | NE | | No/No | | — | 12"-24" same as in "B" ~~location~~ horizon for this location | |
| Date 10/30/12 | NW | Same as for "A" | | Same as "A" | | 12"-24" same as in 'B' ~~location~~ horizon for this location | |
| Time 1537 | C | | Yes/Yes | | — | Sandy Clay w/ wood frags, | blu-gray |
| | SW | | Yes/Yes | | — | same as 'C' loc above – No wood, | minor gravel |
| | SE | | Yes/Yes | | — | Gravelly w/ sand 12"-18, Clay | blu-black 18"-24" |

↳ clays only

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Loc. moved off asphalt (badly broken) – 8' south onto gravel surface

(2) Loc moved from surveyed site 1' from wooden (treated) power pole. Sample collected from loose fill that is about 1' thick (above) level of adjacent asphalt.

(A) Gravel Fill @ surface

(B) Current Inc actively replacing / clean asphalt surface in front of 6 1st Ave south. Excavated soils from 10/30/2012 ~~Note~~ Not @ surface and Not on surface of 'SE' location. Photos of excavation were taken 10/30/2012 by J.D. Shuffer, Hydrometrics

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 13

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 13 -SS-A | NE | 2' S | Yes/Yes | 2" Asphalt | — | Base Course 4" of Clay Gravel, | Clay, black 4"- 12" |
| Date 10/31/12 | NW | ~10' W | Yes/Yes | 4" Asphalt | — | Base Course asphalt base for 6" | Sample: Clayey gravel 6"-12 blu-black |
| Time ~~1045~~ 1125 (A) | C | 0' | Yes/Yes | 2" Asphalt | — | Base Course 12": Clayey Gravel, minor sandy, | blu-black |
| | SW | 0' | Yes/Yes | 3" Asphalt | — (1) | Base Course asphalt base for 12" (stain/odor) | Sample 6"-12" |
| | SE | 3' N | Yes/Yes | 2" Asphalt | — | Base Course 2" below asphalt. | Sample 6"-12" (2) |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Clayey, sandy gravel

(2) Clay gravel, black from asphalt base to 12"

RTI: heated H2S: 304 peak 2% LEL

(A) Comment: VPH sample jar dropped and broken. 1125 sample collected from open hole at depth of 12" below ~~grass~~ asphalt base.

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 14

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 14 -SS-A | NW | 3' N | Yes/Yes | 3" Asphalt | — | Sandy, clayey gravel, black | (C) - brick chunks |
| Date 10-31-12 | SW | 2' NW | Yes/Yes | 10" Asphalt | — (D) | Bar Coarse Sandy Clayey Gravel | stain/odor very strong |
| Time 1157 | C | 3' SW | Yes/Yes | 4" Asphalt | — | (A) See comment below | Concrete @ 6" (B) |
| | NE | 1' S | No No | See soil | — | Sandy Silty gravel 0-6", olive brown, damp | |
| | SE | 1' NE | No No | See soil | | same as 'NE' grid loc. | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) Sandy silty fine gravel to 6" below asphalt, then ~~coarse gravel from~~ cement pad at 6"

(B) Sample collected from Silty Sandy fine gravel in 2" immed above concrete. Sample dk brown - black

(C) Bar Coarse gravel, sandy from asphalt to 6". Sample 6"-12"

(D) Sample 6"-12" below asphalt. Material same as from base of asphalt

RTI: SW location in-hole 14 ppm PID, LEL 0

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 15

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 15 -SS-A | NE | 10' E | No No | a b | — | a. b. | |
| Date 10-31-12 | NW | 5' SSE | No No | a b | — | a. b. | |
| Time ~~1154~~ 1254 KA | C | 1' S | No/No | Poorly Sorted gravel | — | Poorly Sorted Gravel w/ Silty Sand, minor clay, damp, olv. brown | |
| | SW | 10' SE | No No | a a | — | a a | |
| | SE | 1' S | No No | a. a. | — | a a | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

a, a. = as above  a b = as below

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 16

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| | | | | | | brown silty loam Sandy | |
| 16 -SS-A | NE | 0' | No No | Soil | — | (B) ~~as below C-C' location, w/o blu-black clay~~ | |
| | NW | 2' N | Yes Yes | Soil | — | (B) Silty sand minor gravel, olv brn, damp 0-4", 4"-6" Sandy clay blu-black | |
| Date 10-31-12 | C | 1' W | No No | Soil | — | (B) Poorly Sorting sandy silty gravel, damp, olv brown 0-4", (A) | |
| Time 1320 | SW | 6' S | No No | Soil | — | aa at 'C' location w/o clay | |
| | SE | 6' SSE (C) | No No | Soil | — | (B) Silty clay olv-brn damp | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

aa = as above, ab = as below

(A) 4"-6" Clayey sand, minor gravel blu-black strong stain & odor

(B) 4" of loose poorly sorted washed gravel moved from sampling horizon. Below gravel porous fiberglass mesh

(C) Offset 2 ppls to W & N. Offset

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 17

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 17 -SS-A | NE | 1' N | No No | lawn sod | — | On Grass Sod. Silty Clay loam, olv. brn, damp | |
| | NW | 2' W | No No | soil | — | (A) same as below @ location 'C' | |
| Date 10-31-12 | C | 0' | No No | soil | — | (A) Silty Clayey Sand, no gravel, damp olv brown | |
| Time 1347 | SW | 4' SSW | No No | soil | — | (A) Silty Clay, no gravel, damp, olv. brown | |
| | SE | 0' | No No | soil | — | same as at 'SW' location | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) Moist soil 2" washed poorly sorted gravel (≤ 2"). Start at ~~Porous~~ fiberglass mesh.

(B) 1" thick Sod - at surface remove before sampling. Sample from 1" - 7"

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 18

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 18 -SS-A | NE | 1' E | No No | Gravel | — | Same as at 'C' location, matrix more clay content | |
| | NW | | Yes Yes | 3" Asphalt | (A) | Same as at 'C' alv. brn 6"-10", blu-black, stain odor 10"-12" | |
| Date 10/31/12 | C | 1' E | No No | Gravel | — | Poorly Sorted Gravel w/ silty sand matrix, damp, alv. brn | |
| Time 1441 | SW | 2' S | No No | Gravel | — | same as 'C' location | |
| | SE | 3' N | No No | Gravel | — | same as 'C' location | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) Start sample 6" below asphalt base; sample 6"-12"

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 19

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 19 -SS-A | NE | 1' E | – | Sand gravel | – | silty sandy gravels, damp | |
| Date 10.25.12 | NW ~~8~~ | 1' W | – | 1" topsoil | – | silty sandy, gravels, cobbles, standing water in bottom 1" | |
| Time 16:55 | C | 1' N | – | Sand gravel | – | silty sandy gravels | |
| | SW | 1' E | – | gravel | – | silty sandy gravel, dark brown | |
| | SE ② | ~~1' W 4'S~~ | – | silt | – | silty clay | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | ~~NE~~ | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

~~Took Sample on 10-25-12 @ 16:20~~

② in runoff ditch between Buildings & the fence line

# SURFACE SOIL SAMPLING

Grid Number 20

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 20 -SS-A | NE | 1' South | No | Gravel | N/A | Silty, Sand Lt Brown | Coals & Tin Pieces |
| Date 11/6/12 | NW | 1' South | No | Gravel | N/A | Silty Sand Small Gravels, Lt Brown | Petroleum Stain |
| Time 1100 | C (1) | 3' North | No | Gravel | N/A | Gravel, Silt Gravel Lt Brown | Nails encountered |
| | SW | 1' East | No | Gravel | N/A | Silty, Clay, Lt Brown | Fire Brick piece |
| | SE | 1' South | No | Gravel | N/A | Silty Sandy Gravel, Brown | |
| 20 -SS-B | NE | Same As Above | No | SAA | N/A | Silty Clay, Olive Brown Top | |
| Date 11/6/12 | NW | SAA | No | | N/A | Silty Clay, Olive Brown Top | |
| Time 1175 | C | SAA | No | | N/A | Clay Silt, Dark Brown | |
| | SW | SAA | Odor/Slight Stain | | N/A | Silty Clay, Olive Brown | |
| | SE | SAA | No | | N/A | Silty Clay, Olive Brown | |
| 20 -SS-C | NE | SAA | No | | N/A | Clayey Silt Olive Brown | |
| Date 11/6/12 | NW | SAA | No | | N/A | Same As NE | |
| Time 1150 | C | SAA | No | | N/A | Clayey Silt Olive Brown | |
| | SW | SAA | No | | N/A | Same As NE | |
| | SE | SAA | No | | N/A | Same As NE | Hand Digging through top Cobble |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) 3' North of footing of old foundation

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 21

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 21 -SS-A | NE | ~~3' South~~ | | ~~Gravel~~ | | | Reporter Building, No Sample |
| Date 11/6/2012 | NW | 1' South | No | Gravel | N/A | Sandy Gravel, Lt Brown | |
| Time 0942 | C(1) | 10' South | No | Gravel | N/A | Sandy Gravel, Lt. Brown | |
| | SW | 1 North | No | " | N/A | Damp Sandy Gravel, Brown | |
| | SE | 15' West | No | " | N/A | Sandy Gravel Lt Brown | Slight Stain 3"-5" |
| 21 -SS-B | NE | | | | | | |
| Date 11/6/2012 | ~~NW~~ C | Same As Above | No | SAA | N/A | Sandy Gravel, Lt Brown, | Stout Silty Gravel @ 10"-12" |
| Time 1100 | NW | " | No | " | N/A | Sandy Silt and DK Brown | |
| | SW | " | No | " | N/A | Sandy Silty Gravel 6"-8" Brow | Through Gravel 8", Some Mottling |
| | SE | " | No | " | N/A | Damp, Clayey Sand, Dark Brown | Broken Brick Pieces |
| 21 -SS-C | NE | | | | | | |
| Date 11/6/2012 | ~~NW~~ SW | " | No | " | N/A | Clay, Damp, Lt Brown to Dark Brown, Some Orange | |
| Time 1020 | C | " | NO | " | N/A | Clayey Silt, Damp Brown | |
| | ~~SW~~ NW | " | NO | " | N/A | Clayey Silt, Damp Brown | |
| | SE | " | NO | " | N/A | Clay, Damp, Lt Brown to Dark Brown, Some Orange | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

JB

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) 15' West of Loading Dock, 3' South of Building Concrete 6" Down; 4"-6" had Stain, Moved Sample Loc. to 10' South

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 22

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 22 -SS-A | ~~NE~~ NW | 1' East | Odor | Gravel | N/A | Same as C | Tar? @ 6" |
| Date 11/6/12 | ~~NW~~ NE | 1' North | No | | | Same as C | |
| Time 1330 | C | 1' North | No | | | Sandy Gravel lt Brown | Roll |
| | SW | 1' West | No | | | Sandy Gravel olive brown | |
| | SE | 1' South | No | | | Same as SW | Wood Pieces |
| 22 -SS-B | NE | | Slight | | | Sandy Clayey gravel; same as C' but thin horizon | |
| Date 11/6/12 | NW(A) | Same As A' | Odor/Stain | | N/A | Tar? Coated, Black | |
| Time 1410 | C | | No/No | | | Sandy Clayey gravel, broken concrete, asphalt, dk brown | |
| | SW(A) | | Yes/Yes | | Silty | Sandy gravel, blu gray to dk gray, trace asphalt pieces | |
| | SE(A) | | No/No | | | Silty Sandy gravel, minor asphalt | |
| 22 -SS-C | NE | | No | | | Silty Sandy Gravel | Broken Concrete Obstruction |
| Date 11/6/12 | NW | Same As A' | Yes/Yes odor | | | 12"-18 Same as 6" this loc.; 18-24 Sandy Gravel, gray HARD | |
| Time 1533 | C | | | | | Silty Sandy Gravel, changing to Silty Sand w/ depth | |
| | SW | | Yes/Yes | | | Sandy Clay, blu black, bone fragments, dear gravel w/ depth | |
| | SE | | Yes Yes | | | 12"-21 Silty Sandy Gravel brown, 21"-24 Clay, sandy blu-black stain & odor | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) Asphalt, gravelly from 6" to 9". This horizon begins immediately below base of 'A' horizon. VERY HARD!

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 23
5pt.

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 23 -SS-A | NE | 3' W | No | loose gravel | — | Silty Sand Gravel Olive Brown | Metal Lamor - Angle Iron |
| Date 11/7/12 | NW | 2' South | No | Gravel | — | Same as "C" | |
| | C | 1' South | No | Gravel | N/A | Sandy Gravel, Olive Brown | |
| Time 0934 | SW | 2' South | No | Gravel | — | Clayey Silt, Olive Brown | |
| | SE | 1' N | No | loose gravel | — | Same as 'NE' location in the grid | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 25

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 25 -SS-A | NE | 5' S | No No | Gravel | — | Poorly sorted gravel w/ silty sand, damp, olv brown | |
| Date 10-31-12 | NW | 1' SE | Yes/Yes | 3" Asphalt | — | Asphalt millings 6" below asphalt Sample 6"-12" | |
| Time 1522 | C | 1' N | No No | Gravel | — | Poorly Sorted Gravel, silty sand matrix, | some asphalt, grayish-brown, damp |
| | SW | 3' WNW | (B) | 7" Asphalt | — | (A) (B) | |
| | SE | 2' N | No No | Gravel | — | (C) Poorly sorted gravel w/ sandy silt matrix, damp, olv-brown | |
| 25 -SS-B | NE | | No No | | | Same as 'A' horizon | |
| Date 10-31-12 | NW | Same as 'A' | Very Strong | Same as 'A' | — | Asphalt milling @ 12" & Poorly sort gravel, sandy, black | |
| Time 1556 | C | | No No | | — | Same as 'A' horizon materials | |
| | SW | | Yes/Yes | | — | Clay, black, sample depth 19"-25" | |
| | SE | | Yes Yes | | — | Same as @ 'A' horizon - stained w/ odor, dk brown | black |
| 25 -SS-C | NE | | No No | | — | Clayey sandy gravel, poor sorted, olv brn, damp | |
| Date 10-31-12 | NW | Same as 'A' | Yes Yes | Same as 'A' | — | Same as 'B' horizon | |
| Time 1650 | C | | Yes/Yes | | — | (D) same as @ 'B' horizon, | Clay in last 6" to 24" |
| | SW | | Yes/Yes | | — | 12" Sample: Sandy Gravel, minor silt, black | |
| | SE | | Yes Yes | | — | Same as 'B' horizon w/ more silty sand & | Clay last 2", black, strong odor |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) Start sample 6" below asphalt @ 7"+6" = 13"

(B) Sample 13"-19" Upr. 1" Gravel, sandy matrix, poorly sorted, stained, 14"-19" Black clay w/ entire sample stained w/ strong odor

(C) Surface gravel are fill over excavation for twin pipeline located 15'-20' feet E.

(D) 12-18 Gravel 18-24 clay

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 26

5 pt

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 26 -SS-A | NE | 4' North | Yes/Yes | Gravel | — | Sandy Silt Gravel, Olive Brown | Shoulder 4-6" |
| Date 11/5/12 | NW | 1' North | No | Gravel | — | Sandy Silt Gravel Olive Brown | |
| Time 0935 | C | 3' South | No | Grass | — | Sandy Silt Gravel, Olive Brown | |
| | SW | 3' East | No | Roots/Grass | — | Sandy [illegible] 11/1" | |
| | SE | 3' North | No | Grass | — | [illegible] Silt Gravel Tan | Tan Gravel @ 5"-6" |
| 26 -SS-B | NE | Same as [illegible] | Slight | Same As Above | — | Silty Sand, Dark Brown & Black | |
| Date 11/5/12 | NW | / | Mild Odor | / | — | Silty Clay, Dark Brown | |
| Time 1005 | C | / | No | / | — | Sandy Silt Gravel Olive Brown | |
| | SW | / | No | / | — | Silty Sand Some Gravel, Olive Brown | |
| | SE | / | No | / | — | Silty Sand Gravel Tan | Bricks Intact 5-16" Tan |
| 26 -SS-C | NE | / | Odor/Stain | / | | Silty Clay Black | Stopped @ 18" due to concrete |
| Date 11/8/12 | NW | / | Odor/Stain | / | | Clayey Silt Black | |
| Time 1050 | C | / | No | / | — | Sandy Silt [illegible] Tan | |
| | SW | / | Odor/Stain | / | — | Clayey Silt Black & olive Brown | 12-15" Tan 18-24" Clay Silt |
| | SE | / | Odor/Stain | / | | Clayey Silt Olive Brown & Black | Tan 12-15" 15-24" Clay Silt |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 27

5pt

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 27 -SS-A | NE | 3' East | No | Gravel | | Silty Sand Gravel Tan | |
| Date 11/8/12 | NW | 7' West | Yes | Gravel | | Clay, Silt Gravel Black | Strong Odor |
| Time 1500 | C | 15' South | No | Grass | | Silty Clay Lt Brown | |
| | SW | 2' South | No | Grass | | Silty Sand Olive Brown | |
| | SE | 2' South | No | Grass | | Sand [illegible] "C" | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 28

5pt

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 28-SS-A | NE | 2' North | No | Gravel | — | Sandy Silt, Gravel Lt Brown | Stain/Odor 5"-6" Black Tar |
| Date 11/8/12 | NW | 7' South | No | Gravel | — | Sandy Silt Gravel Tan | |
| Time 1330 | C | 15' South | No | Grass | — | Silty Clay Lt Brown | |
| | SW | 1' West | No | Grass | | Silty Sand Lt Brown (Minor gravel) | |
| | SE | 3' South | No | Grass | — | Silty Clay Lt Brown | |
| 28-SS-B | NE | See Above | | See Above | — | Sandy Silt Gravel Lt Brown | 10-12" Black Clay Stain/Odor |
| Date 11/8/12 | NW | | Stain/Odor | | — | Clayey Silt Black | |
| Time ~~1347~~ 1342 | C | | No | | — | Silty Sand Lt Brown | |
| | ~~SW~~ SE | | No | | — | Silty Clay, Lt Brown | |
| | ~~SE~~ SW | | No | | — | Silty Sand Lt Brown | |
| 28-SS-C | NE | | Stain/Odor | | | Clayey Silt Black | Brick Fragments |
| Date 11/8/12 | NW | | Stain/Odor | | | Silty Clay Black | Not as much as NE " |
| Time 1415 | C | | No | | — | Silty Clay Lt Brown | |
| | SW | | No | | | Silty Clay Lt Brown | |
| | SE | | No | | | Silty Clay Lt Brown | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 29

Split of 'C' horizon to RTI

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 29 -SS-A | NE | 4' E | No/- | Gravel | — | (A) Poorly sorted gravel (≤1½") dia) | ~~thin tan pieces @ 4" & black~~ silty sand matrix, olv brown, dark dull (B) |
| Date 11-1-12 | NW | 1' NW | No/- | Gravel | — | (A) same as 'NE' location — No tar | |
| Time 1055 | C | (C) | No/- | Loam | — | Silty clay loam dry lt. brown | |
| | SW | 3' NE | No/- | Loam | — | Same as 'C' ~~location~~ above | |
| | SE | 2' SW | No/- | Loam | — | Same as 'C' location above | |
| 29 -SS-B | NE | | No/- | | — | Clay, sandy, grayish & reddish | brown, dry, minor gravel |
| Date 11-1-12 | NW | Same as 'A' | ?/- | Same as 'A' | — | Clayey gravel w/ minor sand, black, dry | |
| Time 1126 | C | | No/- | | — | Gravelly silty loam, lt brown-tan, dry | |
| | SW | | No/- | | — | same as 'C' location above; pieces of black rock | |
| | SE | | No/- | | — | Silty Sand dry, mottling (orange), lt blu gray to reddish tan | |
| 29 -SS-C | NE | | Yes/Yes | | — | Clayey Silt, dry black - No gravel | |
| Date 11-1-12 | NW | Same as 'A' | Yes/Yes | Same as 'A' | — | Clay, dry black — No gravel — STRONG odor stn — blk-black | |
| Time 1243 | C | | No/No | | — | Gravelly silt clay loam, tan, dry | 2.5 |
| | SW | | No/No | | — | as above as in 'C' location above / Same as 'B' horizon this hole | |
| | SE | | No/No | | — | Sandy Silt, dry, No mottling, | dk tan - lt brown |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) Compacted (0-6"); driveway inside YPL fenced area

(B) Vertical 1" steel pipe w/open end on west end of hole. Loc: 'NE' is ~6' SE of concrete pad/foundation

(C) Move ~7' south of survey location — located midway between 2 E-W pipelines

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 30

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover (A) | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 30 -SS-A | NW | 0' | No/- | Seed. / | — | 5" Poorly sorted gravel w/ sand matrix, damp olv. brown, 1" Silty Sand at bottom olive brown of medium brown | |
| Date 11-1-12 | C | 0' | No/- | 1" Weeds | — | Plant litter & loam 1"-2", Silty loam 4", dry lt. brown | |
| Time 1015 | NE | 0' | No/- | 3' Gravel | — | Poorly sorted gravel w/ sand matrix, damp, olv. brown | |
| | SW | 1' N | No/- | See Soil | — | Gravelly Silty loam, same as 'NW' location | |
| | SE | 2' E | /- | See Soil | — | Same as 'SW' location | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) 'C', SE, SW sites covered at surface by grasses/weeds

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 31

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 31 -SS-A | NE | ~~30' N~~ 4A | / | Sand | | Silty clay, moist w/ gravel | |
| Date 10/26/12 | NW | 30' N | / | sparse grass | | Silty clay, brown/some organics | |
| Time 11:25 | C * | 15' of existing pt | / | sparse grass | | Silty sand w/ pebbles light Brown | |
| | SW | | / | pea gravel | | Silty clay sub/pebbles light to dk brown | |
| | SE | | / | fill | | Sand w/ some organics / lt. brown | |
| 31 -SS-B | NE | | / | See A | | Silty clay, brown | |
| Date 10/26/12 | NW | as above | / | See A | | clayey silt, grey w/ orange mottling | |
| Time 11:45 | C | | / | See A | | Silt w/ small gravel grey brown | |
| | SW | | / | See A | | silty sand w/ pebbles brown | |
| | SE | | / | " | | Sand / brown/black | dark pulverized material |
| 31 -SS-C | NE | | | | | Silty clay, brown | |
| Date 10/26/12 | NW | as above | | | | ~~Silty silt, pebbles brown~~ light to dk brown Clayey silt / Some silty pebbles w/ gravel | |
| Time 12:12 | C | | | | | Silt w/ pebbles light brown | |
| | SW | | | | | Silty sand, gravel cobbles light brown | |
| | SE | | | | | Clay w/ white precipitates some gravel / blue gray | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

* C - 15' S of marked line, 5' south of potential MW4 - picture of set after the 5 location shots, near concrete slab w/ manhole cover

N/A - moved out of blacker facility

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 32

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 32 -SS-A | SW | 1' E | No | See Soil | — | Same as 'C' location | w/ salt crystals |
| Date 10/19/2012 | NW (2) | 1' E | No | See Soil | — | Wet 0"-6" Same as 'C' | location (see below) |
| Time 0945 | C (1) | 1' E | No | See Soil | — | Wet, clay, sandy pea gravel | |
| | NE (2) | 1' SE | No | See Soil | — | As above at 'C' location - | Max. depth possible 4" |
| | SE | 1' N | YES | See Soil | None | Same as at 'C' location | HYDROCARBON ODOR |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved-Space for Graphical Sample Location inside Sample Grid:

① Close (< 4') to white salt encrustation on surface

② Hard, white (cemented) horizons (~ 1/2" thk throughout). Horizons discontinuous w/ depth

Note: MDOT representatives stated asphalt milling, and Mag-Chloride w/ salt are spread and applied as available. Coal Cinders also applied in past. Mag-Chloride still applied for dust control.

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 33

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 33 -SS-A | NE (3) | 1' N | / | Same as C | – | Silty clay, tan color w/some Black streaking | |
| Date 10.25.12 | NW (3) | 1' S | – | Same as C | – | Silty clay, tan color, some white precipitate? | |
| Time 12:05 | C (1)(3) | 10' S | – | (2) | – | Silty sand w/ poorly sorted gravels some cobbles | |
| | SW (3) | 1' N | – | Same as C | – | Silty sand ~~w/ poorly sorted~~, tan color | |
| | SE (3) | 8' N (4) | – | Same as C | – | Silty sand 3" Brown, 3" grey silty clay w/heavy Mottling | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Moved due to active pipelines

(2) Mix of Mg Chloride; asphalt

(3) removed 6" Below surface, and began sample interval

(4) Moved due to puddle

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 34

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 34 -SS-A | NE | | | | | loc dry. Pea gravel, sandy, iron w/ depth (2) | SEE comment |
| Date 10/18/2012 | NW | 10' N | No | See soil | – | Pea gravel, sandy w/ Cobbles 1"-3", stained 2"-6" | |
| Time 1227 | C | 1' W | No | See Soil | – | 1" oily stained pea gravel & sand, unstained 2"-6" | orange stain |
| | SW | 0' N (1) | No | See Soil | – | oil stain @ surface - same @ 'NW' - stain to 2" | See Note |
| | SE | | | See soil | | See Note - Same as loc 'SW'. stain to 2". | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Note: All locations very hard and compacted > 1" depth. Material is porous. Locally thin salt (?) whitish encrustation in locally low spots

(1) Surveyed location had been removed before sampling. Location selected by 'eyeballing' relative to other loc of other grids and location NE & SW of grid 34.

(2) 1" thick asphalt from 2" - 3".

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 35

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 35-SS-A | NE | (2) | | (1) | | as @ loc | w/o Cobbles (2-6" |
| Date 10/18/2012 | NW | 16' E | | (1) | | as @ loc 'C' - oily at surface (stain) | Cobble 2"- |
| Time 1139 | C | 0' | | (1) | | Sandy pea gravel | |
| | SW | 1'S | | (1) | | same @ loc "C" w/ pebbles (asphaltic at base 6"?) | |
| | SE | | | (4) | | same @ loc 'SW' w/ pebbles (gravel to 1" dia below 3") | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Compacted pea-gravel road base - HARD after 2' below surface

(2) 10' E then 3' S

(3) Stain to 1.5" below surface. Med grad sand, slightly silt to 6" w/ pebbles.

(4) minor thin dark layers surface to 3" depth

# SURFACE SOIL SAMPLING

Grid Number 36

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 36 -SS-A | NE | 12' W * | N/N | Sand | | Silty Sand w/pebbles brown | wood debris |
| | NW | | N/N | Gravel | | Silty Sand, small gravel fill | brown |
| Date 11/6/12 | C | | N/N | Gravel | | Asphalt chunks Silty Sand | black |
| | SW | | N/N | Grass Sand | | Silty Sand brown | wood debris Access Road |
| Time 14:04 | SE | | N/N | Grass Sand | | Silty Sand brown | Access Road |
| 36 -SS-B | NE | | N/N** | aa | | Silty Sand w/gravel brown | cobble clayey silt near bottom |
| | NW | | N/N | aa | | Silty sand to clayey silt brown | |
| Date 11/6/12 | C | | Slight odor | aa | | Silty Sand, Small ashphalt chunks black | brown clayey silt @ ~9-12" |
| | SW | | N/N | aa | | Silty Sand brown | |
| Time 14:37 | SE | | N/N | aa | | Silty Sand brown | concrete chunks, wood debris, glass |
| 36 -SS-C | NE | ~~same~~ | N/Y* | aa | | Silty Clay brown | |
| | NW | | N/Y* | aa | | Silty Clay brown | |
| Date 11/6/12 | C | | Sl./Sl.y | aa | | Silty clay brown | |
| | SW | | N/N | aa | | Silty Sand brown | |
| Time 15:35 | SE | | N/N | aa | | Silty Sand/pebbles brown | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

* ODOR, weathered, atypical of other odors encountered on B horizon, typical odor on C horizon to 16"

** pt on loading dock

*** encountered 4" ~~steel~~ iron pipe running N/S. at ~1½' Moved hole slightly west encountered ashalthc layer near surface w/ green + red coloration beneath

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 37
5 pt

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 37-SS-A | NE | 20 N off loading dock | N/N | gravel/fill | | Silty Sand w/gravel brown | |
| Date 11/7/12 | NW* | 20' N off loading dock | N/N | gravel/fill | | Silty Sand w/gravel brown | |
| Time 9:37 | C | | N/N | gravel/fill/silty sand | | Silty Sand, dk brown w/ pebbles | layer of asphaltic material |
| | SW | | N/N | sand/grass | | Sandy silty brown - dry | on access road by tracks |
| | SE | | N/N | silty sand w/weeds | | Sand silt brown w/ wood chips dry | on access road by tracks |
| ~~37~~-SS-B | NE | | | | | | |
| Date ~~11~~ | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| ~~37~~-SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 38 (A) (B)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 38 -SS-A | NE | 3' North | No | Loose Gravel | — | Sandy Gravel, Olive Brown | |
| Date 11/7/12 | NW | 3' West | No | Gravel " | — | Same as "C" | |
| Time 1030 | C (B) | 3' South | No | Gravel | — | Silty Sand Gravel, Lt Brown Tan | |
| | SW | 2' East | No | Top Soil | — | Silt, Dark Brown | |
| | SE | 4' North | No | Top Soil | — | Silt Dark Brown w/roots | |
| 38 -SS-B | NE | See Above | Odor/Stain | See Above | — | Tan Gravels, Black | |
| Date 11/7/12 | NW | | No | | — | Same as "C" | |
| Time 1050 | C (B) | | No | | — | Silty Sand Gravel, Olive Brown w/Cobbles | |
| | SW | | No | | — | Silty Sand, Olive Brown | |
| | SE | | No | | — | Silty Sand, Lt Brown | |
| 38 -SS-C | NE (C) | 15' North | ~~Odor~~ No | | — | Silty Sand Gravel, Large Cobbles | See Note (C) |
| Date 11/7/12 | NW | | ~~Odor~~ | | | Clayey Silt Dark brown & black | Stain @ 10" |
| Time 1715 | C (B) | | No | | | Silty Sand Gravel w/Cobbles Olive Brown | |
| | SW | | | | | Silty sand, silt @ depth Lt. brown | coal pieces |
| | SE | | | | | Silty Sand Lt. brown | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) All grid sample points in proximity to active or abandon railroad tracts

(B) "C" grid point is an approximately the alignment of concrete trench to West of point — that trench contains oily sludge previously tested Non-hazardous.

(C) Cement encountered in original "C" Depth, Moved North for Sample

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 39 w/ Duplicate 39D 1420

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 39-SS-A | NE (A) | 1' South | Odor/No Stain | | | Sandy Clay Gravel, Lt. Brown | |
| Date 11/7/12 | NW (B) | 1' South | Odor/Stain Asphalt | | | Silty Sand, Black | Tar Gravel Cap |
| Time 1415 | C | 5' South | NO | Grass/Weeds | | Sandy Silt Gravel Light Brown | |
| | SW | 3' North | NO | " | | Sandy Silt Gravel Olive Brown | |
| | SE | 3' North | NO | " | | Sandy Silt, Olive Brown, w/ Coal Dust | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) Asphalt cover - 6"

(B) Asphalt cover - 6"

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 40 (A)

5pt

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 40-SS-A | NE | | N/N | weeds silt | | Sandy silt w/ gravel brown | |
| | NW | | N/Y | asphalt 4" | | Silty sand gravel grey moist | removed 6" of [illegible] prior to sampling |
| Date 11/7/12 | C | | N/N | grass ~~[illegible]~~ pieces | | Sandy silt w/ pebbles light brown | roots / clay pieces |
| Time 11/8/12 09:34 | SW | | N/N | charcoal Silty sand/weeds | | Sandy silt gray brown | dry |
| | SE | | N/N | weeds/silt | | Sandy silt rlk brown | ground of cinders |
| 40-SS-B | NE | | N/N | aa | | Sandy silt well sorted gravels brown | cemented in places, tic chunks |
| | NW | | N/Y | aa | | Silty sand, gravel, cobbles grey, moist | |
| Date 11/7/12 | C (1) | | N/N | aa | | Sandy silt w/ pebbles light brown | dry |
| Time 11/8/12 ~~10:17~~ | SW | | N/N | aa | | Sandy silt gray brown | |
| | SE | | N/N | aa | | Sandy silt brown | orange cinders |
| 40-SS-C | NE | | N/N | aa | | Sandy silt to 16" 3" sludge silty clay silt to 18" depth | sludge material, stain/odor in [illegible] |
| | NW | | N/Y | aa | | Silty sand cobbles gray | |
| Date 11/7/12 | C | | N/N | aa | | Sandy silt w/ pebbles brown | |
| Time 11/8/12 ~~11:23~~ | SW | | N/N | aa | | Sandy silt to silt to 18" light brown | cinders, wood debris |
| | SE | | N/N | aa | | Sandy silt (brown) to silt (orange-brown) @ 18" | cinders |

A = 0"-6"; B = 6"-12"; C= 12"-24". 40-SS-C RT1 Split

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) 'C' loc in this grid is an approximate alignment of concrete-lined ditch that extended from south of loading dock @ 360 office to the same (?) concrete-lined ditch in fenced area south of YPL pumping station. Waste in ditch @ 360 was non-hazardous; the ditch waste south of YPL was hazardous.

(1) encountered asphaltic chunk @ 6"

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 41

5pt

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 41 -SS-A | NE | | N/N | grass/silt | | Sandy silt w/ pebbles - brown | |
| Date 11/5/12 | NW | | Y/Y | gravel/fill | | sandy silt w/pebbles brown | silty clay @ 6." stain/odor |
| Time 16:16 | C | | N/N | grass/silt | | Sandy silt w/pebbles brown | |
| | SW | | N/N | silt | | Sandy silt brown | light brown w/ cinders fill access road |
| | SE | | N/N | silt | | Sandy silt w/ clinker grey brown | on RR access road |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 42
5pt

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 42-SS-A | NE | | N/N | grass silt | | Sandy silt brown | roots |
| Date 11/8/12 | NW | | N/N | grass pebbles silt | | Sandy silt w/pebbles brown | |
| | C | | N/N | grass/ gravel/silt | | Sandy silt brown | condoms, roots |
| Time 13:23 | SW | | N/N | silt/sand | | Sandy silt brown | orange cinders RR access road |
| | SE (1) | 9' S | N/N | silt/sand | | Sandy silt dk brown | RR access Road |
| 42-SS-B | NE | | N/N | aa | | Sandy silt w/gravel | |
| Date 11/8/12 | NW | | N/N | aa | | Sandy silt w/gravel brown | |
| | C | | N/N | aa | | Sandy silt w/clinker cinders brown | |
| Time 14:00 | SW | | N/N | aa | | Sandy silt w/orange clinker | |
| | SE | | N/N | aa | | Sandy silt w/clinker dk. brown | |
| 42-SS-C | NE | | Y/Y | aa | | Sandy silt - add gravel ~15", clay silt @ 2" stain/odor | |
| Date 11/8/12 | NW | | Y/Y | aa | | Sandy silt to clayey silt @15" w/ slight odor | |
| | C | | N/N | aa | | Sandy silt to silt brown to light brown w/clinker | |
| Time 14:36 | SW | | N/Y | aa | | Sandy silt w/orange clinker brown to dk brown silty clay @ depth odor gray | |
| | SE | | N/N | aa | | Sandy silt gray/black | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

42-SS-C 14:44 duplicate 42-SS-B RIT Split

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Offset to S. side of road - Met refusal / hard layer @ 3" tried 3 additional holes E & W. molten/hardened material in area.

Yo SD - 1211 - 216 D1 15:32

Yo SD - 121 - 217 Rins 15:39

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana.

Grid Number 43

Spt

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 43 -SS-A | NE-(A) | 1' West | No | Grass | | Silty Clay Tan | Top 1" Light Tan Sand and Mix |
| Date 11/8/12 | NW | 1' South | No | Grass | | Silty Clay Tan | |
| Time 1535 | C | 1' West | No | Grass | | Silty Sand, Olive Brown | RTI / Split for VOC Moisture |
| | SW | 1' North | No | Grass | | Silty Clay Tan w/ Tan | Clay Lens |
| | SE | 1' West | No | Grass | | Sandy Silt Tan | Near Road |
| 43 -SS-B | NE (A) | See Above | No | | | Silty Clay Tan | |
| Date 11/8/12 | NW | | No | | | Silty Clay Tan | |
| Time 1615 | C | | Stain Odor | | | Black Clay | Tan 6-12" |
| | SW | | No | | | Silty Sand Silt | Reddish Brown Broke Br. Glass |
| | SE | | No | | | Silty Sand Tan | |
| 43 -SS-C | NE (A) | | No | | | Silt & Clay Brown | |
| Date 11/8/12 | NW | | No | | | Silty Silt w/ gravel brown | |
| Time 1645 | C | | No | | | Silty Clay Dark Brown | |
| | SW | | No | | | Silty Sand Lt. Brown | Some gravels |
| | SE | | No | | | Silty Clay Olive Brown | Black Stain 22-24" |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) NE grid point ~15' NE of tap door to steel lined sump and in ~25' from wood-lined sump (?)

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 44

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 44 -SS-A 11/2/12 Date ~~11-1-12~~ KA Time 1112 | NE | 2' E | No/ | (B) Silt | — | Silty clay loam, dry tan | |
| | NW | 12' E | No/ | (C) Silt | — | Same as 'NE' point at this horizon | |
| | C | 1' NE | No/ | (A) Silt | — | Silty Loam, organic, dk brown, damp | |
| | SW (D) | 5' NE | No/ | Leaf litter & silt | — | Silty clay loam, dry/dusty - w/minor gravel ≤1" dia | |
| | SE | 5' N | No/ | Leaf litter weeds | — | Same as SW point at this horizon | |
| 44 -SS-B 11/2/12 Date ~~11-1-12~~ KA Time 1135 | NE | | No/ | | — | Same as 'A' horizon this grid point | |
| | NW | Same | No/ | Same | — | Same as 'A' horizon this grid point - gravel minor last 2" | |
| | C | as | Yes/Yes | as | — | 3" Silt Loam (same as 'A' horizon), 3" sludge (sandy) | |
| | SW | 'A' | No/ | 'A' | — | Same as 'A' horizon @ this grid point, incr silt, hard last 2" | |
| | SE | | No | | — | Cobbles @ below 10". Same as 'A' horizon this grid pt. | |
| 44 -SS-C 11/2/12 Date ~~11-1-12~~ KA Time 1203 | NE | | No/ | | — | Same as 'B' horizon this pt - incr clay and hardness | |
| | NW | Same | | Same | — | Same as B horizon this grid point - w/minor gravel @ 18" | |
| | C | as | Yes/Yes | as | — | SLUDGE Moderate viscosity, shiny black (bluish) | |
| | SW | 'A' | | 'A' | — | Gravelly @ 14". Hard, dense clay silt lt. brown-tan End gravel 20" | |
| | SE | | | | — | Gravelly 14"-24" w/ occasional cobbles, hard dense clay silt (as @ SW) | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Duplicates collected 44-SS-Cd 12:08

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) Grid point is @ SW corner of lowest pt. of pond. Pond holding water. Surface soils wet from rain last night.

(B) Located on pennisula extending into pond from N. Approx 5' higher than the 'C' point

(C) Location offset from survey stake about 12' E to offset pipeline 2' W of stake

(D) Location is ~8'-10' E of pipeline (N-S) - CONOCO

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 45 (A)

~~This~~

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 45 -SS-A | NE | (B) 2' N | No/No | loam | | Silty Sandy loam, tan, dry | |
| Date 11-1-12 | NW | (C) 2' N | Yes/Yes | Gravelly loam | | (D) 4" Silty clay loam, tan dry, 2" sandy sludge | |
| Time 1410 | C | 2' N | No/ | Silt | | Clay loam, dry, dk brown (organic), coal chips to 1/2" | |
| | SW (E) | ~5' N | No/ | loam | | Silty sand loam, tan dry | |
| | SE (E) | ~5' N | No/ | loam | | Silty sand loam, tan to dk brown, dry | |
| 45 -SS-B | NE | | No/ | | | Same as 'A' horizon | |
| Date 11-1-12 | NW | Same As | Yes/Yes | Same as | | 3" Silty loam, 3" sandy sludge, black (layered) | |
| Time 1428 | C | | No/ | | | Same as 'A' horizon w/o ~~slat~~ coal, orange mottling | |
| | SW | A, above | No/ | A, above | | Same as 'A' horizon | |
| | SE | | No/ | | | Same as 'A' horizon | |
| 45 -SS-C | NE | | No/No | | | Same as 'B' & 'A' horizon - becoming gravelly | |
| Date 11-1-12 | NW | Same as | Yes Yes | Same as | | SLUDGE, wet, ~~[illegible]~~ mollasses, black, soft/shiny (F) | |
| Time 1447 | C | | Yes Yes | | | Sandy sludge, black, wet, blue-black | |
| | SW | A, above | No/No | A, above | | Same as 'B' horizon, hard/dense, Cobbles 18"-24" depth | |
| | SE | | No/No | | | Sandy clay dry dense, hard, tan-lt brown, Cobbles 14"-18" depth | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) This grid point 'C' is located near center of the second deepest portion of pond site. Site is dry.
(D) 'NW' Site vibrates when jumped up-down or hit with hard object.
(B) Grid point located on bank above pond
(C) Grid point located at NW corner in/on pond bottom — about same elevation as grid point 'C'
(E) Location on bank above south side of pond — located just N of fenceline
(F) Sludge so soft/low viscosity that weight of auger easily and quickly pushed through sludge to depth 5' below surface — bottom not ~~detected~~

# SURFACE SOIL SAMPLING

Grid Number 46

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 46 -SS-A | NE | | / | asphalt millings | | Silty sand dk brown | |
| Date 10/26/12 | NW | | / | weeds | | Silty sand grey brown | |
| Time 14:00 | C | | / | gravel/asphalt mill/weeds | | Silt/small rocks brown | |
| | SW | 3' N/ollroad | / | asphalt millings/grass | | Silt / small rocks grey brown | |
| | SE | | / | " | | Silt / small rocks grey brown | |
| * 46 -SS-B | NE | | / | | | Silty sand grey brown | |
| Date 10/26/12 | NW | as above | / | as above | | Silty sand grey | ashy |
| Time 14:20 | C | | / | | | Silty sand grey brown | few coal chunks |
| | SW | | / | | | Silty clay light brown | pebbles |
| | SE | | ✓ | | | Silty sand w/ cobbles brown | |
| 46 -SS-C | NE | | | | | Silty sand, small rocks, dk grey brown | small white chunks |
| Date 10/26/12 | NW | | | as above | | Silty sand, small rocks grey brown | |
| Time 14:40 | C | as above | | | | Silty sand, small rocks dk brown | |
| | SW | | | | | Silty clay orange brown, orange staining | |
| | SE | | | | | Silty sand brown | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

* Split collected by RTI

YOSD-1210-500 Decon Water 15:33
Composite 10/2, 10/12, 10/18, 10/24

# SURFACE SOIL SAMPLING

Grid Number 47

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 47 -SS-A | NE | 1' E | No | See soil | — | Same as loc 'C' transition from gray black to black | |
| Date 10/18/2012 | NW | 1' W | No | See soil | — | Same as loc 'C' 0"-4", 4"-6 dk black | |
| Time 1452 | C | 1' N | No | See soil | — | Black (coal? oil stain) pea gravel, sandy, pebbles | |
| | (2) SW | 1.5' S | No | Weeds See soil | | Black (coal? oil stain) pebbly sandy gravel, (1) see comment | |
| | (2) SE (3) | 3.5' NW | No | See soil | — | 0-5" Same as SW loc 5"-6" lt gray silty sand | |
| 47 -SS-B | NE | 1' E | No | See "A" | — | Same as material @ 'A' depth (w/ coal dust) | |
| Date 10/18/2012 | NW | 1' W | No | | — | Lt. gray silty sand w/ coal dust throughout | |
| Time 1513 | C | 1' N | No | | — | Coal dust and lt. gray silty sand, occ. pebbles & gravel, dry | |
| | SW * | 1' N | No | | — | Same as 'A' horizon w/ incr pebbles & gravel (lt-med gray) | |
| | SE | 3' N | No | | — | lt-med gray silty sand (minor occ pebbles) (4) | |
| 47 -SS-C | NE | | | | — | Same as horizon A & B, gravelly | |
| Date 10/18/2012 | NW | Same as 'B' loc | | See "A" | | Same as "B" horizon, gravelly | |
| Time 1614 | C | | | | — | See 5 below | |
| | SW | | | | | 1" same as B, 8" olv brn silty sand, incr clay, orange mottling | |
| | SE | | | | — | Olv brown clayey silty sand, fn-med grnd, dry | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

47-SS-CD Duplicate 1614

Reserved Space for Graphical Sample Location inside Sample Grid:

(2) Both SW & SE location at toe of RR embankment

(1) 0"-3" black coaly (?) material. 3"-6" lt. gray silty sandy w/ pebbles, dry

(3) 5' N of Sprint fiber optic cable; 3' NW of staked loc

(*) Loc. moved from 'A' horizon to further offset AT&T line (now ATT 4' south of loc)

(4) Change to silty sand, lt. olive, dry from 9"-12" depth

(5) 12"-16" Igneous rock, 16"-20" gravel, sandy 20"-24" silty sand olv. brown, one cats-eye marble (orange)

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 48

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 48 -SS-A | C ① | 1' W | No | See Soil | — | Sandy pea gravel, oil stained (?) 1-3", Silty Sand, olive, 3-6" | |
| Date 10-18-2012 | NW ① | 1' NE | No | See Soil | — | Same as for @ 'NE' | |
| Time 1413 | NE ① | 0' | No | See Soil | — | Sandy pea gravel, oil stained throughout | |
| | ③ SW ② | 1' N' | No | Coal dust | — | Coal dust? Fine silty sand and coal dust 0-6" | |
| | SE ② | 1' N | No | See Soil | — | Same as SW location, gravelly @ 5"-6" | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① Location contained oil stain in soil materials at surface

② Locations at toe of RR embankment

3

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 49

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 49 -SS-A | NE (2) | 2' S | — | 8" (1) | — | Sand / pea gravel, layered with asphalt millings | |
| Date 12.25.12 | NW (2) | 2' E | (3) | 14" (1) | — | Black Sand 2", Bluish Black Silty clay (smell in clay) | |
| Time 13:00 | C (2) | 1' E | ✓ | 18" (1) | ✓ | Coal / Medium Coarse 4", 2" tan silty clay | |
| | SW | 1' E | ✓ | Veg Debri | ✓ | Silty Sand with gravels on top of Pit Burm | |
| | SE | 4' N | ✓ | " | — | Coal dust w/ some sand & gravels | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Asphalt chunks & magchloride

(2) removed 6" Below surface material, sampled next 6"

(3) VERY Strong hydrocarbon smell

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 50

4 pt. Composite (No Center pt)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 50 -SS-A | NE (4) | 3' SE | Hydrocarbon | 16" Asphalt | — | Coarse grey sand with large gravels | cobbles |
| Date 10-25-12 | NW (2)(3) | 1' S | — | 8" Asphalt | — | tan clay with black "chunks", some red hues in clay | |
| Time 14:26 | C (2) | 2' N | — | — (1) | — | | |
| | SW | 1' E | — | Veg Debri | — | Silty Sandy pea gravel @ toe of RR Berm | |
| | SE | 1' E | — | Veg Debri | — | Coal with sandy gravel @ toe of RR berm | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Asphalt millings

(2) Moved VPH sample to NW Corner Location, Due to inability to get below demolition debri

(3) 10" of gravel cobble fill, sampled next 6" interval

(4) 10" of dry river gravel fill, large cobbles; Medium light grey sand

Blank-208 14:50 Rinsate-209 15:00

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 51

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 51 -SS-A | NE ① | 1' W | Hydrocarbon | 12" Asphalt | – | Sandy Cobbles / gravel 0"-6", Sampled Clayey silt gray ← Hydrocarbon smell | |
| Date 10-25-12 | NW ① | 2' W | Hydrocarbon | 15" Asphalt | – | 2" sandy gravel, 4" Clayey silt (silt has hydrocarbon smell) | |
| Time 15:45 | C ① | 2' S | Hydrocarbon | Asphalt 6" | – | Silty Sand w/ poorly sorted gravel, 3"-5" grey clay, Hydrocarbon smell | |
| | SW ② | 1' N | – | gravel | – | Silty Sand gravels, Dark Brown | |
| | SE ② | 2' S | – | " | – | " " " | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① Asphalt, Removed 6" below Asphalt Horizon, sampled next interval

② @ Base of RR Berm, in drainage / Depression.

# SURFACE SOIL SAMPLING

Grid Number 52

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 52 -SS-A | NE ① | 10' S | No | Gravel | — | 2" thk organic layer over, | Sandy Gravel, moist |
| Date 10/5/2012 | NW ② | 10' S | No | Gravel | — | As above (loc NE), thinner organic layer | |
| Time 0935 | C | 1' W | No | Gravel | — | Sandy Gravel, med gray – No carb | |
| | SW | 1' SW | No | Silt Gravel | — | Sandy silt, wet, orange-brown, mottling, w/ gravel | |
| | SE | 1' W | No | Silt | — | Clayey silt, ~~wet~~ damp, brown, minor orange tint | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① Loc is 10' N of Sewer line and > 20' N of pole. and 6' S of ATT fiber optic

② Same spot as NE loc

# SURFACE SOIL SAMPLING

Grid Number 53 (4)

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 53 -SS-A | NE (1) | 15' S | – | Veg Debri | – | Silty sand with gravel | |
| Date 10.24.12 | NW (2) | 15' S | – | Gram | – | Silty Sand with Gravel fill material | |
| Time 9:30 | C | 1' SW | – | Veg Debri | – | Silty Sand with gravel light tan | |
| | SW (3) | 0.5 | – | 6" Asphalt | – | Silty Clay, gray, with gravels | |
| | SE | 7' NE | – | Veg Debri | – | light tan sandy silt w/ gravels | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) offset 2' W of water line

(2) Next to RR tie, mostly RR ballast

(3) Dug 6" Below base of Asphalt to start sample

(4) RTI took a split sample at this Location

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 54

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 54 -SS-A | NE② | 15' S | – | Coal dust/ weeds | – | Coal dust sands & clinker chunks | |
| Date 10-23-12 | NW | 15' SW | – | Coal dust/ weeds | – | Coal dust, Sand, down 0"-2" (Black), 2"-6" | Silty clay light tan |
| Time 14:50 | C ① | 14' S | – | Coal Dust/ weeds | – | Clinker chunks, coal dust, sand. | |
| | SW③ | 13' W | – | Coal Dust/ weeds | – | Very compacted silty sands with cobbles, Coal dust top 1" | |
| | SE | 2' N W | – | Coal Dust/ weeds | – | Coal dust & sands, wood debri | |
| 54 -SS-B | NE② | " | – | – | – | tan silty sand, bottom 1" dark | brown silty sand |
| Date 10-23-12 | NW | " | – | – | – | Same as C Loc | |
| Time 15:40 | C ① | " | – | – | – | Coal dust w/sand & Clinker | |
| | SW③ | " | – | – | – | Same as C Loc | |
| | SE | " | – | – | – | tan silty sand w/ clinker | |
| FH -SS-C | NE② | " | – | – | – | Sandy Coal dust, 0-20' grey sand, 21'-23' Klinker, 24" Coal dust | |
| Date 10-23-12 | NW | " | – | – | – | tan silty sand | |
| Time 16:05 | C ① | " | – | – | – | Grey gravely Sand w/ Coal dust & Klinker | |
| | SW③ | " | – | – | – | Coal Sand w/ Klinker | |
| | SE | " | – | – | – | Same as C Loc | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

① Moved South Due to RR line Spur, offset to avoid Atlit line & Pipeline

② Moved South due to tracks & utility lines

③ Moved site due to Utility lines

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 55

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 55 -SS-A | NE | 15' S | / | Coal Dust/ Weeds | / | Coal dust, sands, some gravel 0"-4" @5" white/Black gravel, 6" Coal dust sands | |
| Date 10-23-12 | NW | 15' S | / | Coal Dust/ Weeds | / | Coal dust, sands, some gravel | |
| Time 1410 | C | 7' N | / | Coal Dust/ Weeds | / | Coal dust, sand, some gravel | |
| | SW | 1' NE | / | Coal Dust | / | Coal dust, sand, some gravel, Metal debri | |
| | SE | 3' NE | / | Coal Dust | / | Dark Brown silty sand to 4", 4"-6" Sandy silt light Brown | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 56

4 pt. Composite

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 56 -SS-A | NE | 15' S | – | Coal dust | – | Coal dust, some organics, larger chunks of coal, some pebbles | |
| | NW③ | – | – | – | – | ③ – | |
| Date 10-23-17 | C①② | 15' S | – | Coal dust | – | South embankment from Paddy plant Spur line, Sandy sm. gravel, lots of organics | |
| Time 11:55 | SW | 3' NE | – | grass/weeds | – | Sandy Coal dust with gravels, some organics | |
| | SE | 1' W | – | weeds | – | Sandy Loam with decomposing wood, some old Manure | |
| 56 -SS-B | NE | " | – | – | – | Sandy Coal dust w/ gravels dark Brown, light tan sand horizon @ 8" | |
| | NW③ | " | – | – | – | ③ | |
| Date 10-23-17 | C | " | – | – | – | Sandy Pea gravel, light grey | |
| Time 12:36 | SW | " | – | – | – | Sandy Coal dust 6"-9", 9"-12", light grey silty sands w/ gravel Ash | |
| | SE | " | – | – | – | Silty sand w/ gravel, light tan color | |
| 56 -SS-C | NE | " | – | – | – | Coal Dust sand, some gravel, Brick @ 20" (chunks), some cobbles | |
| | NW③ | – | – | – | – | ③ | |
| Date 10-23-17 | C | " | – | – | – | Silty sandy, light Brown color | |
| Time 13:10 | SW | " | – | – | – | 1" Coal dust w/ sand, 13"-24" Silty sand w/ pebbles tan color | |
| | SE | " | – | – | – | Silty sand, light Brown color, some gravel | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

① Sample site amongst Fiber optic lines & pipelines

② Some old Manure

③ Did not sample NW corner, No Site that complies with distance from Utility or pipelines & does not foul tracks (fiber optic lines, AT&T, pipelines oil?). RTI onsite approved decision

# SURFACE SOIL SAMPLING

Grid Number 57

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 57 -SS-A | NE | 15' S | – | Coal dust | – | Coal dust w/sand 0"-3", light tan sandy silt 3"-6" | |
| Date 10.23.12 | NW | ~~15~~ 20' S | – | Coal dust | – | Coal dust w/sand & some Clinker?, light brown | |
| Time 10:55 | C | 4' W | – | Coal dust | – | Coal dust organic Material dark Brown 0"-3", 3"-6" light gray sandy Coal w/dark brown | |
| | SW | 1' SE | – | coal dust | – | Organic sandy loam 0"-2" dark Brown, 2"-6" sandy coal dust w/ gravel grey color | |
| | SE | 1' W | – | Coal dust/ Cobbles | – | 0"-1" coal dust w/sand, sandy silt 1"-6" Brown w/ gravels | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① 1' S abandoned RR ties

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 58

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 58 -SS-A | NE (1) | ~15' S | No | Soil | — | Coal cinders and lt. yellowish frag. (coal fly ash?) | |
| Date 10/14/2012 | (1) NW (2) | ~10' S | No | Soil | — | Coal cinders and silty loam | |
| Time 1052 | C | 4' S | No | Soil | — | Pea gravel, sandy and coal cinders, black | |
| | SW | 1' N | No | Soil | — | Silt Loam w/ minor sand, brown | |
| | SE | 1' W | No | Soil | — | Silt Loam, brown, gravelly 4"-6" | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Orig loc adjacent to RR rail, moved loc south to base of embankment

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 58

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 58 -SS-A | NE | | | | | | |
| Date 10.19.12 | NW | | | | | | |
| Time On different sheet | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| 58 -SS-B | NE ① | 10' S | — | — | — | Coal dust, with Moderate Cement chunks, light grey color, some Metal piece | |
| Date 10.23.12 | NW ① | 10' S | — | — | — | Coal dust, cement chunacks, Black color | |
| Time 10:05 | C ① | 7' S | — | — | — | Coal dust, cement chunacks, Black color | |
| | SW | 1' SE | — | — | — | Sandy, silty light Brown | |
| | SE | 1' W | — | — | — | Silty sand 6"-9", 9"-12", sandy clay, dark Brown | |
| 58 -SS-C | NE ① | " | — | — | — | Coal dust with Cement debri, light grey, some cement chunks brage | |
| Date 10.23.12 | NW ① | " | — | — | — | Coal dust with cement debri, Black color | |
| Time 10:15 | C ① | " | — | — | — | Coal dust with cement debri, Black color | |
| | SW | " | — | — | — | Sandy silt light Brown 12"-18", 18"-24", damp sand Med grain | |
| | SE | " | — | — | — | Sandy clay Dark Brown 12"-18", 18"-24" Silty clay yellow/green color | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

① Called light grey chunks ~~cement~~ Concrete, but have highly porous look; light density. Fly Ash?

# SURFACE SOIL SAMPLING

Grid Number 59

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 59 -SS-A | NE (2) | 3' N | Strong Asphalt | Asphalt | / | Silty sand w/ gravel dark grey | |
| Date 10-24-17 | NW (1) | 3' N | / | Asphalt | / | Same as Loc. C | |
| Time 11:30 | C (1) | 3' N | / | Asphalt | / | Silty sand w/ gravels; Cobbles | |
| | SW | 15' S | / | Lawn | | | |
| | SE (2) | 2' NW | / | Asphalt | / | poorly sorted sandy gravel, dark grey | |
| ___-SS-B | NE | | | | | | |
| Date ___ | NW | | | | | | |
| Time ___ | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| ___-SS-C | NE | | | | | | |
| Date ___ | NW | | | | | | |
| Time ___ | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) 3" Asphalt removed, 6" fill removed, then sampled the next 6" interval

(2) 2" " " " " " " " " "

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 60

4pt. Composite

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 60 -SS-A | NE① | 17' E | / | Concrete | / | 1" Black Silty Sand, 5" grey Silty clay | |
| Date 10/24/12 | NW | 15' E | / | gravel/ Sand | / | Sand, w/ lots of gravel fill poorly sorted | |
| Time 13:20 | C | 2' S | / | gravel/ sand | / | Sand w/ lots of gravel fill poorly sorted | |
| | SW E | — | — | — | — | Does not Exist Building on site | |
| | SE② W | 4' NE | / | Black sand | / | Black Sand w/ lots of gravel fill poorly sorted | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① 8" Concrete, removed 6", Sampled next 6" interval

② Black Sand from sand Blasting Activities

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 61

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 61 -SS-A | NE | 2' W | — | Sand/gravel | — | Highly compact silty sand w/ cobbles & gravel | |
| Date 10.25.12 | NW① | 3' S | — | 6" Concrete | — | Silty sand w/ poorly sorted gravel | |
| Time 9:20 | C① | 3' W | — | 8" Concrete | — | Silty sand w/ poorly sorted gravels | |
| | SW | 7' S | — | Sand/gravel | — | Silty sand w/ poorly sorted gravels | |
| | SE | 10' N | — | Sand/gravel | — | Silty sand w/ poorly sorted gravels | |
| 61 -SS-B | NE | " | Hydrocarbon | — | — | Silty sand w/ poorly sorted gravels, 10"-12" Black sand | |
| Date 10.25.12 | NW | " | — | — | — | Sandy gravel | |
| Time 9:50 | C | " | — | — | — | Silty sand w/ poorly sorted gravels | |
| | SW | " | Hydrocarbon | — | — | 6"-8" sandy silt w/ gravels 8"-10" dark grey clay, 10"-12" sandy silt | |
| | SE | " | — | — | — | gravels w/ cobbles & sand | |
| 61 -SS-C | NE | " | Hydrocarbon | — | — | Silty sandy clay w/ gravels | Dark, strong Hydrocarbon |
| Date 10.25.12 | NW | " | Hydrocarbon | — | — | Brown silty sand 12"-16" grey silty clay 16"-24" strong Hydrocarbon | |
| Time 10:20 | C | " | Hydrocarbon | — | — | Sandy silty dark grey silty clay / strong Hydrocarbon | |
| | SW E | " | — | — | — | Silty sand w/ gravels. Brown color | |
| | SE W | " | Slight Hydrocarbon | — | — | light grey clay 12"-22" slight Hydrocarbon smell, 22"-24" light Brown sand | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

① Removed 6" Below Concrete base, then began sampling interval

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 62

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 62 -SS-A | NE① | 0 | Hydro | 8" Concrete | — | Blueish grey silty clay, slight hydro carbon smell | |
| Date 10.24.12 | NW② | 2' E | — | Concrete Bit. | — | Sandy gravel w/ Concrete chunks & cobbles | |
| Time 15:30 | C① | 0 | Strong Hydro | 6" Concrete | — | Blueish grey silty clay, strong Hydrocarbon smell | |
| | SW③ | 4' E | — | gravel/sand | — | silty sand w/ poorly sorted gravels, tan color | |
| | SE③ | 2' W | — | gravel/sand | — | Silty sand w/ gravels & cobbles, tan color | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① Sampled 6"-12" below Concrete, Removed 0"-6"

② Sampled 0"-6" Horizon out of 1' hole

③ Air Knifed hole sampled off fresh side wall

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 63

Duplicate 63AD time: 14:55

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 63 -SS-A | NE (3)(1) | 4' E | Strong Hydrocarbon | 6" Concrete | (5) | Black silty clay | |
| Date 10.24.17 | NW | 1' SW | " " | 6" Concrete | (6) | Blue/Black silty clay, damp | |
| Time 14:50 | C (1) | 1' N | Strong Hydrocarbon | 12" Concrete | (2) | Black silty clay | |
| | SW | 13' E | — | wood Debri. | — | Sandy gravel poorly sorted, moved due to fill pile | |
| | SE | 13' E | — | gravel/sand | — | Sandy silt w poorly sorted gravel, moved due to Electrical Lines | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) 12" Concrete Cover, removed 8", started sampling the 8"-14" horizon below Concrete

(2) Sample point 120 ppm VOC, 1% LEL (0 heated). Ready taken in sample Boring (160 ppm Heated)

(3) Abanded Electrical Utility connection @ Base of Concrete

(4) Air Knifed 6" Below base of Concrete, Sampled next 6"

(5) 84 ppm & 0% LEL in hole Sample

(6) 57 ppm & 0% LEL

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 64

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 64 -SS-A | NE | 2' N | Ø | weeds | Ø | Silty sand, light Brown, dry | |
| Date 10.10.12 | NW | 2' W | Ø | weeds, organic at current dev | Ø | clayey Sand w/ orange mottling | edge of concrete foundation surrounded by [illegible] |
| Time 14:45 | C | 4' S | Ø | demo debri | Ø | Broken Concrete, Cinderblock, damp | demo debris, grey & black, [illegible] |
| | SW | 1' W | Ø | sand gravel | Ø | poorly sorted gravel w/silty sand Matrix, damp, dark brown | |
| | SE | 2' SW | Ø | demo debri | Ø | Dark Brown, damp, poorly sorted gravel, silty sand, lots or roots | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 65

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 65 -SS-A | ~~NE~~ SE | 1' S | Ø | ~~weeds~~ weeds organic | Ø | Lots of organic matter, chunks of degraded Asphalt. Silt & clay, levee over bank | Homeless persons camp, Marshy |
| Date 10.10.12 | ① NW | 4' SW | Ø | weeds | Ø | Black color. 4" coal dust, silty sand 2". | Coal dust top layer, 2 track rd. |
| Time 11:47 | C | 1' E | Ø | weeds | Ø | light brown, Sandy silt, manure likely | Pig pen, w levee over bank |
| | SW | 1' W | Ø | organic filter | Ø | dry, sandy silt. light brown. | ditch levee |
| | ② ~~SE~~ NE | 1' S | Ø | Coal dust weeds | Ø | RR ballast @ 4", 4" Coal dust Black color | Coal dust layer, 2 track Rd., Sandy silt |
| 65 -SS-B | NE | 1' S | Ø | / | Ø | Coal dust minor, grey brown, silty sand, few gravel areas 1"-2" sized cobbles | |
| Date 10.10.12 | NW | 4' SW | Ø | / | Ø | Brown Silty sand. | |
| Time 12:30 | C | 1' E | Ø | / | Ø | gravel @ 10", silty sand light Brown | |
| | ~~SW~~ E | 1' ~~W~~ S | Ø | / | Ø | Silty sand, minor amount of asphalt, light brown, dry | |
| | ~~SE~~ W | 1' ~~S~~ W | Ø | / | Ø | light brown sandy silt, dry | |
| 65 -SS-C | NE | 1' S | Ø | / | Ø | Sandy silt grey brown, gravel .5"-3" Loosely mixed, poorly sorted | |
| Date 10.10.12 | NW | 4' SW | Ø | / | Ø | Sandy silt, Brown, some large root material | |
| Time 13:50 | C | 1' E | Ø | / | Ø | Sandy silt, with some clayey sand. Small green area | |
| | SW | 1' W | Ø | / | Ø | Silty sand, poorly sorted gravel, grey brown color | |
| | SE | 1' S | Ø | / | Ø | light brown silty sand, bottom 6" Sand (medium) | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① 4' S of Atit, 3' N of fiber optics line, ~~N~~

② NE ¼ NW samples 8" higher elevation, than center sample

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 66

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 66 -SS-A | NE | 10' N | Ø | Coal Dust, Angular RR ballast | Ø | Pea gravel, RR gravel w/ fine sand Silty Matr | Moved due to Fiber optics & AT&T lines |
| Date 10.9.12 | NW | 4' S | Ø | grass | Ø | Sandy silt, damp, Dark brown | |
| | C | .5' SW | Ø | grass, dark soil | Ø | silty sand, Medium yellowish brown | ~~Marsh bottom~~ ditch levy |
| Time 15:52 | SW | 1' S | Ø | grass wetland vegetation | Ø | Organic Sandy Silt, damp, | Marsh bottom, Lots of veg. material |
| | SE | 1' N | Ø | grass | Ø | 3" down, rest is silty sand yellowish gray | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 67

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 67 -SS-A | NE | 1' E | Ø | Veg. Debri | Ø | 3" of Coal dust, then gravelly sands 3"-6" | |
| Date 10·17·12 | NW① | 1' NW | Ø | Bull grass Ballast Coal dust | Ø | 6" Coal dust, Black | |
| Time 9:40 | C | 1' E | Ø | weeds Veg. Debri | Ø | Sandy Loam, roots, Olive Brown, | on ditch bank |
| | SW②③ | 3' S | Ø | Veg Debri | Ø | Sandy loam, roots, Olive Brown | In middle of bareless camp |
| | SE④ | 2' NE | Ø | Veg Debri | Ø | Sandy loam 0"-3", Sandy gravel 3"-6" | |
| 67 -SS-B | NE | " | Ø | – | Ø | Silty sand light brown, some gravel | some Coal chunks in Horizon |
| Date 10·17·12 | NW | " | Ø | – | Ø | large chunks of Coal, with fine Coal | dust, 1" layer of gravel sands from |
| Time 10:10 | C | " | Ø | – | Ø | Olive Brown Clayey sand loam, roots | |
| | SW | " | Ø | – | Ø | Clayey Sands greyish brown, with | Orange Mottling |
| | SE | " | Ø | – | Ø | Silty sand w/some gravel light | Brown |
| 67 -SS-C | NE | " | Ø | – | Ø | Silty sand greyish yellow | |
| Date 10·17·12 | NW | " | Ø | – | Ø | Chunks of Coal, fine Coal, Black | 1" of Coal |
| Time 10:45 | C | " | Ø | – | Ø | Clayey Sands 12"-18", clay greyish | 18"-24", orange Mottling in clay, water @ 24" |
| | SW | " | Ø | – | Ø | light green/Brown Sandy clays, | |
| | SE | " | Ø | – | Ø | greyish brown silty sands, 1.5" white | Precipitate? |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① NW location 10'-12' higher than Center location

② 5' higher than center location

③ SW site 20' from Bull dozed Pile of soil

# SURFACE SOIL SAMPLING

Grid Number 68

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 68 -SS-A① | NE | 1' SW | Ø | weeds | Ø | Loam/Coal 0"-2", 2"-8" Sand with some | gravel, grey color, on RR embankment |
| Date 10·17·12 | NW | 1' E | Ø | Veg. Debris | Ø | 2" coal/loam, 2"-6" pebbly Sands | |
| Time 12:05 | C | 1' W | Ø | Dry grass | Ø | Loam w/ some silty Sand. Scrap Metal | all around site, on side of berm |
| | ~~SW~~ E | 1' E | Ø | Sand | Ø | Dark grey silty Sand w/ some organics | under blown down cottonwood |
| | SE W | 1' W | Ø | Veg Debris | Ø | Loam 0"-3", silty clay and Sand @ 6", | Olive Brown some organics |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① All 5 pts. same elevation relative to ditch

# SURFACE SOIL SAMPLING

Grid Number 69

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 69 -SS-A | NE | 1' S | Ø | grass/Debris | Ø | Silty sandy loam, organic Material, at Toe of RR embankment | |
| Date 10.17.12 | NW | 1' S | Ø | grass/Debri | Ø | silty sandy loam, w/ organic matter, old metal check; wood in bore hole | |
| Time 13:00 | C | 1' SW | Ø | veg Debri | Ø | Silty loam with some gravel | |
| | SW | 1' N | Ø | Sand | Ø | 8' W of Conoco pipeline, sandy silt, top of ditch levy | |
| | SE① | 1' E | Ø | veg Debri | Ø | Silty sandy loam, with organic matter, on Ditch levy | |
| 69 -SS-B② | NE | " | Ø | — | Ø | Silty Sand, some organics, dark brown | |
| Date 10.17.12 | NW | " | Ø | — | Ø | silty sand w/ some gravel & cobbles | |
| Time 13:25 | C③ | " | Ø | — | Ø | Silty sand with pebbles, tan/gray color | |
| | SW | " | Ø | — | Ø | silty sand light Brown/grey | |
| | SE | " | Ø | — | Ø | Silty sand, light brown/grey color | |
| 69 -SS-C② | NE | " | Ø | — | Ø | silty sand w/ pebbles, 22"-24" dark Brown sandy clay mixed w/ pure sand areas | |
| Date 10.17.12 | NW | " | Ø | — | Ø | silty sand w/ large cobbles 12"-18" 18"-24" silty sand w/ white precipitate ? orange nodules | |
| Time 13:45 | C | " | Ø | — | Ø | Silty sand light greyish/Brown | |
| | SW | " | Ø | — | Ø | silty sand, white precipitate @ 19" for 1" | |
| | SE | " | Ø | — | Ø | Silty sand light greyish/Brown | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① 30' W of an apparently abandoned pipeline

② Moved Second & third samples 2' N of original hole, Due to At & t's utility marker

③ Metal Can found in hole

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 70 South

3pt. Composite

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 70 -SS-A ① | ~~NE~~ | | | | | | |
| | ~~NW~~ | | | | | | |
| Date 10.17.12 | C | 1'S | Ø | veg debris | Ø | Silty, Sandy, Loam, dark Brown | |
| Time 15:00 | SW | 1' NW | Ø | veg debris/Metal | Ø | Silty, Sandy, Loam, dark Brown 0'-2", 2"-6" Sandy silt grayish/Brown | |
| | SE | 1' S | Ø | veg debris | Ø | Silty Sandy Loam, dark Brown 0'-3", 3"-6" silty sand, grayish Brown | |
| -SS-B | ~~NE~~ | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | ~~NE~~ | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① Rob ~~Robe~~ Roll authorized a 3 pt. composite 10-17-12

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 70N & 70N-D
3pt. composite

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (LEL) & $H_2S$ (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 70 -SS-AN | NE | 2 | No | 2 1 | 0.0 | Dk black, clayey loam & gravel | RR ballast |
| Date 10-18-12 | NW | No | No | 1 | | Same as above & below | |
| Time 10:10 | C | No | No | 1 | | Dk black, clayey loam & gravell. (RR ballast) | 3 |
| 10:11 Dup | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

70N-SS-AD Duplicate 10:11

Reserved Space for Graphical Sample Location inside Sample Grid:

1. On side of RR embankment weed and fill
2. Moved 10' North of started location (on line w/ AT&T buried line)
3. Metal Bar @ 6" below surface

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 71

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 71 -SS-A | NE | 1.5 NW | No | Gravel Fill | / | Same loc 'C' | |
| | NW | 3' N | No | Silt | / | silt, minor sand, greenish gray - no gravel, no carb | |
| Date 10/4/2012 | C | 1.5 N | No | Gravel Fill | / | Gravel, sandy clayey, cobbles | dk gray, moist |
| Time 1424 | SW | 5' W | No | Gravel Fill | / | Same as loc 'C' | med gray (thin carb layer) |
| | SE | 2' SW | No | Gravel Fill | / | Same as loc SW above | " |
| 71 -SS-B | NE | 1.5' NW | No | " | / | clayey silt, greenish brown, moist | |
| | NW | 3' N | No | Same | / | Same as in 71-SS-A, dry | |
| Date 10/4/2012 | C | 1.5' N | No | As | / | Gravel (Compact / HARD) - same as 'A' above | |
| Time 1451 | SW | 5' W | No | 'A' | / | Compact Gravel - same as loc 'C' above | BIG ROCK @ bottom |
| | SE | 2' SW | No | " | / | Same as 'C' in 71-SS-B | HARD!! |
| 71 -SS-C | NE | 1.5' NW | No | " | / | sandy silt, greenish brown, moist | no gravel |
| | NW | 3' N | No | Same | / | silty sand, lt grayish | no gravel |
| Date 10/4/2012 | C | 1.5' N | No | as 'A' | / | Sandy silt, greenish brown, moist | no gravel |
| Time 1550 | SW | 5' W | No | A | / | sandy silty Gravel, HARD | med gray |
| | SE | 2' SW | No | " | / | Gravel (Cobbles) HARD Compact - silty sand matrix, lt gray | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 72

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 72 -SS-A | NE (4)(5)(6) | 3' E | — | wet Black dirt | — | 0"-5", Black sandy silt w/ poorly sorted gravels. 5" tan silty clay | |
| Date 10-24-12 | NW (1)(2) | 1' W | — | Black Sand | — | Black sand 0"-3", silty clay 3"-6" light tan | |
| Time 13:50 | C | 1' W | — | gravel fill | — | dark Brown silty sand w/ poorly sorted gravels | |
| | SW (3)(4) | 1' SE | — | fill Material | — | silty sand w/ poorly sorted gravels | |
| | SE (6) | 1' E | — | fill Material | — | silty sand w/ poorly sorted gravels | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Black Sand from Sand Blasting activities

(2) High truck traffic

(3) fill Material consists of river gravel, cobbles, Broken sewer tile, concrete, Broken fiberglass panelling, wood chips

(4) 3 offsets encountered concrete @ 6"

(5) hole Air Knifed

(6) Surface drain 11' S of survey pt

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 73

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 73 -SS-A | NE① | 2' S | / | Sand/gravel | / | Same as Loc C | |
| Date 10.25.12 | NW① | 2' S | / | " | / | Same as Loc C | |
| Time 11:00 | C ① | 2' NE | / | Sand/gravel | / | Highly compacted Sandy gravel | |
| | SW① | 4' W | / | " | / | Same as Loc C, w/ Brick chunks | |
| | SE① | 7' SE | / | " | / | Same as Loc C | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① High traffic area

# SURFACE SOIL SAMPLING

Grid Number 74

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 74 -SS-A | NE | 1' W | No | Fill Gravel | — | moist, sandy gravel – same as | Grid Loc 'C' |
| Date 10/5/2012 | NW | 1' E | No | a.a | — | Wet same as Grid Loc 'C' – | |
| Time 0955 | C | 1' E | No | a.a | — | Wet, Sandy Gravel, dk brown – | No organics |
| | SW | 2' S | No | a.a | | Same as 'C' loc – some Sd | blast Sand w/paint chips |
| | SE | 1' S | No | a.a | — | Same as @ Grid loc SW | – sand blast sand |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

1001

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Note Entire grid surface covered by gravel fill material – bladed to even elevation. Also patches of black sand-blasting sand

# SURFACE SOIL SAMPLING

Grid Number 75

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 75 -SS-A | NE | 1'E | No | Fill Gravel | No | Same as 75-SS-A Grid loc 'C', cobbles | |
| | NW | 2' S | No | as above | No | Same as NE and C above and below, Sample Wet | |
| Date 10/5/2012 | C (1) | 6'E | No | Gravel Fill | No | Gravel (Fill) med gray, dry, sandy, cobbles | |
| Time 1059 | SW | 1'W | No | as above | No | same as above Grid loc 'C' | |
| | SE | 1'S | No | as above | No | same as above in Grid loc 'C' | |
| 75 -SS-B | NE | Same as A Interval | No | Same as A Interval | No | Med sand & Sandy Gravel - same as 75-SS-A, Grid loc NE | |
| | NW | | No | | No | Gravel Fill - same as 75-SS-A Grid loc NW | |
| Date 10/5/2012 | C | | No | | No | Gravel Fill - same as 75-SS-A, Grid loc C | |
| Time 1117 | SW | | No | | No | As 75-SS-B Center - minor bits of wood | |
| | SE | | No | | No | Same 75-SS-B SW - wood & styrofoam pieces | |
| 75 -SS-C | NE | Same as A Interval | No | Same as A Interval | No | same 75-SS-B/NE | |
| | NW | | No | | No | Same 75-SS B/NW | |
| Date 10/5/2012 | C | | No | | No | Same as 75-SS-B grid loc C | |
| Time 1138 | SW | | No | | No | Same as 75-SS-B SW cobbles & concrete | |
| | SE | | No | | No | Same as 75-SS-B SE broken concrete! | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Entire site West-half (Grid) overlain by Fill gravel and occasional patches of sand-blasting sand

(1) Loc moved due to original loc on top of 8' Gravel pile

# SURFACE SOIL SAMPLING

Grid Number 76

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 76 -SS-A | NE | 2' N | Ø | Wetland Veg. | Ø | Clayey Sands... Same as Location C | on old bank of ditch, 1"-10" fill cobbles |
| Date 10-10-12 | NW | 1' N | Ø | Dump Debri | Ø | dump, dark brown silty sand w/ poorly sorted gravel | Concrete, Cinder Blocks, gravel fill |
| Time 15:35 | C | 2' S | Ø | Dump Debri | Ø | Clayey sand Matrix, around gravel fill, Debri | site in old ditch, back filled |
| | SW | 1' W | Ø | Same as C | Ø | clayey sand Matrix, around gravel fill Debri | site in old ditch, back filled dump |
| | SE | 1' N | Ø | weeds | Ø | dark brown silty sand, gravel @ 5" Poorly sorted | Brick debris in soil |
| 76 -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| 76 -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number 77

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 77 -SS-A | NE | 1' SE | No | SEE | | GRAVEL, Broken Concrete | Fill material |
| Date 10/2/12 | NW | 1' N | " | Soil | | " | " |
| Time KA ~~1027~~ 1030 | C | No | NO | Type | | " | " |
| | SW | 3' SE | " | | | " | " |
| | SE | 1' N | " | | | Wells, Cobbles, broken concrete | " |
| 77 -SS-B | NE | as above | No | SEE | | as above | Fill Material |
| Date 10/2/12 | NW | as above | N | Soil | | as above | as above |
| Time KA ~~1115~~ 1047 | C | as above | No | Type | | as above | " |
| | SW | as above | No | | | as above | " |
| | SE | as above | No | | | as above | " |
| 77 -SS-C | NE | as above | No | SEE | | as above, based concrete | " |
| Date 10/2/12 | NW | as above | No | Soil | | as " | |
| Time ~~1203~~ KA 1120 | C | as above | No | Type | | as above | " |
| | SW | as above | No | | | silty sandy gravel | |
| | SE | as above | NO | | | silty gravelly loam | brown |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number 78

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 78 -SS-A | NE | 1' E | No | Fill | — | same center location | |
| | NW | 2.5 SW | N | Fill | — | sam as center location | |
| Date 10/2/2012 | C | 1' N | No | Fill | — | Fill, Cobbles silty sand, broken concrete, asphalt | |
| Time 1616 | SW | 3' SW | No | Fill | — | as above | |
| | SE | 2' S | No | Fill | — | as above | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Lots of suspected asbestos containing material. White fibrous, powder

# SURFACE SOIL SAMPLING

Grid Number 79

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 79 -SS-A | NE | 2' N | No | SCC Soil | — | Fill, Cobbles, silty dry | Grey |
| Date 10/2/2012 | NW | 2' N | No | SCC Soil | — | Sand Clay, minor gravel | tan |
| Time 1600 | C | 1' N | No | SCC Soil | — | Fill, Cobbles, silty, dry | tan |
| | SW | 1' S | No | SCC Soil | — | Fill, gravel, clayey w/fn sand | lt. grey |
| | SE | 1' E | No | SCC Soil | — | Silt Sand | Grey |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

This site forms alignment of Yegen Ditch.
All material is fill except SE location

# SURFACE SOIL SAMPLING

Grid Number 80

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 80 -SS-A | NE | 1' W | No | weeds thin org layer | | Gravelly sand, loose - grey, dry | |
| Date 10/2/2012 | NW | | | | | | |
| Time 1540 | C | 1' W | No | " | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| 80 -SS-~~B~~ A | NE | 3' NW | No | weed gravel | — | Gravelly loam, sand | lt. grey |
| Date 10/2/2012 | NW | 2' S | No | do below | — | clayey loam - minor gvl | dk grey |
| Time 1540 | C | 1' W | No | weeds thin org layer | — | Gravelly sand, loose - grey, dry | |
| | SW | 2' E | No | as above | — | Clay loam - minor gvl | lt. brown (greyish) |
| | SE | 2' SE | No | as above | — | clayey loam | greenish grey |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

JRS 10/2

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number 81

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 81 -SS-A | NE | 14' N | orange stain | Sand | Ø | Silty sand, orange stain @ 1" | |
| | NW | 0.5' SW | Ø | gravel fill | Ø | Sand with some gravel | |
| Date 11.11.12 | C① | 16' W | Strong Hydrocarbon | gravel fill | Ø | 1/2" depth drill fm. stain, asphalt layer ~2" thick, tar like texture, gravel fill above | |
| Time 15:30 | SW | 13' N | Ø | Sand | Ø | Silty sand w/clayey layer @ 3"-4" depth | |
| | SE | 16' SE | Strong Hydrocarbon | " | Ø | Sandy gravel fill material, grey clay layer @ 5" + Strong smell @ this horizon | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① This location is still on asphaltic layer so unable to track

# SURFACE SOIL SAMPLING

Grid Number 82

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 82 -SS-A | NE | ~~8' N~~ 2' NE | Ø | gravel | Ø | Poorly sorted sandy gravel w/ cobbles damp | |
| Date 10-16-12 | NW | — | Ø | Sandy | Ø | Sand damp @ 4" bluish gray sandy clay with orange mottling | |
| Time 10:33 | C | 8' E | Ø | gravel | Ø | Poorly sorted sandy gravel | |
| | SW | 1' N | Hydro Stain | Sand | Ø | Sand damp, @ 4" bluish gray sandy clay with orange mottling | |
| | SE | 1' N | Ø | Sand | Ø | poorly sorted sandy gravel | |
| 82 -SS-B | NE | " | Ø | — | Ø | Sand, Some gravel 6"-8", damp | |
| Date 10-16-12 | NW | " | Ø | — | Ø | Sand, @ 8" clayey sand greyish blue, 10"-12" coarse poorly sorted sand | |
| Time 11:00 | C | " | Ø | — | Ø | Sand, poorly sorted damp, dark horizon @ 6" | orange mottling @ 11" |
| | SW | " | Ø | — | Ø | light Brown sand 6"-9", light Brown clay, sand @ 9" for 1" | |
| | SE | " | Ø | — | Ø | Sand damp olive Brown, some clay, Brick @ 10", some parts in sample | |
| 82 -SS-C | NE | " | Ø | — | Ø | white mottling (precipitate?) damp sandy clay, bluish gray, sand 12"-14' | |
| Date 10-16-12 | NW | " | Ø | — | Ø | Sand 12'-14', sandy clay greyish blue. Mottling orange 12"-16" | |
| Time 11:40 | C | " | Ø | — | Ø | Sand poorly sorted, white mottling 12"-16", 16"-22" sand greenish brown 22"-24" | |
| | SW | " | Ø | — | Ø | 15" river gravel, poorly sorted sandy gravel, damp | grey bl clayey sand |
| | SE | " | Ø | — | Ø | Gravely sands poorly sorted | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 85

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 85 -SS-A | NE | 2' E | Ø | gravel | Ø | gravely sand poorly sorted | |
| Date 10·16·12 | NW | 1' E | Ø | gravel | Ø | gravely sands w/cobbels poorly sorted damp | |
| Time ~~[illegible]~~ 15:30 | C | 1' E | Ø | gravel | Ø | Sandy gravel, clayey sand @ 5', poorly sorted gravels | |
| | SW | 1' S | Ø | Sand/gravel | Ø | gravely sands, poorly sorted | |
| | SE① | 1' S | Ø | Sand | Ø | ~~[illegible]~~ gravely sands, poorly sorted gravels | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① 15' from black water on top of sands, ¼ control panel (old)

# SURFACE SOIL SAMPLING

Grid Number 84

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 84 -SS-A① | NE | 1' W | Ø | gravel | Ø | Gravely sand w/scattered cobbles damp | |
| Date 10·16·17 | NW | 20' N | Ø | " | Ø | Sandy gravel damp poorly sorted | |
| Time 13:35 | C | 10' E | Ø | gravel fill | Ø | Sandy gravel damp poorly sorted | |
| | SW | 3' S | Ø | " | Ø | Sandy gravel damp poorly sorted | |
| | SE | 2' E | Ø | sandy gravel | Ø | Sandy gravel damp w/cobbles poorly sorted | |
| 84 -SS-B | NE | — | Ø | — | Ø | gravely sands damp poorly sorted | |
| Date 10·16·17 | NW | — | Ø | — | Ø | Sandy gravel, poorly sorted | |
| Time 14:00 | C | — | Ø | — | Ø | gravely sand poorly sorted damp | |
| | SW | — | Ø | — | Ø | gravely sands 6"-10", Sand 10"-12", poorly sorted | |
| | SE | — | Ø | — | Ø | gravely sands with cobbles, Black shiney asphalt chunks in this zone | |
| 84 -SS-C | NE | — | Ø | — | Ø | gravely sands w/ cobbles | |
| Date 10·16·17 | NW | — | Ø | — | Ø | gravely sands 12"-22" greyish clayey sands with orange Mottling | |
| Time 14:35 | C | — | Ø | — | Ø | gravely sands w/cobbles poorly sorted | |
| | SW | — | Ø | — | Ø | gravely sands w/cobbles poorly sorted | |
| | SE | — | Ø | — | Ø | Sand gravel w/cobbles poorly sorted | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① Butane? paint thinner? smell east side of tank in middle of grid

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 85

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 85-SS-A | NE | 1' NE | Slight Stain | " | 0 | " " " | light stain @ 2" & 6" |
| Date 10.11.12 | NW | 0.5' W | Slight Stain | " | 0 | Sand/gravel, poorly sorted, damp | light stain @ 5" |
| Time 14:00 | C | 1' NW | Strong hydrocarbon | fill gravel | 0 | Sand gravel, poorly sorted for 4", ran into ~~metal~~? plate, lower? asphalt layer | |
| | SW | 1' N | Strong hydro Staining | " | 0 | " " " | Sandy clay @ 4" Bluish grey layer |
| | SE | 1' E | Stain BK | " | 0 | " " " | Black Stain @ 3" for 1" (photo) |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

0 Riveted tank is surrounded by asphalt layer, underlayment by asphalt

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 86

4 pt composite

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 86 -SS-A | NE | — | — | — | — | Did not Sample, could not locate point ? | in unleaded marsh material |
| Date 10.11.12 | NW | 0.5' S | Ø | " " | Ø | " " " | |
| Time 13:10 | C | 15' N | Ø | gravel fill | Ø | poorly sorted gravel sand mix w/cobbles | |
| | SW | 12' NW | Ø | " " | Ø | wind blown sand off berm with large cobbles | |
| | SE | | Ø | weeds | Ø | silty sand to dam, damp | Outside tank farm, 2' from Bike trail |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number 87

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 87 -SS-A | NE | 1' SE | θ | gravel fill | θ | Silty clay top layer, gravel silt, clay | heavily compacted, dark Brown |
| Date 10.9.12 | NW | 1' S | θ | Same as C Loc | θ | Loamy, clay, silt, dark Brown, damp | |
| Time 14:00 | C | 1' S | θ | weed, mat dark brown | θ | Sandy silt, loamy dry, greyish Brown | |
| | SW | 1' S | θ | Same as C Loc | θ | Sandy silty loam, Dark Brown damp | |
| | SE | 1' S | θ | Same as C Loc | θ | Anyte loam, dried manure, dry | Orange mottling, minor gravel |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 88

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 88 -SS-A | NE | 1' SE | No | ~~00~~ at 'C' loc | — | Sandy / Silty Gravel, carbonous, med gray | |
| Date 10/4/2012 | NW | 1.5' E | No | Same as loc 'C', | — | Gravelly sandy silt, minor carb, ~~lt~~ grayish brown | |
| Time 1117 | C | 1' NW | No | compound, Fill wards / gravel | — | Sandy silt, minor gravel, no carb, grayish tan | |
| | SW ① | 1' NW | No | Compound Wards Fill Gravel | — | Sandy silty gravel, lt-med gray, no carb | |
| | SE | 3' W | No | Fill Gravel | — | Gravel, Cobbles, sandy, lt-med gray, minor carb. | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

① Loc is in the middle, under, surrounded by steel & iron scrap and salvage. Many parts w/ obvious lubrication oils exposed or covering flexible joints, bearing rollers

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 89

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 89 -SS-A | NE | No | No | loamy gvl | | loamy gravel | as below |
| Date 10/2/12 | NW | N | No | as above | | as above | as below |
| Time 13:40 | C | None | No | loam/gvl | | loamy (gravelly) | Lt. grayish brown |
| | SW | No | No | as above | | as above | as above |
| | SE | No | N | as above | | as above | as above |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 90

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 90 -SS-A | NE | No | No | see soil type | | Cobbles, broken concrete | grayish tan |
| Date 10/2/12 | NW | 1' E | No | | | gravelly loam | as below |
| Time 14:00 | C | No | No | grass weeds | | gravelly loam | lt. grayish brown |
| | SW | No | No | gravelly weeds | | as above (+1in organic layer) | grayish black |
| | SE | No | No | as above | | gravelly loam | lt. grayish brown |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 91

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 91 -SS-A | NE | No | No | see soil | — | sandy-clayey loam - no gravelly | grayish brown |
| Date 10/2/12 | NW | 1.5' W | No | gravelly loam | — | gravelly loam | as above |
| Time 14:20 | C | No | No | see soil | — | minor gravelly loam w/ | manure - grayish brown |
| | SW | 2' W | No | as above | — | very gravelly loam | grayish brown |
| | SE | 2' W | No | as above | — | as above | as above |
| 91 -SS-B | NE | No | No | a.a. | — | Sandy clay | grayish brown |
| Date 10/2 | NW | as above | No | a a | — | ~~silty~~ silty clay loam | as above |
| Time 14:35 | C | No | No | see soil | — | sandy-clayey loam w/ minor manure | minor grayish brown |
| | SW | as above | No | see soil | — | silty clayey gravel | grayish brown |
| | SE | as above | No | see soil | — | silty sand, hard | lt. grayish tan |
| 91 -SS-C | NE | as above | No | see soil | — | clay sand, moist | greenish brown |
| Date 10/2 | NW | as above | No | see soil | — | gravelly loam, sandy | lt. grayish brown |
| Time 15:00 | C | as above | No | see soil | — | silty sand w/ gravel | dk brown |
| | SW | as above | No | see soil | — | silty clayey sand | greenish brown |
| | SE | as above | No | see soil | — | silty sand, hard | lt greenish tan |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 92

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 92 -SS-A | NE | 1.5' N | No | weeds see soil | — | silty sand - no gravel | lt. grayish tan |
| Date 10/2/12 | NW | 1.5 NW | No | weeds see soil | — | silty sand - no gravel | lt. grayish tan |
| Time 1530 | C | 1' W | No | weeds see soil | — | silty sand - no gravel | lt. grayish tan |
| | SW | 1' N | No | weeds see soil | — | gravelly silty sand | as above |
| | SE | 2' E | No | weeds see soil | — | gravelly silty sand minor gravel | as above |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number 93

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 93 -SS-A | NE | 1' | No | | — | same as Grid Loc C | |
| | NW | 1' | No | | — | as above | |
| Date 10/~~2~~3/2012 | C | 1' | No | | — | Silty sand - grayish yellow | |
| Time 0954 | SW | 2' | No | | — | silty/clayey sand - dk gray - manure minor | |
| | SE | 2' | No | | — | Sandy gravel - med gray | |
| 93 -SS-B | NE | as | No | | — | silt sandy dk gray gray | |
| | NW | as | No | | — | as in Grid Loc A | |
| Date 10/3/2012 | C | as above | No | | — | Sandy, silty fn gravel - grayish gray | |
| Time 1005 | SW | 2' | No | | — | same as Grid Loc A | |
| | SE | 2' | No | | — | same as Grid Loc A | |
| 93 -SS-C | NE | as above | No | | — | same as Grid Loc C center | |
| | NW | as below | No | | — | same as Grid Loc C center — silty sand matrix | |
| Date 10/3/2012 | C | as Below | No | | — | Rnd Gvl. matrix fn-med Sand | |
| Time 1030 | SW | as Below | No | | — | same as Grid Loc C center | |
| | SE | as above | No | | — | Silty Sand No gvl. grayish gray | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

@ depth B

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 94

Duplicate Sample Collected 14:01 94-SS-A1

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 94 -SS-A | NE | No | No | WEED | — | clayey silt - no gravel | dk grey |
| Date 10/3 | NW | 1' N | No | WEED | — | clayey silt - minor gravel | minor mottle dk grey |
| Time 1400 | C | No | No | WEED | — | Silty sand - No gravel | dk grey |
| | SW | No | No | WEED | — | Clay silt (sandy?) no gravel | lt grey |
| | SE | 1' S | No | WEED | — | clay silt, gravelly | lt. grey |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 95
Split provided to RTI

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 95 -SS-A | NE | 1' W | No | same as below | — | same Grid Loc C, below | |
| Date 10/3/2012 | NW | 1' W | No | as below | — | sandy silt lt. grey, minor gravel | |
| Time 1423 | C | 1' W | No | weeds organic | — | sandy silt lt. grey, minor gravel | |
| | SW | 1' E | No | as above | — | sandy silt, gravelly lt. grey | (orange mottling) |
| | SE | 1' S | | as above | — | gravel w/ silt sand matrix | lt. grey |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number 96

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 96 -SS-A | NE | 1' S | No | Heavy Weed organic | — | sandy silts, No gravel, medium ~~gray~~ tan | |
| | NW | 1' W | No | as above | — | Sandy silt gray - No gravel | |
| Date 10/3/2012 | C | 1' S | No | WEED Organic | — | silty med grn Sand, lt gray - No gravel | |
| Time 1432 | SW | 1' No | No | WEED organic | — | sandy silty, gray No gravel | |
| | SE | 1' N | No | as above | — | silt (minin sand) No gravel | lt. gray |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 97

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 97 -SS-A | NE | 1' SE | Ø | gravel fill | Ø | Sandy gravel, poorly sorted | Brown |
| Date 10·12·12 | NW | 10' E | Ø | " | Ø | Sand gravel poorly sorted | |
| Time 13:20 | C | 25' E | Ø | gravel fill | Ø | gravely sand, ~~some rounded~~ | Brown |
| | SW | 11' E | Ø | Sand | Ø | Sand, light Brown, few gravels | |
| | SE | 10' E | Ø | Sand | Ø | Sand top 2", large cobbles with sand 2"-6" | |
| 97 -SS-B | NE | " | Ø | — | Ø | Sand Gravel predominately gravel till 10", 10"-11" sand, 11"-12" clayey sand | |
| Date 10·12·12 | NW | " | Ø | — | Ø | Sand, light brown | |
| Time 13:45 | C | " | Ø | — | Ø | Gravely light Brown Sand | |
| | SW | " | Ø | — | Ø | 9" Grayge mottling in wet sand, gravel @ 11", 6-11" sand | |
| | SE | " | Ø | — | Ø | Sandy gravel with large cobbles | |
| 97 -SS-C | NE | " | Ø | — | Ø | Sand poorly sorted, some clayey sand horizons | |
| Date 10·12·12 | NW | " | Ø | — | Ø | Sand poorly sorted, with some clayey sand horizons | |
| Time 14:30 | C | " | Ø | — | Ø | Sandy gravel w/ ~~[illegible]~~ large cobbles | |
| | SW | " | Ø | — | Ø | Sandy poorly sorted gravel w/ large cobbles | |
| | SE | " | | — | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number 98

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 98 -SS-A | NE | 1' W | 0 | " | 0 | Gravelly Sand fill Material, dark Horizon @5", clay layer @6" | |
| Date 10·11·12 | ~~NW~~ SE | 1' SW | 0 | " | 0 | fill gravelly sand, mottled sand | |
| Time 1505 | C | 1' SE | ~~tight~~ orange | fill gravel | 0 | Silty sand, damp, dark brown, some gravel, orange bones (Broken up) | |
| | SW | 1' S | 0 | fill gravel | 0 | Sandy gravel fill Material | |
| | ~~SE~~ NW | 1' SE | 0 | " | 0 | " " | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number 99

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 99 -SS-A | NE | 1' S | Ø | " | Ø | Poorly sorted sand w/some silt, olive Brown, Damp | |
| Date 10·12·12 | NW | 0.5' SE | Ø | " | Ø | Poorly sorted sandy gravel Olive Brown | |
| | C | 0.5' W | Ø | gravel | Ø | Poorly sorted sandy gravel, in middle of road track | |
| Time 10:20 | SW | 0.5' NW | Ø | " | Ø | " " , 6-14" depth clayey sand in depression ~30' diameter, damp, | |
| | SE | 1' S | Ø | " | Ø | poorly sorted sandy gravel, mostly sand | |
| 99 -SS-B | NE | 1' S | Ø | — | Ø | Sand with some silt, olive Brown, Damp | |
| | NW* | 0.5' SE | Strong Hydrocarbon | — | Ø | Sand till 8", bluish grey clay with some sand, begin @ 11" (VOC=780 ppm) | |
| Date 10·12·12 | C | 0.5' N | Ø | — | Ø | Poorly sorted sand gravel to 9", then mostly sand w/few gravel | |
| Time 10:40 | SW | 0.5' NW | Strong Hydrocarbon | — | Ø | Poorly sorted sandy gravel, bluish grey clay @ 6", Strong Hydrocarbon | gravel in clay |
| | SE | 1' S | Ø | — | Ø | poorly sorted Sand | |
| 99 -SS-C | NE | " | Strong Hydrocarbon | — | | Sand till 22", Bluish grey silty clay w/orange mottling, Strong odor | |
| Date 10·12·12 | NW | " | Strong Hydrocarbon | — | Ø | Bluish grey sandy clay, intense odor, tree root @ 22" | |
| | C | " | Ø | — | Ø | Poorly sorted sandy gravel | |
| Time 11:55 | SW | " | Ø | — | Ø | poorly sorted sandy gravel w/cobbles | 22" 22"-24" |
| | SE | " | Ø | — | Ø | poorly sorted silty sand, minor orange mottling till ~~10", 10"-12"~~ clayey sand with moderate orange mottling greyish color. | ~~12" 12"-14"~~ |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

*In bluish grey clay sample

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 100

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 100 -SS-A | NE | 0.5' NE | θ | " | θ | Same as NW loc w/cobbles | Sand @ 5", slight clayey sand @ 6" |
| Date 10.17.12 | NW | 0.5' N | θ | " | θ | Poorly sorted fill gravel with sand | |
| Time 09:45 | C | 0.5' W | slight odor | gravel | θ | Sandy with poorly sorted gravel, damp | |
| | SW | 0.5 S | θ | " | θ | Same as NW loc | |
| | SE | 0.5 W | θ | " | θ | Same as NW loc w/cobbles | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 101

4 pt. Composite

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 101 -SS-A | NE | 15' SE | Ø | " " | 0 | " " " | |
| Date 10-11-17 | NW | 2.5' E | Ø | " " | Ø | " " " | |
| Time 12:10 | C | | Ø | Sand gravel Debri | Ø | Sand with some gravel, damp w/cobbles | |
| | SW | 21' N | Ø | " " | Ø | poorly sorted sandy gravel, damp w/cobbles | |
| | ~~SE~~ | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 102

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 102 -SS-A | NE① | 1' SW | Ø | Same as C Loc | Ø | Same as C Location | Same as C Location |
| Date 10.9.12 | NW① | 1' SW | Ø | Same as C Loc | Ø | Sandy/Loam, damp, slight organics | Same as C Location |
| Time 11:52 a.m. | C① | 1' SW | Ø | Sandy Silt | Ø | Clay/loam, sandy, wet, some organics | surface material has weed mat |
| | SW | | | | | | |
| | SE | | | | | | |
| 102 -SS-B | NE | 1' SW | Ø | \ | Ø | Silty sand, dry, grayish yellow | |
| Date 10.9.12 | NW | 1' SW | Ø | \ | Ø | Silty Sand w/increased silt, dusky yellow | |
| Time 12:15 | C | 1' SW | Ø | \ | Ø | Sandy silt, dry, grayish yellow color | |
| | SW | | | | | | |
| | SE | | | | | | |
| 102 -SS-C | NE | 1' SW | Ø | \ | Ø | Silty sand, dry, fine, grayish yellow | |
| Date 10.9.12 | NW | 1' SW | | \ | | Silty Sand w/gravel layer, damp, 1/3 gravel | gravel @ 14", gravel w/sand Matrix |
| Time 12:48 | C | 1' SW | Ø | \ | Ø | Silty sand, Lower layer gravel w/sand Matrix | gravel @ 1.5', Boulder @ 1.7', 1-3" gravel |
| | SW | | | | | | |
| | SE | | | | | | |

plastic bag in hole minor glass

grayish yell .25-3" gravel, cobble grayish yellow dry

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Duplicate 102-SS-CD time = 12:50 Date = 10.9.12

Reserved Space for Graphical Sample Location inside Sample Grid:

① Color of C, NW, NE Locations is dark yellowish brown

# SURFACE SOIL SAMPLING

Grid Number 103

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 103 -SS-A | NE | 5' W | Ø | Same as C loc | Ø | Sandy silt, loamy, Moderate olive Br. | 1' from fence line |
| Date 10/5/2012 | NW | 1' SW | Ø | Same as C loc | Ø | silty clay, ~~loamy~~, damp, sandy loam | Moderate olive brown |
| Time 15:31 | C | 1' SW | Ø | Weed layer Dark Brown | Ø | Sandy loam, Dark Brown, damp, | plant material in sample |
| | ~~SW~~ | | | | | | |
| | ~~SE~~ | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

This sample collected 10/9/12

JAS 11/5

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number ~~105~~ 104 CR

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| ~~105~~ 104 KK -SS-A | NE | 1' N | No | Sandy gravel | — | loamy Gravel, silty, dk brown (organic) | |
| Date 10/4/2012 | NW | 4' NW | No | Manure dried | — | Sandy silt, carbonaceous (minor manure) greyish brown | |
| Time 1032 | C | 1' E | No | WEEDS silt | — | Sandy Silt, No gravel - greyish brown | |
| | SW (1) | 3' NNE | No | WEEDS silt | — | Sandy silt, No gravel - No carb mat'l., greyish brown | |
| | SE (2) | 2' N | No | as above | — | Same as Grid loc SW (above) | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material . Cobbles , Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Partial open container of Tractor Hydraulic Fluid (CarQuest) and cracked, leaking 1 gal container Flex-CON Acrylic Latex Bonding Admixture — within 6' West of location
Lots of industrial scrap/salvage steel and iron, motors (fans)

(1) (2) Loc about 12.5' N of EXXON Ppl.

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number ~~104~~ 105 ~~108~~

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| ~~104~~ 105 ~~8~~-SS-A | NE | 1' N | No | weeds silt | — | Silt, minor sandy, minor gravel, grayish brown | |
| Date 10/4/12 | NW | 1.5' N | No | Weeds organic | — | Sandy silt, minor gravel - lt. gray | |
| Time 1016 | C | 1' W | No | WEEDS silt | — | Sandy silt, No gravel lt. gray | |
| | SW (*) | 4' N | No | weeds silt | — | Sandy silt, NO gravel, (charcoal?) | med gray |
| | SE (#) | 2' N | No | | | Sandy silt, lt. gray - No carb / No gravel | |
| _____-SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| _____-SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(*) 12.5' N of ~~CENEX Ppl.~~ & Exxon 12" Crude Ppl.

(#) 12.5' N of Exxon Ppl.

# SURFACE SOIL SAMPLING

Grid Number 106

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 106 -SS-A | NE | 1.5' S | No | weeds organic | / | Sandy silt, w/ minor gravel | lt. grey |
| Date 10/3/2012 | NW | 1' W | No | weeds organic | / | Sandy silt w/ minor organics | No gravel, med. grey |
| Time 1600 | C | 3' W | No | weeds organic | / | Sandy silt, minor gravel, lt. brown (greyish) | |
| | SW (*) | 8' N | No | as above | / | Sandy silt, minor gravel, lt. grey, dried veg. organics in sample | |
| | SE (*) | 3' NW | No | as above | / | as above | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(*) 106-SS-A/SW: ~~FO~~ 15' N of Pipeline

# SURFACE SOIL SAMPLING

Grid Number 107

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 107 -SS-A | NE | 1' S | No | Same as C below | — | silt, minor sand, orange mottling, lt. gray silt | |
| Date 10/3/12 | NW | 1' NW | No | as below | — | silt, minor gravel med gray | |
| Time 1515 | C | 2' W | No | Heavy weed Gravel | — | silt, sandy minor small gravel | lt. gray |
| | SW | 1' S | No | as above | — | Gravelly fine sand, silty med gray, some mottling (orange) | |
| | SE | No | No | Gravel Fill | — | Sandy Gravel, med gray | (Fill from highway constr) |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 108

3 pt. Composite

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 108-SS-A | NE | 0.5' NW | Θ | " | Θ | Same as C loc/steel plate @ 6' | No Hydrocarbon Horizon |
| Date 10/11/12 | NW | 11' E | Same as | fill Material | Θ | Same as C loc | Same as C Loc |
| Time 11:00 | C | 14' NE | Hydrocarbon odor | poorly sorted sandy gravel | Θ | Sandy poorly sorted gravel w/cobbles | 4"-5" thick oily/brown Hydrocarbon Horizon |
| | ~~SW~~ | | | | | | |
| | ~~SE~~ | | | | | | |
| ~~-SS-B~~ | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | ~~SW~~ | | | | | | |
| | SE | | | | | | |
| ~~-SS-C~~ | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 109

3 pt. Composite

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| 109 -SS-A | NE | 1' N | Ø | Same as C Loc | Ø | Same as C Loc | |
| Date 10/11/2012 | NW | 1' E | Ø | Same as C Loc | Ø | Same as C Loc | |
| Time 11:25 | C | 12' N | Ø | gravel fill | Ø | poorly sorted sandy gravel, damp | 15' N of Gas pipeline |
| | ~~SW~~ | | | | | | |
| | ~~SE~~ | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | ~~SE~~ | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS1

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS1 -SS-A | NE | | | | | | |
| Date 11/29/2012 | NW | | | | | | |
| Time 12:46 | C | 1' E | No No | low weeds & clayey gravel | — | Silty gravel, moist-dry, lt olv gray, gvl, subrnd to 1" dia | |
| | SW | | | | | | |
| | SE | | | | | Silty w/ minor sand | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS 2
Pt 0683

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS2 -SS-A | NE | | | | | | |
| Date 11/29/2012 | NW | | | | | | |
| Time 0930 | C | 1'S | No No | Sandy gvl | / | Sandy Gravel (<1/4 to 2"), loose, wet, dk. brown | |
| | SW | | | | | | |
| | SE | | | | | | |
| PS2 -SS-B | NE | | | | | | |
| Date 11/29/2012 | NW | | | | | | |
| Time 0937 | C | a a | No No | a a | / | Silty Sand w/o gravel, ~~damp~~-wet, dk-med olv brown | |
| | SW | | | | | | |
| | SE | | | | | | |
| PS2 -SS-C | NE | | | | | | |
| Date 11/29/2012 | NW | | | | | | |
| Time 0945 | C | a a | No No | a a | / | Silty Clay w/o gravel, wet, | med olv brown |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

Split to RTI

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS3
Pt 684

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS3 —SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29/2012 | C | 1' E | No No | loose 1" gvl | — | Gravel, sandy matrix, loose, wet, med-dk olv brown | |
| Time 0952 | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS4
pt 0685

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS4 -SS-A | NE | | | | | | |
| Date 11/29/2012 | NW | | | | | | |
| Time 1001 | C | | | loose gravel | — | Sandy Gravel (1/4"-1") round to subrd, loose, wet, sand matrix (med grnd), dk.-med olv brown | |
| | SW | | | | | | |
| | SE | | | | | Note this is same soil as @ sites PS2A & PS3A | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

Loc is ~ 1.5 to 2 W of foundation of 360 office bldg (west side). Loc is 2' N and 6' S of two downspouts

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS5

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS5 -SS-A | NE | | | | | | |
| Date 11/29/2012 | NW | | | | | | |
| Time 1251 | C | 1'E | No No | low weeds & Silt | — | Clayey Silt, No gravel, dry, loose, lt olv gray to yellowish gray | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS 6 (pt ~~0687~~ ~~0686~~ 0688)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS6 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29/2012 | C | 1' E | No No | loose Sdy Gvl | | Sandy Gravel (round to subrd), 1/4"-2", wet, loose | |
| Time 1010 | SW | | | | | sandy matrix, med grnd, dk-med olv brown | |
| | SE | | | | | Sandy disaggregated concrete ~ 10% sample | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS-7

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS7 -SS-A | NE | | | | | | |
| Date 11-29-12 | NW | | | | | | |
| Time 1027 | C | 1' N | No No | loose sdy gvl | — | Gravel (rnd to subrnd) w/ sandy matrix (fine to med grnd), loose, wet | |
| | SW | | | | | dk-med oly brown | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Loc is about 3' N of loading and metal staircase on N side of annex to 360 office bldg

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS8
Pt ~~688~~ 686

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS8 -SS-A | NE | | | | | | |
| Date 11-29-12 | NW | | | | | | |
| Time 1035 | C | | | loose Sndy Gvl | | Gravel, sandy, loose, wet, Gvl (1/4"-1", rnd-subrnd) Sand (med grnd) | med-dk olv brown |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Loc is ON N side of loading dock on N side of annex to 360 office bldg.
— loc is immed to bldg. foundation w/ double doors

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS-9 (pt 690)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS9 -SS-A | NE | | | | | | |
| Date 11/29/12 | NW | | | | | | |
| Time 1048 | C | | No | loose, wet gvl | / | Gravel w/ clayey sand matrix, loose, wet, dk brown | |
| | SW | | | | | Gravel, rnd to subrd, 1/4-1" dia | |
| | SE | | | | | clayey sand fg-mg, of this location | more clay than sample to NE |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS 10

Pt 691

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS 10 -SS-A | NE | | | | | | |
| Date 11-29-12 | NW | | | | | | |
| Time 1057 | C | 1' E | No No | loose sandy gvl | — | Gravel, sandy loose, wet, unconsol. med-dk olv brn | |
| | SW | | | | | — Soil are same description as PS6A & PS7A | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Duplicate Collected

Grid Number PS11

pl- 0692

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS 11 -SS-A | NE | | | | | | |
| Date 11-29-12 | NW | | | | | | |
| Time 1108 | C | 1'W | No No | loose Sndy Gvl | / | Gravel, sandy matrix, loose, wet, med-dk dv brown gvl rnd-subrnd, 1/4"-1" sand med-fine grnd | |
| | SW | | | | | | |
| | SE | | | | | | |
| PS11 -SS-B | NE | | | | | | |
| Date 11-29-12 | NW | | | | | | |
| Time 1116 | C | aa | No No | aa | / | Same as 'A' horizon above | |
| | SW | | | | | | |
| | SE | | | | | | |
| PS11 -SS-C | NE | | | | | | |
| Date 11-29-12 | NW. | | | | | | |
| Time 1123 | C | aa | | aa | / | 12-18" same as horizons A & B above | |
| | SW | | | | | 18-24 Sandy Silty clay, olv brown, wet, loose | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

Duplicate PS11-SS-Cd @ 1124

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS12
pt 693

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS12 -SS-A | NE | | | | | | |
| Date 11/29/2012 | NW | | | | | | |
| Time 1304 | C | 0.5' W | No No | same as soil | — | Clayey Silt, blackish d/N.E, damp | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS 13
pt 694

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS 13 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29/12 | C | 1' E | No No | same as soil | / | Gravel, sandy, loose, wet, dk olv brown | |
| Time 1313 | SW | | | | | Gravel: 1/4"-2", angular to subrnd | |
| | SE | | | | | sand, fn-md grnd w/ some clay | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number PS14

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS 14 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29/12 | C | | | same as soil | — | Silty, Sandy Gravel, moist-dry, olv brown, loose | |
| Time 1320 | SW | | | | | Gravel rnd-subrnd, 1/4"-2" | |
| | SE | | | | | Sand: fg-mg | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Loc is 1' south of annex to 360 Office bldg. Annex foundation is ~~elevated~~ raised 3' above ground level.

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS 15

pt 696

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS 15 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29/12 | C | 1' S | No No | same as soil | / | Silty Sand gravel, loose, | damp-dry, loose, olv brown |
| Time 1329 | SW | | | | | Gravel subrnd-rnd, | 1"-1/4" |
| | SE | | | | | Sand fg-mg | |
| / -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Loc at corner of loading dock and ~~elevated~~ raised annex to 360 office bldg. Loc is immed. outside of doors at ground level

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS16 (pt 697)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS16 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29/2012 | C | 1' E | No No | same soil as | | Gravel & Sand (50/50), mor sand vs. other loc | |
| Time 1357 | SW | | | | | loose, wet, dk-med olv brown | |
| | SE | | | | | Gvl: typically 1/2" rnd.-subrnd. Sand mg-fg | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS17
(Pt 0698)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS17 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29/17 | C | 1' E | No No | same as soil | — | Sandy Gravel, saturated, loose, dk olv brown | |
| Time 1402 | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

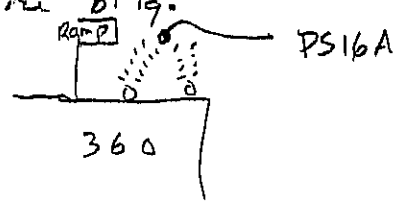
A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

Loc is 20' W of bottom of concrete ramp to loading dock

Loc is at the confluence of 2 downspouts and surface depressions carrying runoff from roof of 360 alt ini bldg.



# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS18

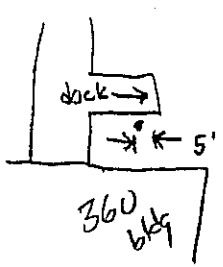
| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS18 -SS-A | NE | | | | | | |
| Date 11/29/2012 | NW | | | | | | |
| Time 1409 | C | | | | — | Sandy Gravel, wet, loose, med-dk olv brown | |
| | SW | | | | | Gvl to 1" | |
| | SE | | | | | Snd fg-mg | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Loc is about 2' N of ramp leading down from loading dock



# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS19

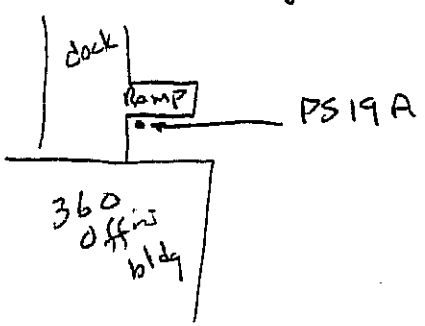
| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS19 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29/12 | C | | No No | | / | Sand, med grn w/ minor gravel (<1") and disaggregated | |
| Time 1417 | SW | | | | | bits of concrete (white) | |
| | SE | | | | | material (soil) is wet, loose | Salt & Pepper color |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Loc at corner of loading dock and ramp



# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS 20 (pt 704)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS20 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29/12 | C | 1' E | Yes/No | same as soil | — | Sandy Gravel, loose, wet, blu-black to dk brown | |
| Time 1425 | SW | | | | | clay content incr in bottom 1" of hole | |
| | SE | | | | | Gvl ~1" dia, rnd-subrnd ~ 50% of sample | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS21 (pt 703)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS21 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29/2012 | C | 1' E | No No | Same as soil | / | Gravelly Sand, loose, ~~surrounded~~ mostly, salt & pepper color | |
| Time 1433 | SW | | | | | Sand: med grn black & white | |
| | SE | | | | | Gravel, < 1/2", subrnd about [redacted] 10% of sample | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number ~~21~~ 22
(pt 702)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS22 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29 | C | 1' E | No No | GRAVEL <1" | — | Gravelly Sand, (50/50) loose, wet, salt & pepper color | |
| Time 1441 | SW | | | | | Gvl (≤1"), subrnd | |
| | SE | | | | | Sd med grn | |
| PS22 -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29 | C | aa | | aa | — | 6"-10": Same as above w/ thin black sandy horizon | |
| Time 1449 | SW | | | | | 10"-12" blu-gray CLAY w/ orange mottling on frac | |
| | SE | | | | | All soil damp, loose, pieces of red brick | |
| PS22 -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29/12 | C | aa | | aa | — | Sandy CLAY, bluish gray, damp, low cohesive | |
| Time 1458 | SW | | | | | orange mottling on fractures | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 23
(pt 703)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS23-SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/29/2012 | C | 3' W | No No | sandy gravel | — | Sandy Gravel, loose, wet, | gray black |
| Time 1513 | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 24
(Pt 705)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS 24 -SS-A | NE | | | | | | |
| Date 11/30/12 | NW | | | | | | |
| Time 1010 | C | 1' E | (1) Y/N | loose gravel | | 0-2" Sandy Gravel, loose, wet, rusty brown | |
| | SW | | | | | 2-5" as above blue-black color, wet | |
| | SE | | | | | 5-6 Sandy Clay-blue-black, damp-wet, Stain / Odor | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Stain and odor in lower part of sample 5"-6".

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS 25 (pt 2 of 2)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS 25 -SS-A | NE | | | | | | |
| Date 10/30/12 | NW | | | | | | |
| Time 1013 | C | 1'E | No/No | Same as Soil | — | Sandy Gravel, Loose, wet, GV: rnd-subrnd, 1/4-1.5" Sand: mg-fg | dk brown w/ salt & pepper color |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS 26
pt 707

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS26 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/30/2012 | C | 1'E | No/No | Same as soil | | 0-2 Sandy Gravel, minor clay, wet, dk brown-black | |
| Time 1020 | ~~SW~~ | | | | | 2-5 Sandy Gravel, as above, dry, olv brown | |
| | ~~SE~~ | | | | | 5-6 Sandy clay, damp-wet, dk brown | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS 27
(OH 0708)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS 27 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/30/2012 | C | | No/No | same as surface | | Sandy Gravel, loose, wet, | dk brown - salt & pepper |
| Time 1049 | SW | | | | | Gvl: 1/4" - 1", rnd - subrnd | |
| | SE | | | | | Sand: fg-mg, salt & pepper texture & color | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS28
(pt 0712)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS 28 -SS-A | NE | | | | | | |
| Date 11/30/12 | NW | | | | | | |
| Time 1058 | C | 1' E | No No | Sam oo oil | | Sandy Gravel, loose, wet | (0"-2") |
| | SW | | | | | 0"-2" blue-black | |
| | SE | | | | | 2"-6" olv brown, damp | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Duplicate Collected

Grid Number PS 29 (pt 711)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS29-SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/30/12 | C | 1'E | No No | same as soil | — | Sandy Gravel, wet, loose, dk brown | |
| Time 1107 | SW | | | | | Gravel: subrnd-rnd, 1/4"-1" | |
| | SE | | | | | Sand: mg-fg salt & pepper | |
| (A) PS29-SS-B | NE | | | | | Note: 5"-6" color change "rusty brown" | |
| | NW | | | | | | |
| Date 11/30/12 | C | aa | No No | aa | — | Sandy CLAY, minor gravel, dk brown | |
| Time 1118 | SW | | | | | damp. Grl size less than 1/2" | |
| | SE | | | | | | |
| (A) PS29-SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date 11/30/12 | C | aa | No No | aa | — | Silt CLAY, damp, mod loose, minor gravel | |
| Time 1125 | SW | | | | | (1/2" dia), olv brown | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

Duplicate for 'C' horizon ~~PS2-SS-C @~~ PS29-SS-Cd @ 1126

(A) RTI Split of 'B' horizon

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS 30 (pt 710)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS 30 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11-20-12 | C | 1' E | No No | Same as soil | — | Sandy Gravel, loose, wet-damp, olv brown | |
| Time 1139 | SW | | | | | Gvl: (less than 50%) 1/4" - 1" | |
| | SE | | | | | Sand: fg - mg, salt & pepper texture | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS 31 (pt 709)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS 31 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/30/12 | C | 1' W | No No | clayey silt | / | Clayey Silt, loose, damp, olv brown | |
| Time 1148 | SW | | | | | w/ minor fg-mg sand, | |
| | SE | | | | | minor gravel at surface 0"-2" (dia 1", subrnd) | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS 32 (pt 713)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS32-SS-A | NE | | | | | | |
| Date 11/30/12 | NW | | | | | | |
| Time 1156 | C | 1' E | No/? | same as soil | ✓ | Silty Gravel, damp, loose, black | |
| | SW | | | | | Gvl 1/2"-1" | |
| | SE | | | | | minor sand (feel gritty) | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Sample loc approx. 7' N of RR spur

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS33 (pt 0714)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS33-SS-A | NE | | | | | | |
| Date 11/30/12 | NW | Yes? / No | | | | | |
| Time 1203 | C | 1' E | No | same as soil | | Silty Clayey Gravel, damp, loose, black | |
| | SW | | | | | GV: subrnd ≤ 1.5" | |
| | SE | | | | | occ. wood fragments. | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Sample loc approx. 4' N of RR spur

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number PS34
(pt 715)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS34-SS-A | NE | | | | | | |
| Date 11/30/12 | NW | | | | | | |
| Time 12:12 | C | 1' N | No/No | Same as sa; | | Clayey Silt w/ gravel (<1/2"), damp, loose, dk brown | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Sample loc approx 4' N of RR spur and 10' SW of loading dock
Sample loc approx 10' SW of West end of concrete trench containing non-hazardous oil sludge

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

DUPLICATE COLLECTED

Grid Number PS35

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| PS35-SS-A | NE | | | | | | |
| Date 11/30/12 | NW | | | | | | |
| Time 1222 | C | 1' E | No No | random sand w/gr/. | | Sandy Gravel w/ silt, damp, loose-unconsolidated dk brown | |
| | SW | | | | | | |
| | SE | | | | | several large broken pieces asphalt | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Sample located between loading dock/concrete trench containing non-hazardous only sludge and RR spur.

Duplicate sample ~~PS35-S~~ PS35-SS-Ad. @ 1224

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL1

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL1 -SS-A | NE | | | | | | |
| Date 11/28/2012 | NW | | | | | | |
| Time 0934 | C | 1' E | No No | Native Grass / Loam | | Sandy Silt Loam, lt olv grey, | dry, minor gvl to 1" dia |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL 2

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 2 -SS-A | NE | | | | | | |
| Date 11/28/2012 | NW | | | | | | |
| Time 09:42 | C | | | | | Sandy Silty Loam, lt olv gray, dry, very minor gvl 1"d | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Same Soil as TEL 1

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL 3

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 3 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/28/2012 | C | 1' E | No No | Native Grass/Loam | — | Sandy Silty Loam, lt. olv grey, dry, loose, No gravel | |
| Time 0950 | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Same soil as TEL 1 and TEL 2

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL-4, (pt #-0720)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL4 -SS-A | NE | | | | | | |
| Date 11-27-12 | NW | | | | | | |
| Time 1048 | C | 1' E | No/No | Grass loam | | Silt Clay Loam, olv gray dry | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL-5
Pt 0721

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 5 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11-27-12 | C | 1' NW | No/No | Grass Loam | — | Silty Clay Loam, olv gray dry-damp, minor pebbles | |
| Time 1050 | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date | C | | | | | | |
| Time | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Duplicate collected

Grid Number TEL 6

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 6 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/28/2012 | C | 1' W | No/No | Native grass | — | Silty Clay Loam, minor sand, lt olv gry, No gravels | |
| Time 0956 | SW | | | | | damp @ top — dry at bottom | |
| | SE | | | | | | |
| TEL 6 -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date 11/28/2012 | C | aa | No No | aa | — | aa @ 0-6" (A horizon) — incr minor gravel 1"d | |
| Time 1002 | SW | | | | | dry | |
| | SE | | | | | | |
| (A) TEL 6 -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date 11/28/2012 | C | aa | No No | aa | — | Silty Clay (Loam?), minor v-fine sand w/ occ. gvl to 1" | |
| Time 1011 | SW | | | | | firm, dry, lt olv gray | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

(A) Duplicate TEL6-SS-Cd @ 1013

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL7

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL7 -SS-A | NE | | | | | | |
| Date 11/28/2012 | NW | | | | | | |
| Time 1052 | C | | No/Yes? | native grass (1) | — | Sandy Silt, lt-med brownish gray, dry, No gvl, piece of plastic | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Sample site on a slight mound of earth about 1' higher than surrounding site. Loc. of sample adjacent to low volume mixed debris pile of wood (const.) and metal.

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL 8

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 8 -SS-A | NE | | | | | | |
| Date 11/28/2012 | NW | | | | | | |
| Time 1101 | C | | | | | ① Sandy Silt, dry, loose, med brown - gry brown | |
| | SW | | | | | - minor gravel (pea size) | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

Sample from auger incl. ~~several~~ several pieces of green, broken glass, thin strip of plastic, and a 3x3" piece of landscape plastic sheeting

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL 9
(pt. 0725

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 9 -SS-A | NE | | | | | | |
| Date 11/27/12 | NW | | | | | | |
| Time 1116 | C | | No/No | Grass Loam | / | Silty Clay Loam, olv gray, dry-damp | |
| | SW | | | | | | |
| | SE | | | | | | |
| ~~-SS-B~~ | NE | | | | | | |
| ~~Date~~ | NW | | | | | | |
| ~~Time~~ | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| ~~-SS-C~~ | NE | | | | | | |
| ~~Date~~ | NW | | | | | | |
| ~~Time~~ | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

DUPLICATE COLLECTED

Grid Number TEL 10 (pt. 0726)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 10 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/27/12 | C | 1'S | No/No | Grass Loam | — | Silty Clay Loam, olv gray damp, | minor 1" gvl & minor 1" tar |
| Time 1122 | SW | | | | | | |
| | SE | | | | | | |
| TEL 10 -SS-B | NE | | | | | | |
| | C | 1' S | No/No | a.a | — | Silt Loam, dry, olv gry, gvl to | 2" dia., Gravelly @ 6" depth |
| Date 11/27/12 | | | | | | | |
| Time 1126 | SW | | | | | Duplicate sample TEL10- | SS-Bd collected 1130 hrs |
| | SE | | | | | | |
| TEL 10 -SS-C | NE | | | | | | |
| | NW | | | | | Gravelly Silt, dry, lt olv gray - | gvl to 3" dia |
| Date 11/27/12 | C | 1'S | | a a | — | | |
| Time 1143 | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Split w/ RTI @: TEL10-SS-Bs @ 1130 hrs.

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL 11

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 11 -SS-A | NE | | | | | | |
| Date 11/28/2012 | NW | | | | | | |
| Time 1114 | C | 1' NE | No No | Native grass (1) | | grayish brown Sandy silt, damp-dry, loose | No gravel |
| | SW | | | | | | |
| | SE | | | | | some clay in blocky chunks | , tar chunk (~2") |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

(1) Sample loc is ~10' S & SW of const wood debris pile showing evidence of charring (fire)
Sample loc is ~10' N of concrete foundation w/o center drain pipe
Mixed debris incl wire and minor steel piping in vicinity

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL 12

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 12 -SS-A | NE | | | | | | |
| Date 11/28/2012 | NW | | | | | | |
| Time 1130 | (C) | 7' SE | No No | ~~Native Grass/ Soil (Muddy)~~ | — | Sand (vy fine) Silt, dry, loose, minor gvl to 1" dia, lt. grayish brown, 1" sqaw of tarry silt at depth 1"-6" | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Sampl loc. is ~15' N of eastern-most trench (Non-haz oily sledge st. 21 in trench) and also about 10' W of wood-lined sump (?) that is about 10' from TEL sump at E ~~side~~ end of trench

Concrete slab at surface extends at least 5' to S & E from portion exposed

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL 13

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 13 -SS-A | NE | | | | | | |
| Date 11/28/2012 | NW | | | | | | |
| Time 1148 | C | 1' S | No No | accum weedy stems, native grass and sandy silt | | Sand/Silt/Clay (tending to a Clay sand), lt gray brown, minor gravel to 1" and pieces of concrete, (tarry pieces thin layer) | |
| | SW | | | | | | |
| | SE | | | | | | |
| _____-SS-B | NE | | | | | | |
| Date _____ | NW | | | | | | |
| Time _____ | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| _____-SS-C | NE | | | | | | |
| Date _____ | NW | | | | | | |
| Time _____ | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

Sample loc about 10' N of steel-lined sump and 5' E of wood-lined sump(?)

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL14
( pt 0728 )

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL14 -SS-A | NE | | | | | | |
| Date 11-27-12 | NW | | | | | | |
| Time 1307 | C | 1' W | No No | Grass | — | Clayey loam, damp, brown, No gvl, grass roots | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Grid loc. is immed. adjacent to pile of wood debris (RR ties & elec spool, PVC, steel piping)

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL 15
(pt 0727)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 15 -SS-A | NE | | | | | | |
| Date 11-27-12 | NW | | | | | | |
| Time 1313 | C | 1' W | | Grass loam | — | Clayey loam, sandy, brown, damp-dry, no gvl, grass roots | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL16
(pt 0732)

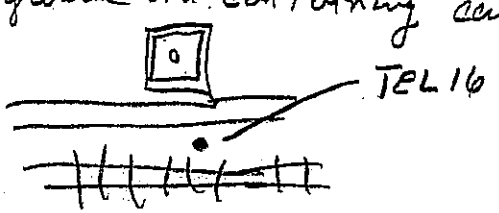
| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL16 -SS-A | NE | | | | | | |
| Date 11/28/2012 | NW | | | | | | |
| Time 1358 | C | 1'E | | | | Same as sample TEL17 | |
| | SW | | | | | | |
| | SE | | | | | small pieces broken red brick | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Sample loc is midway between RR spur and eastern concrete-lined trench containing ~~non~~ hazardous oily sludge. Loc is also within 5 feet of concrete foundation standing ~4' above ground and containing central-located drain pipe



# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 17
(pt 0733)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 17 -SS-A | NE | | | | | | |
| Date 11/28/2012 | NW | | | | | | |
| Time 1346 | C | 1'E | No No | Native grass sl sand | / | Silty Sand, f-mg, loose, damp, grayish brown-black | — small brts of concrete and tarry(?) materials less than 1/4" dia, also very minor gravel less than 1/2" dia |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Sample site is midway between RR spur and concrete-lined (Eastern) trench containing hazardous oily-sludge (waste)

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 18

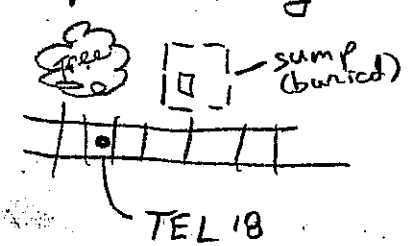
| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 18 -SS-A | NE | | | | | | |
| Date 11/28/2012 | NW | | | | | | |
| Time 1410 | C | 3'S | Yes/No | Native grass & sand | / | Sand & Clay (~ 75/25) | |
| | SW | | | | | Sand, silty w/ clay, dry, blackish-brown small gravel <1/4" (minor), some broken & dis-aggregated concrete (?) white-gray. | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

Sample loc midway between rail tracks. Located about 6' SW of opening to steel-lined sump containing non-hazardous oily sludge (waste)



# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL 19
(pt 0735)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL19 -SS-A | NE | | | | | | |
| Date 11-27-12 | NW | | | | | | |
| Time 1331 | C | 9' S.E | No No | Grass Gravelly silt | | Gravelly sandy loam, dk brown, damp - dry (at 6" depth) | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

PI is immed adjacent to concrete slab (?) that is 20' due E. of buried steel sump w/ non-hazardous oily waste

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL20
(pt # 0736)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL20 -SS-A | NE | | | | | | |
| Date 11-27-12 | NW | | | | | | |
| Time 1338 | C | 1.5' S | | Grass Gravelly | | Gravelly silty sandy loam, gravel 1"-3", wet, dk brown | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Site loc. covered w/ wet, gravelly loam, incl pieces of broken red brick

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 21

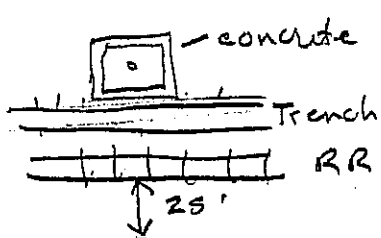
| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 21 -SS-A | NE | | | | | | |
| Date 11/28/2012 ~~11/24~~ | NW | | | | | | |
| Time 1424 | C | 1'N | Yes/No | Nothing grass and RR ballast (sand) | | Sand/silt/clay approx equal amounts, asphaltic/hydrocarbon stain | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Sample loc is about 25 ft south of RR track and 28' south of concrete foundation contain a drain. N of RR is concrete-lined trench containing hazardous (lead) oily sludge



# SURFACE SOIL SAMPLING

Grid Number 22

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL 22 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 11/28/2012 | C | | No No | NATIVE grass & soil | / | Sandy Silt w/ minor gravel (≤1" dia) grayish olv, | |
| Time 1437 | SW | | | | | loose, dry. Some minor | broken concrete (?) |
| | SE | | | | | | |
| TEL 22 -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date 11/28/2012 | C | a a | Yes(?)/No | a a | / | Sand, silty, angular gravel and concrete chip (≤1/2"-1/4") | |
| Time 1445 | SW | | | | | grayish olv - med gray, loose, dry. | |
| | SE | | | | | gravelly material < 15% | |
| TEL 22 -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date 11/28/2012 | C | a a | Yes/No | a a | / | 12"-21" as above in 'B' horizon | |
| Time 1453 | SW | | | | | 21"-24 Clayey Silt, olv brown, dry, loose | |
| | SE | | | | | NO gravel, minor sand (v.fg) throughout | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number 23

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL23 -SS-A | NE | | | | | | |
| Date 11/29/2012 | NW | | | | | | |
| Time 1505 | C | 1' E | No/No | native grass and soil | — | Gravelly Sand Silt, loose, dry, grayish-brow/red gray -tarry silt-piece to 1" gravel (1/4"-3"), asphaltic gravelly 15% | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL 24
(pt #0738)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL24 -SS-A | NE | | | | | | |
| Date 11/27/12 | NW | | | | | | |
| Time 1400 | C | 2' SSE | N. No | Grass 10cm | — | Damp @ surf. Sandy Gravelly loam, brown, gvl to 1" | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

30' SSE of sump w/ non-hazardous oily waste

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number TEL 25
(pt. # 737)

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| TEL25 --SS-A | NE | | | | | | |
| Date 11/27/12 | NW | | | | | | |
| Time 1406 | C | 1' SW | Yes/No | Gravel debris | — | Sandy Gravelly Loam, wet, dk brown, gvl to 2" dia | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-B | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| -SS-C | NE | | | | | | |
| Date | NW | | | | | | |
| Time | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

Loc is immediately adjacent to wood slash, gravel, barb wire - debris pile

# SURFACE SOIL SURVEY NOTES

Projects (continued).....

Control Points

CP-01 Good Stability (Next to South Gate Post near AS I)

Atlas 27855' NW corner tract 1A (Next to Power Pole & Fence Corner

E & H Engineering 9518 ES (NE Corner Tract A-I)

J. Bergin S. Gilstrap 9/13/12

| Time | Sample Grid Location | Comments | | |
|---|---|---|---|---|
| 1630 | 61 | CNTR | in Concrete | Pt II |
| | 60 | CNTR | Gravel | 9/14/12 |
| | 60 | NW | Asphalt | |
| | 60 | SW | Asphalt | |
| | 59 | SE | " | 531 |
| | 59 | NE | " | 510 |
| | 59 | NW | " | 509 |
| | 59 | SW | " | 532 |
| | 53 | SW | " | 508 |
| | 55 | SE | " | 503 |
| | 63 | CNTR | CONCRETE | 200 |
| | 63 | NW | " | 517 |
| | 63 | NE | " | 518 |
| | 61 | NW | " | 513 |
| | 88 | SW | ON SCRAP EQUIPMENT, | |

1-foot north of point is in soil, sewer line marked below point

POINT 655 MARKED W/ ORANGE PAINT

J Bergin , J Gilstrap 9/19/12

SAMPLE GRID COMMENTS

| GRID | TYPE | COMMENT | PT # |
|---|---|---|---|
| | YMW-18 | IN CONCRETE | 251 |

MATCHED W/TAG AND MAC NAIL

| GRID | Sample Loc | COMMENTS | Pt # |
|---|---|---|---|
| 35 | SE | CONC | 362 |
| 35 | NE | ~~CONC~~ Asphault | 361 |
| 35 | NW | Asphault | 360 |
| 34 | NE | Asphault | 359 |
| 34 | NW | A | 358 |
| 35 | C | A | 169 |
| 34 | C | A | 168 |
| 33 | C | A | 167 |
| 32 | C | A | 166 |
| 51 | NE | A | 426 |
| 51 | NW | A | 425 |
| 50 | NE | A | 424 |
| 50 | NW | A | 423 |
| 49 | NE | A | 422 |
| 49 | NW | A | 421 |
| 48 | NE | A | 420 |
| 48 | NW | ~A? | 419 |
| 49 | C | A | 172 |
| 50 | C | A | 171 |
| 51 | C | A | 170 |
| 73 | NE | A? | 540 |
| 74 | NW | A? | 541 |
| 74 | SW | A? | 576 |
| 73 | SW | A? | 578 |

| GRID | LOCATION | COMMENTS | PT # |
|---|---|---|---|
| 74 | C | A? | 208 |

A – "Asphault"

"A" - Asphault

YMW-17 Under Power Lines
& on Top of Buried Tank

| | | |
|---|---|---|
| 43C | Under Power Line | |
| 42C | " | |
| 41C | " | PT. #180 |
| 40NE | Possible Concrete Pad | PT #404 |
| 43NE | " | PT 409 |
| ~~4NW~~ | | ~~PT 263~~ |
| ~~PT 26 3~~ ~~4NW~~ | | PT 264 |
| ~~4NW~~ | | ~~265~~ |
| 4NW | A | PT #263 |
| 4NE | A | 264 |
| 5NW | A | 265 |
| 3NW | A? | 261 |
| 2NE | A? | 260 |
| 2NW | A | 259 |
| 1C | A3 | 135 |
| 4C | A | 138 |
| 5C | A | 139 |
| 5SW | A | 257 |
| 3SW | A? | 281 |
| 2SE | A? | 282 |
| 2SW | A? | 283 |

| | | |
|---|---|---|
| 284 | 1SE | A? |
| 285 | 1SW | A3 |
| 280 | 3SE | A |
| 293 | 12NE | A |
| 294 | 13NW | A |
| 295 | 13NE | A |
| 296 | 14NW | A |
| 148 | 14C | A |
| 340 | 25NW | A |
| 38/389 | 25SW | A |
| 403 | 40NW | A |
| 402 | 39NE | A |
| 401 | 39NW | A |
| 320 | 135E | A |
| 319 | 14SW | A |
| 321 | 13SW | A |
| 151 | 11C | A |
| 150 | 12C | A |
| 149 | 13C | A |
| 391 | 21SE | Concrete Pad |

Yale Oil of South Dakota — Surface Soil Sampling

| Grid | Date | Time | Depth Interval | Sample Number | Stain/Odor | Comments |
|---|---|---|---|---|---|---|
| 77 | 10/2/12 | 10:30 | 0-6" A | 77-SS-A | No/No | EPH/VPH/RCRA Metals |
| | 10/2/12 | 10:47 | 6-12" B | 77-SS-B | No/No | " |
| | 10/2/12 | 11:20 | 12-24" C | 77-SS-C | No/No | " |
| 89 | 10/2/12 | 13:40 | 0-6" A | 89-SS-A | No/No | EPH/~~PAH~~ PH/VPH RCRA Metals |
| 90 | 10/2/12 | 14:00 | 0-6" A | 90-SS-A | No/No | EPH/VPH/RCRA Metals |
| 91 | 10/2/12 | 14:20 | 0-6" A | 91-SS-A | No/No | EPH/PAH/VPH/RCRA METALS |
| 92 | 10/2/12 | 1530 | 0-6" A | 92-SS-A | No/No | |
| 80 | 10/2/12 | 1540 | 0-6" A | 80-SS-A | No/No | |
| 79 | 10/2/12 | 1600 | 0-6" A | 79-SS-A | No/No | |
| 78 | 10/2/12 | 1616 | 0-6" A | 78-SS-A | No/No | |

YALE Oil of South Dakota 10/3/2012 — Surface Soil Sampling

| Grid | Date | Time | Depth Interval | Sample # | Stain/Odor | Comments |
|---|---|---|---|---|---|---|
| 93 A | 10/3/12 | 0954 | 0'-6" | 93-SS-A | No/No | EPH/VPH/RCRA Metals |
| 93 B | 10/3/12 | 1005 | 6"-12 | 93-SS-B | No/No | as above |
| 93 C | 10/3/12 | 1030 | 12"-24 | 93-SS-C | No/No | as above |
| 94 A | 10/3/12 | 1400 | 0"-6" | 94-SS-A | No/No | EPH/VPH/RCRA Metals |
| 94AD | 10/3/12 | 1400 | 0"-6" | 94-SS-AD | No/No | duplicate |
| 95 A | 10/3/12 | 1423 | 0"-6" | 95-SS-A | No/No | split to/with RTI (see below) |
| 96 A | 10/3/12 | 1432 | 0"-6" | 96-SS-A | No/No | EPH & VPH w/Frac if > 200 |
| 107 A | 10/3/12 | 1515 | 0"-6" | 107-SS-A | No/No | EPH & VPH w/Frac if > 200 |
| 106 A | 10/3/12 | 1600 | 0"-6" | 106-SS-A | No/No | EPH & VPH w/Frac if > 200 |

95A: EPH & VPH w/Frac if > 200

YATE Oil Utility Survey 10-4-2012

R. Lobb

| Point ID | Time | Notes |
|---|---|---|
| 2000 - 2055 | 1335 | 2000 - 2055 (yellow) Conoco phillips pipeline even #'s south flags odd #'s North flags |
| | Code G | |
| 2020 / 2021 | 1340 | permanent marking posts N of job trailer |
| 2054 / 2055 | 1355 | permanent marking posts @ toe of railroad ballast. |
| 2056 - 2129 | 1400 | Second Conoco Phillips pipeline (N. pipeline) (yellow) even #'s South flags/markings odd #'s North flags/markings |
| 2058/2059 | | permanent marking posts near AT tracks |
| 2074-2081 | | Series of single non-parallel markings resume parallel #'s counter @ 2082 |
| 2094 | | "northern" marks become intermittent |

| Point ID | Time | Notes |
|---|---|---|
| 2014/2015 | 1420 | permanent marking posts next to main road seem to depart from markings |
| 2130 to 2150 | | Single set of yellow gas pipeline markings that veer North + go over tracks |
| 2139 | | 10° turn in marking S |
| 2151 - 2178 | 1440 | Sewer (green) 2151 is marked |
| | Code - SVLT | marking code is SVLT |
| 2179-2301 | 1450 | AT+T fiber optic (orange) use code TEL |
| {2186, 2197, 2213, 2259, 2272, 2280, 2288} | | permanent marking posts AT+T Fiber optic |
| 2307 - 2313 | 1540 | Montana Sulfur + chemical ~~Conoco Phillips Co. pipeline~~ FSL code at fenceline |
| 2314-2327 | 1546 | Phillips 66 pipeline (GL-08) |
| GL-08 | | |

YALE OIL site R. Noble 10-4-2012

| GPS ID | Time | Note |
|---|---|---|
| 2322 | 1552 | permanent marker @ toe of ~~B&R~~ ballast GL-08 |
| 2323/2334 | 1555 | GL-09 (Phillips 66) |
| | | *GL-08 & GL-09 parallel each other extend to N. from tank farm |
| 2335-2344 | 1600 | Exxon Mobil Crude line from Tank farm to Mapl Stop & RR tracks |
| 2345-2349 | 1605 | Texas gas pipeline from Tank farm to North |
| 2350-2362 | 1610 | Qwest telephone, From Tank Farm North |
| 2354 | 1610 | Green telephone Box (AGS) |
| 2363-2366 | 1615 | Conoco Phillips pipeline from Tank Farm to North |
| 2364 | | permanent steel post |
| 2365 | | permanent poly post |
| 2366 | | permanent steel post @ toe of ballast |
| 2367-2390 | 1620 | Conoco Phillips pipeline(s) from tracks to Tank farm parallel yellow water line odd = west even = east |

Utility Locate Survey

| | |
|---|---|
| 2373 & 2374 | permanent steel marker posts |
| 2379-2380 | permanent steel marker posts |
| 2367-2390 | pipeline cross drain & have gravel & parking Tank farm |

10-5-2012

YALE Oil Site R. Lobbe Utility Survey

| Site code | Time | Note |
|---|---|---|
| 2391 - 2394 | 0910 | Four corners of cement water vault<br>2391 - SW<br>2392 - SE<br>2393 - NE<br>2394 - NW |
| 2395 | 0915 | Fire Hydrant |
| 2396 - 2406 | | valve @ 2398, 2401, 2404<br>manhole @ 2403 |
| 2407 - 2485 | 0925 | high pressure gas line (MDU)<br>runs other drain + is marked by overhead cable (suspended ~10' above ground) |
| 2414, 2415 | | end of suspended cable, permanent stakes |
| 2427 - 2451 | 0940 | Exxon mobil crude pipeline<br>along S. boundary of site |
| 2452 - 2466 | | Cenex gas line |
| ★ | | Need to double check Century Link line into ASI building + survey it ★ |

| Site Code | Time | Note |
|---|---|---|
| 2467 - 2529 | 1030 | Sprint comm. line (TEL)<br>Fiber Optic |
| 2530, 2531 | | Conoco pipeline permit markers<br>2530 is East 2531 is West |
| 2532, 2533 | | phillips 66 pipeline permit markers<br>2532 is East 2533 is West |
| 2534 - 2553 | | Exxon mobil crude pipeline<br>permit markers @ 2539 + 2553 |
| 2554 - 2566 | | Cenex pipeline<br>permanent markers @ 2554, 2566 |
| 2569 - 2584 | | MDT Lighting + Light poles<br>pole code = LP<br>~~yellow~~/red marking code = LLS<br>markings in east are red; ~~yellow~~ western |
| 2587 - 2639 | | MDU gas line<br>marked w/ LLS code id |
| 2640 - 2685 | | MDU gas line (G code)<br>2640 is poly marker in curb of Jerry Port |
| 2669 | | cement valve w/ MH cover |

YALE OIL Site | R. Lobbe | Utility Survey
10-5-2012

| Site ID | Time | Note |
|---|---|---|
| 2670-2685 | 1215 | MDU markings end @ 2685 ? arrow points to East |
| 2686-2696 | 1220 | Commencement in markings (orange) Code = TEL unknown carrier (CLN? Qwest?, AFFT?) |
| 2697-2757 | 1225 | phillips66 gas line permanent marker @ 2697 |
| 2738, 2739, 2740 | | ground clearance + permanent markers in center of MDT Lot. Yellowstone, Exxon, Conoco / Wes markings. |
| 2741-2742 | | yellow markings from Texas Barrier toward MDU markings. |
| * 10-9-2012 | Tailgate | safety review JSA + note Lots of comments @ ASI |

10-9-2012 R. Lobbe

| Site ID | Time | Note |
|---|---|---|
| Base 17 | 1200 | Base station IV for day |
| CP-01 JI | 1205 | connected here to CP-01 |
| 2743-2749 | 1215 | (Communications near ASF building) CLN from Tel pole to N. under trucks. |

R. Lobbe GVS Utility Survey
10-9-2012

| Site ID | Time | Note |
|---|---|---|
| 2750-2758 | 1230 | CLN parallel KC Junction @ 2758 Line goes North South + cc cross East |
| 2759-2773 | 1235 | South CLN from junction |
| 2773- | | CLN junction 2 lines to East 1 line to west |
| 2774-2790 North set of East lines | | 2774 to CLN East lines 2 parallel lines that proceed East before diverging last set converge @ 2790 due to building interference line enters building @ NE corner |
| 2791-2807 South set of East CLN Lines | | possibly one line with 11 markers last converge @ 2807 due to building interference |
| 2808-2854 | | CLN line to west from 2773 terminates @ pole S. of job trailer. |

10-9-2012

VALE OIL Utility Survey R. Lobbe

| Site ID | Time | Note |
|---|---|---|
| 2855 - 2864 | 1315 | Phillips 66 Lines come from south under tracks<br>odd #'s = East line<br>even #'s = west line<br>Lines and a fence attached off road here<br>2862 + 2863 are permanent markers |
| 2865 - 2872 | | Conoco Phillips pipelines (parallel) from S to N over tracks<br>odd #'s = East<br>even #'s = west |
| 2873 - 2880 | | Conoco Phillips pipelines (parallel) from S. to N over ~~other~~ tracks<br>odd #'s = East<br>even #'s = west |
| 2881 - 2884 | | Water Line |
| 2885 - 2889 | | CLN, (TEL) Line |
| 2890 - 2891 | | Sewer Line marked w/ code SVLT |

| Site ID | Time | Note |
|---|---|---|
| 2892 - 2898 | 1345 | Yellow gas line from South to North under tracks, partially, no flags |
| | 1400-1430 | OFF for Lunch |
| 2900 - 2921 | | Exxon Mobil Conoco pipeline on "Plains" property |
| 2922 - 2932 | | Water Line |
| 2933 - 2941 | | Sewer, manhole @ 2938 marked w SVLT code |
| 2942 - 2951 | | Orange (CLN2) from south under tracks to pole in SE corner of 360 office allowed "float" positions to road |
| 2952 - 2959 | | city water line to furthest extent North |
| 2960 - 2992 | | Sewer (SVLT) manhole @ 2962 make 90° turn to East. Sewer leaves site makes exit at road |
| 2993 - 2995 | | Water line (W) from Road to Conoco fence |

R Lathe 10-9-2012

2996 - 3001 water line from Road to YPL line 2996 is Gylwat

3002 - 3005 water line water @ 3002

3006 - 3071 yellowstone pipeline HPG (MDU?) permit marker @ 3011

3022 Junction ⊥ pipeline goes to East + continues south
3023 - 3026 is East line to Bldg.

⊥ line goes east @ 3037 and continues to south.
3037 - 3045 is East path line goes to Bldg.
3046 - 3071 continue w/ south path
3052 ⌉ 90° turn to East
3063 ⌈ 90° turn to South

WYLE Utility Inc

R. Lathe 10-11-2012

Base 18 started @ 0915
Needed for CHS Tank Farm
connected to CP-01

| Site ID | Time | Note |
|---|---|---|
| 3072-3083 | 0940 | montana sulfur + chemical in (Tank Farm) |
| 3084 - 3131 | 0945 | phillips 66 GL-08 and GL-09<br>GL-08 are even #'s<br>GL-09 are odd #'s |
| 3132 - 3161 | 0955 | Exxon mobil crude pipeline |
| 3162 - 3211 | 1015 | Conoco pipeline in Tank Farm |
| 3212 - 3221 | 1035 | Exxon mobil crude |
| 3222 - 3254 | 1050 | Conoco pipelines<br>Even = 8pt 8" Discharge<br>odd = 8pt 8" suction |
| 3255 - 3257 | 1055 | Overhead electrical from pole to transformer |
| 3258 - 3261 | 1055 | CLN |
| 3262 - 3290 | 1100 | electrical source @ new location possibly electrical feeder between wells. |

10-11-2012 N. Lubke Yale Oil Akeley Survey

| | | |
|---|---|---|
| Site #10 | | Note |
| 108 center | | moved point 108 center perpendicular to field to relocate utilities |
| 670 Alternate | | moved point 670 in field to get away from berm. point 170 NW |
| 3291 - 3320 | | MDN gas line |
| 3321 - 3332 | 1238 | Resume gas line on MDT side of tracks, line goes into Conoco yard. |
| 3333 | | G line very new road |

11/13/12 J. Bergin Focus Area Stak-Out

- Former Paint Area (FPA)
- Points along Loading Dock 701, 708, & 709 were offset 18' West.
- Point 700 was offset 20' West
- Points 698, 699, 702, 703, 706, 707, 711, 710, 714, 715 were offset 18' West
- Points 697, 704, 705, 712, 713 were offset 12.5' (edge of grid)
- Poin 692 offset 6' West due to Building
- Corner Grid Points 747, 749, 748 were not staked due to Building

- All other points staked in proposed location including TEL Area

12/19/12

YMW-22 Clearance Hole

0-2 Med. Difficulty Gravel

2-5' Easy Silt

@ 5'-6' ~~Wet Sand~~ Moist Clay

6'-8' Hydraulic Ram ~~Wet Clay~~ Moist Clay

8+ Encountered Cobbles (Could not penetrate w/ Hand Auger

# SURFACE SOIL FIELD FORMS

September 19, 2012
Survey UULC on Montana Rail Link ROW
North of RR tracks and between
RR and CHS tank farm.
MRL flagmen present
Kris Adler John Bergin Josh Gilstrap
Don Clayton - MRL
Eli Brown MRL
Conduct Tailgate Safety Mtg / briefing

September 20, 2012
Continue UULC surveying/
John Bergin
Josh Gilstrap
Tailgate Safety Meeting



September 13 2012

Survey and stake out locations for shallow soil sampling. Begin survey south of MRL tracks.
~~John Gilstrap~~ Josh Gilstrap } Hydrometrics
John Bergin
Kris Adler
Tailgate Safety Meeting

September 14, 2012
Continuation of stake-out of locations for shallow soil sampling
Kris Adler
~~John~~ Bergin } Hydrometrics
Josh Gilstrap
Tailgate Safety Meeting

September 18, 2012

Continued survey and stake-out of locations and grids for shallow soil sampling. Sites on ASI and CHS tank farm.

Kris Adler
John Bergin
Josh Gilstrap
Ryan Robinson — CHS

Conduct Tailgate Safety Briefing

September 19, 2012

Continue survey of locations for shallow soil sampling and grids on South and North of BNSF/MRL tracks

Meet MRL flagman onsite

Kris Adler John Bergin
Josh Gilstrap
Don Clayton - MRL
Eli Brown - MRL

Tailgate Safety Mtg. Review MRL Requirements for crossing tracks



September 20, 2012

Surveying locations for shallow soil sampling — location North of RR tracks. Properties: MDOT, MRL ROW,

John Bergin
Josh Gilstrap

Tailgate Safety Review

September 21, 2012

Continue survey locations for shallow soil sampling and grids

John Bergin
Josh Gilstrap

Tailgate Safety Review

~~Tuesday~~ ~~Monday~~

Monday September 24, 2012

① Meet underground utility locators at ASI to instruct and explain area extent of location/markings

Locators present
- City of Billings water, sewer
- City of Billings Traffic
- CONOCO - Jim Costello
- EXXON - Dan Echardt
- MDU/__/__ -

Jim Shaffer Hydrometrics

Met @ ASI parking lot, explain site history, purpose, safety concerns (general) all locators claim HAZWOPER training

② Continuation of grid location surveying and stake-out
John Bergin
Josh Gilstrap

Tailgate Safety Meeting
~~Jim Shaffer~~

---

September 26, 2012 Wednesday
UULC locators meeting and access to MDOT & BNSF / MRL ROW
Met @ Glacier Ppl. parking lot
Locators: City of Billings - water/sewer
Phillips 66 - Jim Costello
MDU/NWE/CenturyLINK - Jeanie ?
Jim Shaffer - Hydrometrics



Thursday September 27, 2012
~~to~~ UULC locators meeting for access to CHS (Yale) Tank Farm
Locators present: Montana Sulfur - Leroy Sabe
EXXON - Brian Lawerence
CHS - !
Jim Shaffer - Hydrometrics

September 28, 2012 Friday
0900 Meeting with UULC locators for bldgs. as 600, 550, 724 1st Avenue North and fenced area owned/operated as Auto Magic

No locators showed up at meeting
Jim Shaffer 9/28/12

October 1, 2012 Monday

1500 Job Trailer and porta-toilet delivered and setup at/on ASI tract.

October 2, 2012 Tuesday

① Shallow soil sampling on ASI tract
② Surveying/stake-out of grids and sampling points

Onsite: Kris Adler, Jim Shaffer, John Bergin } Hydrometrics/Billings
Robert ~~Roth~~ Roll - MT DEQ/Helena
Mark Johnson - RTI/Bozeman
Moniza Johnson - RTI/Bozeman

0916: EMGR Work Permit & Tailgate Safety Mtg

Soil Samples (hrs) (Location - Horizon)

| | |
|---|---|
| 1030: | 77-SS-A |
| 1047: | 77-SS-B |
| 1120: | 77-SS-C |
| 1340: | 89-SS-A |
| 1400: | 90-SS-A |
| 1420: | 91-SS-A (dried manure in sample) |
| 1435: | 91-SS-B |
| 1500: | 91-SS-C |



(cont.) October 2, 2012

| | |
|---|---|
| 1530: | 92-SS-A |
| 1540: | 80-SS-A |
| 1600: | 79-SS-A (loc along alignment of former Yegen Ditch) All materials are fill. |
| 1616: | 78-SS-A (lots of woven material possibly asbestos-containing - sample collected for analysis) |

October 3, 2013 Wednesday

① Shallow soil sampling w/ hand-auger, hand tools

Onsite: Kris Adler, Jim Shaffer, John Bergin } Hydrometrics/Billings
Robert Roll - MDEQ/Helena
Moniza Johnson, Mark Johnson } RTI/Bozeman

0915: EMGR Permit & Tailgate Safety Mtg

Soil Samples collected:

| | |
|---|---|
| 0954: | 93-SS-A, ~~93-SS-B, 93-SS-C~~ |
| 1005 | 93-SS B |
| 1030 | 93-SS-C |
| 1400 | 94-SS-A |
| 1401 | 94-SS-AD (duplicate) |
| 1423 | 95-SS-A (Split sample for RTI) |

(cont.) October 3, 2012

Samples:

1432: 96-SS-A

1515 107-SS-A

1600 106-SS-A (15' N of pipeline at the 'SW' sample point. Same for 'SE' sample point

10/3/2012

1300 YOSD-1210-200 Field Rinsate

1320 YOSD-1210-201 (DI Water Blank

10/4/12



October 4, 2012 Thursday

Shallow soil sampling with hand tools and hand-auger; equipment decontamination

Onsite staff/persons:

Kris Adler
John Bergin
Jim Shaffer } Hydrometrics/Billings

Mark Johnson RTI/Bozeman

0937 EMGR Permit/Tailgate Safety Mtg

Sample Collection

1016 105-SS-A (SW & SE sample pts each about 12' N of pipeline Row)

1032 104-SS-A (SW & SE sample pts located amongst debris & demo equip storage on ASI tract)

1117 88-SS-A (SW sample point located amongst steel & scrap storage on ASI tract)

1424 71-SS-A

1451 71-SS-B

1550 71-SS-C

October 5, 2012 Friday

Shallow soil sampling — ~~continuation~~ of 10/4/2012 sampling. Surveying utilities.

People onsite: Kris Adler, John Begin, Jim Shaffer, Richard Lobbe — Hydrometrics/Billings; Mark Johnson RTI Bozeman

~~Tailgate~~

0853 Tailgate Safety Mtg & EMGR Permit

Samples Collected

| | | |
|---|---|---|
| 0935 | 52-SS-A | ~~(Sand from sand blasting on surface)~~ 10/5 JAS |
| 0955 | 74-SS-A | Sand from sand blasting at surface |
| 1059 | 75-SS-A | |
| 1117 | 75-SS B | |
| 1138 | 75-SS-C | |



October 9, 2012 (Tuesday)

Shallow soil sampling w/ hand-tools on ASI tract and MRL Row

Persons onsite: Kris Adler, Jim Shaffer — Hydrometrics/Billings; Laurie Childs — Hydrometrics/Idaho contractor; Mark Johnson RTI/Bozeman

Tailgate Safety Mtg @ 1043

Samples Collected

| | |
|---|---|
| 1152 | 102-SS-A |
| 1215 | 102-SS-B |
| 1248 | 102-SS-C |
| 1250 | 102-SS-CD (duplicate) |
| 1331 | 103-SS-A |
| 1400 | 87-SS-A |
| 1552 | 66-SS-A |

October 10, 2012

Shallow soil sampling along MRL Row South of tracks and North of CHS tank farm

Personnel: Jim Shoffner Hydrometrics Billings
Laurie Childs Hydrometrics/Helena
Mark Johnson RTI
Kris Adler Hydrometrics/Billings

0803 Tailgate Safety Mtg

Samples Collected today:

| | | | |
|---|---|---|---|
| YOSD-1210-202 | | 0940 | Rinsate |
| YOSD-1210-203 | | 1030 | Blank |
| 1147 | 65-SS-A | | Coal in NE loc |
| 1230 | 65-SS-B | | coal in NE loc |
| 1350 | 65-SS-C | | |
| 1445 | 64-SS-A | | |
| 1535 | 76-SS A | | |



October 11 2012

① Shallow soil sampling @ CHS Tank Farm
② Utility & pipeline location surveying

Persons Onsite: Kris Adler, Jim Shoffner, Laurie Childs, Richard Lobbe — Hydrometrics
Mark Johnson RTI/Bozeman

0841 Safety Mtg

~~Sampling~~

0930 Meet CHS Mike Stanley representative @ tank farm gate to obtain access. ~~Also~~

Sampling:

| | | |
|---|---|---|
| 1100 | 108-SS-A | (3 pts only) |
| 1125 | 109-SS-A | (3 pts only) |

Montana Sulfur & Chem representative onsite to locate its pipeline. Pipeline is abandon. Extends from RR bridge over Yellowstone R to Conoco refinery. Reported capped and filled with Nitrogen

| | | |
|---|---|---|
| 1210 | 101-SS-A | (4 pts only) |
| 1310 | 86-SS-A | (4 pts only) |
| 1400 | 85-SS-A | |
| 1505 | 98-SS-A | |
| 1530 | 81-SS-A | |

Jim Moran, CHS came onsite to review activity and progress

October 12, 2012 Friday

Continue shallow soil sampling inside CHS Tank Farm

Personell

| | | |
|---|---|---|
| Kris Adler | Hydromatrix | Billings |
| Laurie Childs | Hydromatrix | Helena |
| Jim Shaffer | Hydromatrix | Billings |
| Mark Johnson | RTI | Bozeman |

0859 Tailgate Safety Mtg & EMGR Permit

Samples Collected:

| | |
|---|---|
| 0945 | 100-SS-A |
| 1020 | 99-SS-A |
| 1040 | 99-SS-B |
| 1155 | 99-SS-C |
| 1320 | 97-SS-A |
| 1345 | 97-SS-B |
| 1430 | 97-SS-C |



October 16, 2012 ~~Monday~~ Tuesday JOB

Finish shallow soil sampling inside CHS tank farm

Onsite Personell:

| | |
|---|---|
| Jim Shaffer | Hydromatrix Billings |
| Laurie Childs | Hydromatrix Helena |
| Robert Roll | Montana DEQ |
| Mark Johnson | RTI Bozeman |
| Monica Johnson | RTI/Bozeman |

0859 EMGR Permit & Tailgate Safety Mtg

Samples Collected

| | | |
|---|---|---|
| 1033 | 82-SS-A | |
| 1100 | 82-SS-B | |
| 1140 | 82-SS-C | |
| 1335 | 84-SS-A | Butane/Paint odor in proximity of east side of tank 281 (Grid 84) |
| 1400 | 84-SS-B | |
| 1435 | 84-SS-C | |
| YOSD-1210-204 | 10:10 | Rinsate |
| YOSD-1210-205 | 1300 | DI Blank |

This blank collect later in day than rinsate after realized had inadvertently collected 2 rinsates. DI blank from 10:10 AM was discarded and New blank collected

1530 83-SS-A

October 17, 2012 Wednesday

Shallow soil sampling along MRL ROW south side of tracks, along Yegen Ditch and North of CHS tank farm

Personell: Jim Shaffer } Hydrometrics
Laurie Childs }
Monica Johnson RTI Bozeman

0905 Tailgate Safety Meeting

Samples Collected

0940 67-SS-A
1010 67-SS-B
1045 67-SS-C
1205 68-SS-A
~~68-SS-B~~ DOS
~~68-SS-C~~ DOS
1300 69-SS-A
1325 69-SS-B
1345 69-SS-C
1500 70-SS-A (Grid 70 divided by MRL RR. Monica J. (RTI) called Rob Roll (MDEQ) who authorized a 3 pt composite for South of RR. He also authorized a 3 pt composite 70N, to be N of RR tracks)



October 18, 2012 Thursday

Shallow soil sampling on MDOT tract. All sites North of MRL RR ROW tracks.

Personell: Jim Shaffer Hydrometrics / Billings
Laurie Childs Hydrometrics / Helena
Monica Johnson RTI / Bozeman

0850 Tailgate Safety Meeting / Discussion

Samples:

1010 70N-SS-A
~~70-S~~
1011 70N-SS-AD (duplicate)
1139 35-SS-A
1227 34-SS-A
— ~~51~~ More than 1 sampling point covered by asphalt - defer sampling
— ~~50~~ As above
— ~~49~~ As above
1413 48-SS-A
DOS 1452 ~~48~~ 47-SS-A Coal fragment at all points
DOS ~~1~~ 1513 47-SS-B Coal fragments in "C", NE, NW and SW
1614 47-SS-C NE, NW w/ coal frags
1618 47-SS-Cd (duplicate)

October 19, 2012 Friday

Sample ~~in~~ shallow soils in MDOT Tract

Sample shallow soils in ~~ASI Tract~~ MRL Tract south of RR tracks and North of Midland Pkg Co bldg

Personell Jim Shaffer Hydrometrix/Billings
Laurie Childs Hydrometrix/Helena
Mark Johnson RTI Bozeman
Kris Adler Hydrometrix/Billings

~~Comment, Kris Adler~~

0858 Tailgate Safety Meeting/

Samples Collected

0945 32-SS-A Very hard surface!! Mg-Cl & asphalt millings
1052 58-SS-A

Comment: Grids 57-53 defend to later date - Need asphalt ~~based~~ drilled core

1336 10-SS-A
1403 10-SS-B
1435 10-SS-C

1520 YOSD-1210-206 Rinsate
1525 YOSD-1210-207 DI Blank



October 23, 2012 Tuesday

① Shallow soil sampling along South side of RR Tracks on ~~ASI~~ MRL Tract
② Sample on ASI Tract on south and East side of Midland Packing Co bldg when one/more sample points no covered by asphalt or concrete
③ Core drilling asphalt/cement as needed

Personell: Jim Shaffer Hydrometrix/Billings
Laurie Childs " /Helena
John Bergin " /Billings
Walton Crave " /Helena
Josh Gilstrap " /Helena
Mark Johnson RTI/Bozeman

0920 Tailgate Safety Meeting
Kris Adler called to jobsite. 58-SS-A should have been sampled for 'B' and 'C' horizons. Will do first thing today

1005 58-SS-B
1015 58-SS-C
1055 57-SS-A
1155 56-SS-A
1230 56-SS-B
1310 56-SS-C

10/23/2012 continued on page 54.

(cont.) October 23, 2012

Samples Collected:

1410 55-SS-A
1450 54-SS-A
1540 54-SS-B
1605 54-SS-C



October 24, 2012 Wednesday

Shallow soil sampling East side and South of Midland Packing Co bldg – at grids ~~sites~~ where some sites required core drilling cement/asphalt

Personnel: Jim Shaffer Hydrometrics/Billings
Laurie Childs Hydrometrics/Helena
Walter Crauc " "
Josh Gilstrap " "
Mark Johnson RTI/Bozeman

0844 Tailgate Safety Mtg

Sampling Sites

| | | |
|---|---|---|
| 0930 | 53-SS-A | * |
| 1130 | 59-SS-A | |
| 1320 | 60-SS-A | |
| 1350 | 72-SS-A | |
| 1450 | 63-SS-A | |
| | ~~63-SS-B~~ | |
| | ~~63-SS-B 63-SS-C~~ | |
| 1455 | 63-SS-Ad (duplicate) | |
| 1530 | 62-SS-A | |

* Road base/base coarse below cored surface material extremely hard to dig thru with spud bar. Decision to call in Wang air knife.

John Bergin and air knife onsite at about 1100
Tailgate Safety Form and discussion completed

OCTOBER 25 2012 Thursday

① Shallow soil sampling w/ hand-auger
② Core drilling asphalt / cement
③ Air-knife (as needed)

Personell: Jim Shaffer Hydrometrics / Billings
Laurie Childs " / Helena
John Bergin " / Billings
Walter Crane " / Helena
Josh Gilstrap " / Helena
Maniza Johnson RTI / Bozeman

0851 Tailgate Safety Mtg / EMGR Permit

Samples Collected

0920 61-SS-A
0950 61-SS-B
1020 61-SS-C
1100: 73-SS-A

Finished all sampling at Grid s. lies south of RR tracks on ASI, MRC, CMS on PGG tracts. All remaining sampling located North of MRL ~~Tracts~~ tracks

1205 33-SS-A
13:00 49-SS A
14:20 50-SS-A
~~1450~~ 1500 YOSD-1210-~~208~~ 209 Rinsate
~~1500~~ 1450 YOSD-1210-208 Dr Blank
10/25

(continue on page 57)



October 25 2012 (continued)

Samples:
1545 51-SS-A
1655 19-SS-A

October 26, 2012 Friday

Shallow soil Sampling w/ hand auger and hand tools.

Personell: John Bergin Monica Johnson (RTI)
Kris Adler

0930 Tailgate Safety meeting

Samples Collected today

| | |
|---|---|
| 31-SS-A | 11:25 |
| 31-SS-B | 11:45 |
| 31-SS-C | 12:12 |
| 46-SS-A | 14:00 |
| 46-SS-B | 14:20 |
| 46-SS-C | 14:40 |

Decon water: composite of wash water from
October 2
October 12
October 18
October 24
} YOSD-1210-500 15:33
EPH, VOCs, Metals



October 30, 2012 Tuesday

Shallow soil sampling w/ hand-auger and hand tools. Air Knife (as needed)

Personell: Jim Shaffer
John Bergin

0920 Tailgate Safety Mtg

Samples Collected today

| | |
|---|---|
| 0945 | 8-SS-A |
| 1029 | 7-SS-A |
| 1103 | 6-SS-A |
| JBB ~~1103~~ 1146 | 5-SS-A |
| 1252 | 4-SS-A |
| 1343 | 11-SS-A |
| 1345 | 11-SS-Ad (duplicate) |
| 1411 | 12-SS-A |
| 1503 | 12 SS-B |
| JBB ~~1537~~ 1537 | 12-SS-C |

October 31, 2012 Wednesday
Continue shallow soil sampling w/ hand tools and/or air knife as needed. Work inside YPL/GPL pump ~~station~~

Personell: Jim Shaffer, John Bergin — Hydrometrics/Billings
Mark Johnson RTI/Bozeman

Samples Collected

| | | |
|---|---|---|
| JDS | ~~1045~~ 1125 | 13-SS-A |
| | 1157 | 14-SS-A |
| JDS | ~~1254~~ 1254 | 15-SS-A |
| | 1320 | 16-SS-A |
| | 1347 | 17-SS-A |
| | 1441 | 18-SS-A |
| | 1522 | 25-SS-A |
| | 1556 | 25-SS-B |
| | 1630 | 25-SS-C |
| | 0932 | YOSD-1210-211 Rinsate |
| | 0920 | YOSD-1210-210 DI Blank |



November 1, 2012 Thursday
Shallow soil sampling with hand tools and hand auger inside fenced area known as the 'TEL Ponds Area'

Personell: Kris Adler — Hydrometrics/Billings
Jim Shaffer — " "
John Bergin — " "
Rob Roll — MT DEQ
Mark Johnson — RTI/Bozeman

Tailgate Safety Mtg

Samples Collected today

| | | |
|---|---|---|
| | 1015 | 30-SS-A |
| | 1055 | 29-SS-A |
| | 1126 | 29-SS-B |
| JDS | ~~1143~~ 1243 | 29-SS-C (split w/ RTI) |
| " | 1410 | 45-SS-A |
| | 1423 | 45-SS-B |
| | 1447 | 45-SS-C ~~(split w/ RTI)~~ JDS |
| JDS all sampling deferred until 11/2/2012 | | ~~44-SS-A~~ |
| | | ~~44-SS-B~~ |
| | | ~~44-SS-C~~ |
| | | ~~44-SS-Cd (duplicate)~~ |
| | | ~~YOSD 1211-212 Rinsate~~ |
| | | ~~YOSD-1211-213 DI Blank~~ |

November 2, 2012 Friday
Complete shallow soil sampling with hand tools / hand auger inside "TEL Pond Area"

Personnel: Jim Shaffer Hydrometrics/Billings
John Bergin " "
Mark Johnson RTI/Bozeman

0920 Tailgate Safety Mtg

Samples Collected:

| | | |
|---|---|---|
| 1112 | 44-SS-A | |
| 1135 | 44-SS-B | |
| 1203 | 44-SS-C | |
| 1208 | 44-SS-Cd (duplicate) | |
| 1042 | YOSD-1211-212 | Rinsate |
| 1050 | YOSD-1211-213 | DI Blank |

Book 2

CONTENTS

| PAGE | REFERENCE | DATE |
|---|---|---|
| 1 | Shallow Soil Sampling – North of MRL RR at 660, 600 & 550 1st Ave N, Billings | 11/6/12 |



November 6, 2012 Tuesday

Continue shallow soil sampling w/ hand tools / hand auger in paved and gravel-surface areas surrounding 360 Office Supplies. Air Knife excavation as needed

Personnel: Jim Shafton Hydrometrix/Billings
John Bergin "
Monica Johnson RTI/Bozeman
Kris Adler Hydrometrix/Billings
George Metzger Hydrometrix/Helena

0927 Tailgate Safety mtg / Discussion
1230 Tailgate Safety mtg / Adler & Metzger

Sampling Today:

| | | |
|---|---|---|
| | 0942 21-SS-A | 1404: 36-SS-A |
| 0 | 1000 ~~1100~~ 21-SS-B | 1437: 36-SS-B |
| 0 | 1020 ~~1120~~ 21-SS-C | 1535: 36-SS-C |
| | 1100: 20-SS-A | |
| | 1125: 20-SS-B | |
| | 1150: 20-SS-C | |
| | 1330 22-SS-A | |
| | 1410 22-SS-B | |
| | 1533 22-SS-C | |

Rite in the Rain

November 7 2012 Wednesday

Continue shallow soil sampling in parking area of 360 office and in along MRL RR ROW behind loading dock and RR

Personnell: Kris Allen, John Bergin, Jim Shaffer — Hydrometrics/Billings
George Metzger — Hydrometrics/Helena
Monica Johnson — RTI/Bozeman

0855 Tailgate Safety Meeting/Sign in
0912 LPS Follow up to ~~fuel~~ Trailer incident

Sampling Today

| | | | | |
|---|---|---|---|---|
| 0934 | 23-SS-A | | ~~37~~ | |
| ~~40~~ | ~~A~~ | 0937 | 37 SS A | |
| ~~40~~ | ~~B~~ | ~~1030~~ ~~1033~~ | 9 SS A | 1033 |
| ~~40~~ | ~~C~~ | 1104 | 9 SS B | |
| 1415 | 39-SS-A | 1202 | 9 SS C | |
| 1030 | 38-SS-A | 1433 ~~1450~~ | 2-SS-A | |
| 1050 | 38-SS-B | 1513 ~~1555~~ | 2-SS-B | |
| 1215 | 38-SS-C | 1541 ~~1600~~ | 2-SS-C | |
| 1420 | 39-SS-~~B~~ AD | RTI duplicate: 33-SS-A @ 0937 | | |
| Rinsate 1514 | YOSD-1211-214 | 1627 | 1-SS-A | |
| DI Blank 1520 | YOSD-1211-215 | | ~~2-SS~~ | |
| | | 1609 | 3-SS-A | |



November 8, 2012 Thursday

Continue shallow soil sampling inside the YPL pumping station and the fenced area (MRL) south of YPL

Personnell: Kris Allen — Hydrometrics w/ Billings
George Metzger — Hydrometrics Helena
Jim Shaffer — Hydrometrics/Billings
John Bergin — " "
Mark Johnston — RTI/Bozeman

0914 Tailgate Safety Mtg

Samples Collected Today w/ Times (VPH)

| | | | |
|---|---|---|---|
| 0935 | 26-SS-A | 0934 | 40-SS-A |
| 1005 | 26-SS-B | 1017 | 40-SS-B |
| 1050 | 26-SS-C | 1123 | 40-SS-C |
| 1500 | 27-SS-A | 1616 | 41-SS-A |
| 1330 | 28-SS-A | 1323 | 42-SS-A |
| 1342 | 28-SS-B | 1400 | 42-SS-B |
| 1415 | 28-SS-C | 1436 | 42-SS-C |
| | | 1535 | 43-SS-A |
| | | 1615 | 43-SS-B |
| | | 1645 | 43-SS-C |

Rite in the Rain

November 9, 2012 Friday

1400 To job site –
- pick up and return compressor to United Rentals in Lockwood

1500 return to office



November 12, 2012 Monday

Survey (locate & mark) locations for Focused Sampling @:
1) Paint Shop area
2) T.E.L. Pond site

Personell: John Bergin
Luci Childs

Start 0830 – about 3:00 pm

Unlock gates to access TEL & haz wst area south of YPL facility
Jim Shoffner 1030 & 1315 hrs.

Rite in the Rain

November 27, 2012 Tuesday

0900 Depart Hydrometrics
Pickup DI Water & Acetone @
NW Scientific

1001 Complete Tailgate Safety Briefing
and ExxonMobil permit

Personnel: Jim Shaffer Hydrometrics
John Bergin Billings
Mark Johnson RTI / Bozeman

Shallow Soil / Focused sampling inside
T.E.L. Area and fence area
south of Yellowstone Pipl. Pump Station

Samples collected (TEL##-SS-A/B/C)

| | |
|---|---|
| TEL 4 (pt 720) | 1048 |
| TEL 5 (pt 721) | 1050 ~~1049~~ JGB. |
| TEL 9 A (pt. 725) | 1116 |
| TEL 10 A (pt. 726) | 1122 |
| TEL 10 B (pt. 726) | 1126 |
| TEL 10 Bd (pt 726) | 1130 |
| TEL 10 C (pt 726) | 1143 |

1156 - 1230 - Decon equipment
1230 - 1300 lunch break

(OVER)

Rite in the Rain

November 27, 2012

Sampling (continued)

| | | |
|---|---|---|
| TEL14 | 1307 | (pt 0728) |
| TEL15 | 1313 | (pt. 0727) |
| TEL19 | 1331 | (pt. 0735) |
| TEL20 | 1338 | (pt 0736) |
| TEL24 | 1400 | (pt 0738) |
| TEL25 | 1406 | (pt 0737) |

~~To Yellowstone [illegible] mor~~

1417 Decon equipment augers & bowls
1438 Depart trailer
P/U ice & water - Yellowstone Ice
Gas truck
Return to office - unload samples
~~[illegible]~~
1532 QA samples forms and times in the book
1553 End for 11/27/2012



November 28, 2012 Wednesday

Shallow soil / focus sampling in fenced area south of Yellowstone (P66) Pipeline -- Tract D

0900 Health and Safety briefing

Personell Jim Shaffer Hydrometrics / Billings
John Bergin
Mark Johnson RTI / Bozeman
Rob Roll MDEQ / Helena

Collect ~~Rinsate~~ Blanks:
Rinsate YOSD-1211-310
DI ~~Rinsate~~ Blank YOSD-1211-311

Samples collected:

| | | | |
|---|---|---|---|
| TEL 1A | (pt 0717) | @ | 0934 hrs |
| TEL 2A | (pt 0718) | @ | 0942 |
| TEL 3A | (pt 0719) | @ | 0950 |
| TEL 6A | (pt 0722) | @ | 0956 |
| TEL 6B | (pt 0722) | @ | 1002 |
| TEL 6C | (pt 0722) | @ | 1011 |
| TEL 6Cd | (pt 0722) | @ | 1013 |

(over)

Rite in the Rain

November 28, 2012 Wednesday

Samples collected (cont)

TEL 7A (pt. 0723) @ 1052
TEL 8A (pt 0724) @ 1101
TEL 11A (pt 0731) @ 1114
TEL 12A (pt 0730) @ 1130
TEL 13A (pt 0729) @ 1148

Rinsate: YOSD-1211-301 @ 1044
DI Blank: YOSD-1211-302 @ 1041
Source of water from Energy Labs
this date confirmed 2X by JDD → dated 10/8/12 (box label)
QC completed by W.E.B ___ A (box label)
"Voc free water 11-28-12 glass
Metals free water 11-28-12 plastic
1200 - 1300 LUNCH BREAK
TEL 16 (pt 0732) @ 1358
TEL 17 (pt 0733) @ 1346
TEL 18 (pt 0734) @ 1410
TEL 21 (pt 0741) @ 1424
TEL 22A (pt 0740) @ 1437
TEL 22B (pt 0740) @ 1445
TEL 22C (pt 0740) @ 1453
TEL 23A (pt 0739) @ 1505
1513 End of Sampling for 11/28/2012
Decon equipment and return to office



November 28, 2012 (continued)

Rinsate YOSD-1211-303 @ 1530
DI Blank YOSD-1211-304 @ 1534

Same water source as that used for blanks -301 and -302
see page 10

1553 Depart for office

Rite in the Rain

November 29, 2012 Thursday

Continue Shallow Soil (Focusoil) using hand tools at former Paint Shop site located west of Tract B

0915 Health and Safety briefing
Jim Shaffer Hydrometrics/Billings
John Bergen " "
Mark Johnson RTI/Bozeman

Samples collect @ Paint Shop

| | | | |
|---|---|---|---|
| PS-2A | (pt 683) | @ | 0930 |
| PS-2B | pt 683) | @ | 0937 |
| PS-2C | (pt 683) | @ | 0945 |
| PS-3A | (pt 684) | @ | 0952 |
| PS-4A | (pt 685) | @ | 1001 |
| PS-6A | (pt 688) | @ | 1010 |
| PS-7A | (pt 687) | @ | 1027 |
| PS-8A | (pt 686) | @ | 1035 |
| PS-9A | (pt 690) | @ | 1048 |
| PS-10A | (pt 691) | @ | 1057 |
| PS-11A | (pt 692) | @ | 1108 |
| PS-11B | aa | @ | 1116 |
| PS-11C | o.a. | @ | 1123 |
| PS-11Cd | (duplicate) | @ | 1124 |



November 29, 2012. Thursday

The following are valid: JOB 11/29/12 @1301

~~Rinsate YOSD-1211-401 @ 1138~~
~~DI Blank YOSD-1211-402 @ 1143~~
~~See pg 14~~

Disregard Strikeout JOB 11/29/12 @1301

1148 - 1241 Lunch Break

Samples collected JOB 1/17/2013

| | | | |
|---|---|---|---|
| PS 1A | (pt 682) (pt 328) | @ | 1246 |
| PS 5A | (pt 689) | @ | 1251 |
| PS 12 A | (pt 693) | @ | 1304 |
| PS 13 A | (pt 694) | @ | 1313 |
| PS 14 A | (pt 695) | @ | 1320 |
| PS 15 A | (pt 696) | @ | 1329 |
| PS 16 A | (pt 697) | @ | 1357 |
| PS 17 A | (pt 698) | @ | 1402 |
| PS 18 A | (pt 699) | @ | 1409 |
| PS 19 A | (pt 700) | @ | 1417 |
| PS 20 A | (pt 704) | @ | 1425 |
| PS 21 A | (pt 703) | @ | 1433 |
| PS 22 A | (pt 702) | @ | 1441 |
| PS 22 B | (pt 702) | @ | 1449 |
| PS 22 C | (pt 702) | @ | 1458 |
| PS 23 A | (pt ~~703~~ 701) | @ | 1513 |

JOB 1/17/2013

Discontinue Sampling for 11/29/12 @ 1525

To Yellowstone Ice for water and ice

Rite in the Rain

November 30, 2012 Friday

Continue shallow soil sampling on west side of loading dock, SW of Tract B, located on RR ROW

Health and Safety Briefing

Personnel Jim Shaffer Aptometrino/
John Bergin " Billings
Mark Johnson RTI/Bogema

Samples collected

| | | | |
|---|---|---|---|
| | PS24A | (pt 705) @ | 1010 |
| | PS25A | (pt 706) @ | 1013 |
| | PS26A | (pt 707) @ | 1020 |
| DI Blank | YOSD-1211-404 | @ | 1043 |
| Rinsate | YOSD-1211-403 | @ | 1038 |
| | PS27A | (pt 708) @ | 1049 |
| | PS28A | (pt 712) @ | 1058 |
| | PS29A | (pt 711) @ | 1107 |
| | PS29B | (pt aa) @ | 1118 |
| | PS29C | (pt aa) @ | 1125 |
| duplicate 29C labelled ~~PKZ-SS-C~~ | PS29-SS-Cd | @ | 1126 |
| | 30A | (pt 710) @ | 1139 |
| | 31A | (pt 709) @ | 1148 |



November 30, 2012 (continued)

Samples Collected:

| | | | |
|---|---|---|---|
| PS32A | (pt 713) | @ | 1156 |
| 33A | (pt 714) | @ | 1203 |
| 34A | (pt 715) | @ | 1212 |
| 35A | (pt 716) | @ | 1222 |
| PS35-SS-Ad | (pt aa) | @ | 1224 |
| Rinsate | YOSD-1211-406 | @ | 1235 |
| DI Blank | YOSD-1211-405 | @ | 1230 |

Unload field equipment from Trailer that won't stay for good Christmas

Call BCS – arrange p/u of portable toilet

Unload / put away equipment at Hydrometrics

1430 — job complete for today

Rite in the Rain

# SUBSURFACE SAMPLING FORMS

**SUBSURFACE SOIL - SAMPLING METHODS**

| Grid Number | Date | Hand Auger Depth | Date | Air knife/ Vac Truck Depth | Date | Geoprobe Depth | SWL | Comments |
|---|---|---|---|---|---|---|---|---|
| 1 | 5/17/2013 | 0-4.8 | 8/8/2013 | 4.8-8 | 8/8/2013 | 11-15 | 10 | |
| 2 | 5/17/2013 | 0-4.2 | 8/8/2013 | 4.2-8 | 8/8/2013 | 11.5-15.5 | 11 | |
| 3 | 5/17/2013 | 0-5.4 | 8/8/2013 | 5.4-7.5 | 8/8/2013 | 11.5 | 7.5 | |
| 4 | 5/7/2013 | 0-8 | NA | NA | 6/6/2013 | 8-10.5 | 10 | |
| 5 | 5/7/2013 | 0-8 | NA | NA | 6/7/2013 | 8-15 | 14 | |
| 6 | 5/9/2013 | 0-7 | 7/12/2013 | 7-8 | 8/2/2013 | 8-16 | 8 | |
| 7 | 5/6/2013 | 0-9.5 | NA | NA | 6/6/2013 | 9.5-14 | 4.5/8 | |
| 8 | 5/6/2013 | 0-5.7 | 7/11/2013 | 5.7-8.8 | 7/31/2013 | 8.8-15 | 7.8 | |
| 9 | 5/16/2013 | 0-7 | 7/11/2013 | 7-9 | 8/1/2013 | 8-11 | 8 | |
| 10 | 4/24/2013 | 0-7 | 7/11/2013 | 7-8 | 7/30/2013 | 8-16 | 9.5 | |
| 11 | 5/16/2013 | 0-7.5 | 6/7/2013 | 7.5-8 | 6/27/2013 | 8-10 | 8 | |
| 12 | 5/7/2013 | 0-6.7 | 7/11/2013 | 6.7-9 | 7/31/2013 | 8-15 | 8 | |
| 13 | 5/7/2013 | 0-6.6 | 7/10/2013 | 6.6-8 | 7/31/2013 | 8-14.5 | 8.5 | |
| 14 | 4/29/2013 | 0-8 | NA | NA | 6/6/2013 | 8-15 | 12-13 | |
| 15 | 5/8/2013 | 0-6.8 | 7/12/2013 | 6.8-8.8 | 8/2/2013 | 8-14 | 7.7 | |
| 16 | 5/9/2013 | 0-9.5 | NA | NA | 8/2/2013 | 8.3-13 | 8.3/9 | |
| 17 | 5/10/2013 | 0-9.2 | NA | NA | NA | NA | 8.8 | |
| 18 | 5/8/2013 | 0-7.7 | 7/12/2013 | 7.7-8.5 | 8/2/2013 | 8-11.5 | 7.5 | |
| 19 | 5/2/2013 | 0-4.8 | X | 4.8-8 | 8/9/2013 | 8-15.5 | 7 | Air Knife data not available |
| 20 | 4/24/2013 | 0-8 | NA | NA | 8/1/2013 | 8-15 | 7.5 | |
| 21 | 5/13/2013 | 0-7 | 6/11/2013 | 7-8 | 6/27/2013 | 8-11.5 | 7.8 | |
| 22 | 5/16/2013 | 0-10.5 | NA | NA | NA | NA | 9.5 | A, B, C collected by hand |
| 23 | 5/16/2013 | 0-11.5 | NA | NA | NA | NA | 9.5 | |
| 24 | NA | NA | NA | NA | NA | NA | NA | Building on grid |
| 25 | 4/29/2013 | 0-4 | 8/8/2013 | 4-8 | 7/31/2013 | 8-11.5 | 7.3 | *see sample depth sheet |
| 26 | 4/30/2013 | 0-8.1 | NA | NA | 7/31/2013 | 8.1-14.5 | 8 | |
| 27 | 4/30/2013 | 0-7 | 7/9/2013 | 7-8.5 | 7/31/2013 | 8-13 | 7.5/5 | |
| 28 | 4/30/2013 | 0-7.3 | 7/9/2013 | 7.3-8.5 | 7/31/2013 | 8-11.5 | 5.6 | |
| 29 | 5/1/2013 | 0-6.7 | 6/11/2013 | 6.7-8 | 6/28/2013 | 8-11.5 | 5.4 | |
| 30 | 5/1/2013 | 0-9.9 | NA | NA | 8/1/2013 | 9.9-15 | 7.9 | |
| 31 | 5/2/2013 | 0-7.5 | 6/10/2013 | 7.5-8 | 6/28/2013 | 8-11.5 | 8/6.6 | |
| 32 | 5/2/2013 & 6/6/13 | 0-8.1/5-7.5 | NA | NA | 6/6/2013 | 8.1-15 | 7.5 | (1) |
| 33 | 5/2/2013 | 0-9 | NA | NA | 6/6/2013 | 6.3-13 | 8.2 | |
| 34 | 5/2/2013 & 6/10/13 | 0-3.5/4-8 | 6/10/2013 | 3.5-4 | 6/28/2013 | 8-15 | 10.5 | |
| 35 | 5/6/2013 | 0-8.6 | NA | NA | 6/7/2013 | 7.5-20 | 9 | |
| 36 | 5/13/2013 | 0-10 | NA | NA | NA | NA | 7 | |
| 37 | 5/13/2013 | 0-7 | 6/10/2013 | 7-8 | 6/27/2013 | 8-16 | 7 | |
| 38 | 5/16/2013 | 0-4 | 6/7/2013 | 4-8 | 6/27/2013 | 8-11 | 7.5/7 | |
| 39 | 4/26/2013 | 0-4 | X | 4-8 | 6/27/2013 | 8-15.5 | 8 | Air Knife data not available |
| 40 | 4/29/2013 | 0-7.5 | 6/11/2013 | 7.5-8 | 6/28/2013 | 8-20 | 8 | |
| 41 | 4/30/2013 | 0-6.6 | 7/10/2013 | 6.6-8 | 7/31/2013 | 8-16 | 8/6.2 | |
| 42 | 4/30/2013 | 0-7 | 7/10/2013 | 7-8.2 | 7/31/2013 | 8.2-11.5 | 7.2/6.3 | |
| 43 | 4/30/2013 | 0-5.5 | 7/10/2013 | 5.5-8.3 | 7/31/2013 | 8.3-11.5 | 7.3/6 | |
| 44 | 7/31/2013 | 0-6 | NA | NA | NA | NA | 2 | |
| 45 | 5/1/2013 | 0-4.9 | 8/9/2013 | 0-8 | 8/9/2013 | 8-11.5 | 8 | (2) |
| 46 | 5/1/2013 | 0-6.2 | 6/7/2013 | 6.2-8 | 6/28/2013 | 8-12 | 6.2/6.8 | |
| 47 | 5/2/2013 | 0-7.7 | 6/7/2013 | 7.7-8 | 6/27/2013 | 8-11.5 | 6.6 | |
| 48 | 4/25/2013 | 0-9.2 | NA | NA | NA | NA | 6.8 | |
| 49 | 4/25/2013 | 0-7.2 | 6/6/2013 | 7.2-8 | 6/27/2013 | 8-14.5 | 8 | |
| 50 | 4/25/2013 | 0-8 | NA | NA | 7/31/2013 | 8-14 | 9 | |
| 51 | 4/24/2013 | 0-7 | 6/6/2013 | 7-8 | 6/7/2013 | 8-12 | 7.7 | |
| 52 | 5/17/2013 | 0-10 | NA | NA | NA | NA | 7 | |
| 53 | 5/21/13 & 5/23/13 | 0-2.9 & 6.5-9 | 5/23/2013 | 2.9-6.5 | 6/5/2013 | 9-12 | 8/6.5 | |
| 54 | 5/20/2013 | 0-7 | 5/23/2013 | 7-8.5 | 6/5/2013 | 7-10 | 8/7 | |
| 55 | 5/21/2013 | 0-5.75 | 5/23/2013 | 5.75-8 | 6/5/2013 | 8-10 | 8 | |
| 56 | 5/20/2013 | 0-7.5 | 5/24/2013 | 7.5-8 | 6/5/2013 | 8-10 | 7 | |

**SUBSURFACE SOIL - SAMPLING METHODS**

| Grid Number | Date | Hand Auger Depth | Date | Air knife/ Vac Truck Depth | Date | Geoprobe Depth | SWL | Comments |
|---|---|---|---|---|---|---|---|---|
| 57 | 5/21/2013 | 0-7 | 5/24/2013 | 7-8 | 7/2/2013 | 8-12 | 7 | |
| 58 | 5/22/2013 | 0-10.8 | NA | NA | 8/1/2013 | 10.8-14 | 7.8 | |
| 59 | 5/22/2013 | 0-5.3 | 5/28/2013 | 5.3-8.7 | NA | NA | 6 | |
| 60 | 5/22/13 & 5/28/13 | 0-5.3 & 6-8 | 5/28/2013 | 5.3-6 | 7/1/2013 | 8-15.5 | 5.9 | |
| 61 | 5/2/2013 | 0-9 | NA | NA | NA | NA | | |
| 62 | 5/21/2013 | 0-8 | NA | NA | 8/1/2013 | 8-9 | | |
| 63 | 5/21/2013 | 0-5.3 | 5/28/2013 | 5.3-6 | NA | NA | | |
| 64 | 5/21/2013 | 0-7 | 5/24/2013 | 7-8 | 7/2/2013 | 8-15.5 | 7 | |
| 65 | 5/28/2013 | 0-8 | NA | NA | 8/1/2013 | 8-15 | | |
| 66 | 5/31/2013 | 0-5.5 | NA | NA | NA | NA | | |
| 67 | 5/30/2013 | 0-7 | 6/6/2013 | 7-8 | 7/2/2013 | 8-16 | 6.3 | |
| 68 | 5/30/2013 | 0-4 | 6/6/2013 | 4-8 | NA | NA | 4 | |
| 69 | 5/30/2013 | 0-4 | 6/6/2013 | 4-8 | 7/2/2013 | 8-11 | 5.5 | |
| 70 | 5/30/2013 | 0-4 | 6/6/2013 | 4-8 | NA | NA | 4.5 | |
| 71 | 5/30/2013 | 0-4.4 | 6/3/2013 | 4-8 | 6/28/2013 | 8-11.5 | 6.5 | |
| 72 | 5/29/2013 | 0-9.5 | NA | NA | NA | NA | 6.5 | |
| 73 | 5/22/2013 | 0-3.2 | 8/12/2013 | 3.2-8 | 6/28/2013 | 8-10.5 | 5 | (1) |
| 74 | 5/22/2013 | 0-4 | 8/12/2013 | 4-8 | 8/1/2013 | 8-11.5 | 5.7 | (1) |
| 75 | 5/22/2013 | 0-5.7 | 6/4/2013 | 5.7-8 | 7/1/2013 | 8-12 | | |
| 76 | 5/23/2013 | 0-7.4 | NA | NA | NA | NA | 5.3 | |
| 77 | 5/24/2013 | 0-6 | 6/5/2013 | 6-8 | 7/1/2013 | 8-16 | 5.7 | |
| 78 | 5/24/2013 | 0-5.5 | 6/5/2013 | 5.5-8 | NA | NA | 4.8 | |
| 79 | 5/23/2013 | 0-6 | NA | NA | NA | NA | 2 | |
| 80 | 5/23/2013 | 0-5.8 | NA | NA | NA | NA | 2.5 | |
| 81 | 5/14/2013 | 0-4 | 6/11/2013 | 4-7 | NA | NA | 5 | |
| 82 | 5/15/2013 | 0-4.9 | 6/11/2013 | 5-7 | NA | NA | 5 | |
| 83 | 5/15/2013 | 0-4.2 | 6/11/2013 | 6-8 | NA | NA | 6 | |
| 84 | 5/15/2013 | 0-4.5 | 6/12/2013 | 4.5-8 | 8/9/2013 | 8-15.5 | 7.5 | |
| 85 | 5/15/2013 | 0-3.5 | 6/12/2013 | 3.5-7.5 | NA | NA | 5.5 | |
| 86 | 5/15/2013 | 0-3.2 | 6/12/2013 | 3.2-7 | NA | NA | 5.5 | |
| 87 | 5/28/2013 | 0-7.2 | NA | NA | NA | NA | 5.5 | |
| 88 | 5/24/2013 | 0-4.2 | 6/3/2013 | 4-8 | 7/2/2013 | 8-11.5 | 4.5 | |
| 89 | 5/24/2013 | 0-5.9 | 6/4/2013 | 4-8 | 7/1/2013 | 8-11.5 | 4.5 | |
| 90 | 5/24/2013 | 0-7 | 6/4/2013 | 4-8 | NA | NA | 4.5 | |
| 91 | 5/23/2013 | 0-4.2 | 6/4/2013 | 4-8 | 7/1/2013 | 8-14.5 | 5 | |
| 92 | 5/23/2013 | 0-3.1 | 6/4/2013 | 4-8 | 7/1/2013 | 8-10.5 | 5 | |
| 93 | 5/3/2013 | 0-3.1 | 6/5/2013 | 3.1-8 | NA | NA | 5.5 | |
| 94 | 5/24/2013 | 0-4.4 | 6/5/2013 | 4.4-8 | NA | NA | 5.5 | |
| 95 | 5/23/2013 | 0-8 | 6/5/2013 | 0-8 | 7/1/2013 | 8-11 | 6.8 | Hole widened for geoprobe |
| 96 | 5/23/2013 | 0-2.6 | 6/5/2013 | 2.5-8 | NA | NA | 4.5 | |
| 97 | 5/14/2013 | 0-4 | 6/10/2013 | 3-7 | NA | NA | 4 | |
| 98 | 5/14/2013 | 0-4.3 | 6/11/2013 | 3.5-5.5 | NA | NA | 3.5 | |
| 99 | 5/14/2013 | 0-5.5 | 6/11/2013 | 3.4-7 | NA | NA | 5.5 | |
| 100 | 5/15/2013 | 0-3 | 6/12/2013 | 3-7.5 | NA | NA | 5.5 | |
| 101 | 5/15/2013 | 0-3 | 6/12/2013 | 3-8.2 | NA | NA | 6.2 | |
| 102 | 5/28/2013 | 0-3.3 | 5/28/2013 | 3-8 | 8/2/2013 | 5.7-11.5 | 7 | |
| 103 | 5/28/2013 | 0-3 | 5/28/2013 | 3-8 | 8/2/2013 | 8-15 | 7 | |
| 104 | 5/3/2013 | 0-3.5 | 6/5/2013 | 3.5-8 | NA | NA | 5.5 | |
| 105 | 5/3/2013 | 0-4.8 | 6/5/2013 | 4.8-8 | 7/1/2013 | 8-11 | 6.5 | |
| 106 | 4/26/2013 | 0-6.8 | NA | NA | NA | NA | 4 | |
| 107 | 4/26/2013 | 0-8 | NA | NA | NA | NA | 5 | |
| 108 | 5/14/2013 | 0-3.9 | 6/10/2013 | 3-7 | NA | NA | 4 | |
| 109 | 5/14/2013 | 0-5 | 6/10-11/2013 | 4-6.5 | NA | NA | 4 | |

(1) Water table rose between hole clearance and geoprobe. "B" sample collected by hand.
(2) "C" sample offset - no access for vac truck or geoprobe.
X= Data not available

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: Grad CNTR 1 RECORDED BY: JB 5/17/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Offset 10' North | 4" mins gravel sandy silt, Sl. Moist No Stain No Odor, Lt Brown |
| 2 | | | | 1-SB-A 0955 | | | DH 0.0 HH 0.8 | 2-3.5 Brown, Sl. Moist Silt No Stain No Odor |
| 3 | | | | | | | | 3.5-4 Brown, Sl. Moist 30% Sandy Silt 70%, No Stain No Odor |
| 4 | | | | 1-SB-A 1110 | | | DH 0.0 HH 2.2 | 4-4.2 SAA |
| 5 | | | | | | | | 4.2-4.84' m iron gravel Sandy Silt, Sl. Moist No Stain, No Odor |
| 6 | | | | | | | | 4.8+ Could not Advance |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: 8-8-13

WELL ID: Grid CNTR 1 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Cont. from hand Auger hole w/ Air Knife & Vac Truck | Red Brick @ 6'-8' |
| 8 | | 1-SB-B 1310 HH PID: 4.4 | | | | | Water in 10' 8'-11' | Sandy gravels, Brown Large to med. cobbles No Stain, No Odor |
| 11 | | 1-SB-C 1315 HH PID: 3.2 | | | | | 11-15' | More sand than above, All others same as above |
| 15 | | | | | | | | |

Rinsate YOSD-1308-105 over water level meter
1300

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: ~~[illegible]~~ EXXon PROJECT NAME & NO: Yale oil 5/17/13

WELL ID: Grid #2 Cntr RECORDED BY: C.J.

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0-18" | Road base, Parking lot |
| | | | | | | | 18"-2' | ~~Sandy~~ silt, ~~[illegible]~~ Moisture (low) light brown, no odor |
| | | | | | | | 2'-3' | Silt, light brown, low moisture no odor |
| 2 | | DH PID → 0.0 | | | | | 3.0-3.5 → | Sandy silt, light brown, low moisture no odor, low cohiscreness |
| | | HH PID → HH.7 | | | | | | |
| | | Sample @ → 1200 | | | | | | |
| 4 | | Sampled 2'-4' | | | | | 3.5-4' | cobbles, gravels (3/4"-8") light brown, silty sand, no odor low moisture |
| | | Refusal @ 4.2' | | | | | | |
| 6 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: 8-8-13

WELL ID: Grid CNTR 2 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Cont. from previous hole using Air Rotate & Vac Truck | No water to 8' Cont. w/ Geoprobe |
| 8 | | | 2-SB-B 1120 HH PID: 0.6 | | | | water @ 11' sample 8-11.5' | Odor, No Staining Grey-Lt Brown, Large grain sand w/ gravel |
| 11.5 | | | 2-SB-C 1130 HH PID: 2.0 | | | | | Very Slight Odor, No Stain Grey to Lt Brown Large grain sand w/ gravel |
| 15.5 | | | | | | | | |

Rinsate 1050-1308-104 @ 1015

H:\OFFICE\Forms\TEST HOLE LOG.doc

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: Grid CNTR 3 RECORDED BY: JG 5/17/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 3' West | Cobbles 6" minus w/ gravels Lt Brown Sandy Silt No Stain No Odor, Sl. Moist |
| 2 | | | | | | | | |
| 3 | | | 3-SB-A 1215 | | | | DH 12.8 ? HH 2.9 | 4" minus gravels, Brown Sandy Silt, Sl. Moist, No Stain, No Odor |
| 4 | | | | | | | | |
| 5 | | | 3-SB-A 1335 | | | | DH 0.0 HH 8.2 | 4-5.4" Minus gravel, Brown Silty Sand, Sl. Moist No Stain, No Odor |
| 6 | | | | | | | | 5.4+ Could Not Advance |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: 8-8-13

WELL ID: Grid CNTR 3 RECORDED BY: JA

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Cont. Air Rifle from previous ~~bagl~~ auger hole | |
| | | | 3-SB-B 1000 HH PID: 44 | | | | 7.5'-8' | Brown. Sandy gravel & cobbles, No Stain No Odor |
| 8.0 | | | 3-SB-C (Grab) 10:30 HH PID: ~~3~~ 27.4 VLX | | | | | Sandy gravel. Grey. Meet cobbles. Moderate staining, moderate odor. |
| 11.0 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: 0

WELL ID: GNCL CNTR 4 RECORDED BY: JB 5/7/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Asphault Cover | 0-6" Asphaltic<br>6"-1.8' Brown Silty Gravel, No Stain No Odor<br>1.8-2 ~~Black~~ Grey Clayey Silt sl. Moist, Stain & Odor |
| 2 | | | 1-SB-A 1055 | | | | OH 10.6<br>HH 55.0 | 2-4 Grey, Clayey Silt Sl. Moist, Stain Odor |
| 3 | | | | | | | | |
| 4 | | | 4-SB-A 1105 | | | | DH 15.1<br>HH 154 | 4-6 Grey, Clayey Silt Sl. Moist, Stain & Odor |
| 5 | | | | | | | | |
| 6 | | | 4-SB-A 1120 | | | | DH 138<br>HH 4000+ | 6-7.3 Grey Clayey Silt Stain & sl. Moist Odor<br>7.3-7.75 Moist Clay Grey Stain & Odor<br>7.75-8 Silty Sand, Grey 10% 90% Moist, Stain & Odor<br>8+ Could Not Advance (Gravels) |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

6/6/13

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 4-SB-B(8-10.5) RECORDED BY: CR

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | SWL - Dry @ 8.0 = TA<br>MA = Asphalt<br><br>- Refusal @ 10.5'<br><br>B Horizon — Sample Time 10:20<br>8 - 10.5, Filled 3 jars<br>1 zip lock for headspace<br>PID 76.5<br><br>C Horizon<br>No sample collected, did not reach Ground water<br>- Product found @ bottom of hole.<br>- Cobble & sand/silt composition of B Horizon<br><br>- Water @ 10.0 |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: 5/7/13

WELL ID: Grid CNTR 5 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Asphalt Cover | 2" Minor gravel, Black Silty Sand, Odor Stain |
| 2 | | | 5-SB-A 0935 | | | | DH 32.7 HH 1620 | Grey Clayey Silt stain Odor, Sl. Moist |
| 3 | | | | | | | | |
| 4 | | | 5-SB-A 0945 | | | | DH 51.7 HH 2580 | Grey Silty Sand Stain, Odor Sl. Moist |
| 5 | | | | | | | | |
| 6 | | | 5-SB-A 1000 | | | | DH 0.1 HH 3050 | 6 - 6.8 SAA<br>6.8-7.3 SAA, but Moist<br>7.3-7.9 Clay, Moist Grey, Stain & Odor<br>7.9 - 8 Gray Silty Sand stain & Odor 2" Gravels<br>8+ Could Not Advance |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: Yale Oil PROJECT NAME & NO: 6/6/13

WELL ID: 5-5B-B(8-12) RECORDED BY: CTL

5-5B-C(12-15)

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | - Hole Dry = 8.0 BTO Asphalt<br>-Hit ground water @ 14.0'<br>B Horizon<br>Advanced probe 8-12'<br>Filled 3 jars, plus head space. Sample Time 09:00<br>PID 525.2 ppm<br>C Horizon<br>Advanced probe 12-~~14~~ 15<br>Filled 3 jars, plus headspace.<br>Sample Time 09:15<br>PID 117 ppm<br>- Hole caved in while pulling probe out<br>- Saturated oil/sediment in C Horizon, both horizons have product smell.<br>-Refusal @ 15'<br>-Filled w/ Hole Plug |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale Oil PROJECT NAME & NO: ____

WELL ID: Grid Center 6 RECORDED BY: 5/9/13

#2 15' NW of Mark

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Surface 2" of gravel<br>0.2 - ~2' clayey silt, some gravels, mottled, iron staining grading to sandy silt & odor @ ~2' |
| 2 | | | | | | | DH PID 53.4 ppm<br>HH PID 2520 ppm<br>Time 11:45 | 2-2.5 Silty Sand cobbles to 3", stain, odor brown + gray.<br>2.5-3.0 Silty clay, black, odor gravel to 1" |
| 4 | | | | | | | | 3 - Silty Clay, black odor some sand |
| 6 | 6-SB-4 | | * Sample - selected based on higher downhole reading | | | | DH PID: 180 ppm<br>HH PID: 4000+ ppm<br>Time: 12:00 | 3-3.5 silty clay black odor/st<br>3.5-5.7 gray, silty clay, stiff odor stain<br>5.7-6 to black grading to silty sand |
| 6 | | | | | | | DH PID: 131 ppm<br>HH PID: 4000+<br>12:20 | 6-6.8 Silty sand, black odor<br>6.8-7 Silty sand w/ gravel<br>Refusal @ 7' |
| 8 | 6-SB-4 | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date 7/12/13 PROJECT NAME & NO: Yale Oil

WELL ID: 6 AK RECORDED BY: JPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Previously Sampled Previously Augered | | | | | | |
| 7.0' | | Not Sampled | | | | | No Water found | Cleared to 8.0', No samples taken. |
| 8.0' | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: YNL PROJECT NAME & NO: 8-2-13

WELL ID: Grid CNTR 6 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Cont. Clearance Hole | DRY @ 8.0' |
| 8 | | | 6-SB-B 1050 | | 8-12' | | | Black Sandy Gravel stain/oil & Odor |
| 12 | | | 6-SB-C 1110 | | 12-16' | | 6-SB-CD 1115 | Black Sandy gravel stain oil & Odor |
| 16 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION: 5/6/13

CLIENT: _____ PROJECT NAME & NO: Vale oil

WELL ID: 7- grid center RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-2 sandy silt w/ gravel, moist, med brown to gray, ~~[illegible]~~ mild cohesion, subrounded |
| 2 | | | | | | | 7-SB-A<br>DH PID = 72.7<br>HH PID = 1790<br>ST = 1345 | 2-4 sandy silt, slightly moist, dark gray to black, moderate cohesion, stain + odor |
| 4 | | | | | | | 7-SB-A<br>DH PID = 204<br>HH PID = 4000+<br>ST = 1405 | 4-5.25 same as above<br>5.25-6 silty sand, moist, med gray, No cohesion, stain + odor |
| 6 | | | | | | Sampled | 7-SB-A<br>DH PID = 132<br>HH PID = 4000+<br>ST = 1420 | 6-7.2 same as above<br>7.2-8 sandy clay, moist, med gray, moderatly cohesion, stain + odor |
| 8 | | | | | | sampled | 8-9.5 7-SB-B<br>HH PID < 2080<br>ST = 1430<br>9.5 TD<br>DH PID = 138 | 8-9.5 sandy clay: wet, med gray moderatly cohesive, stain + odor some sheen, more sand towards 9.5' |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 6/6/13

WELL ID: 7-5B-C(12-14) RECORDED BY: CTL

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | SWL ~ = 4.5 BFOA<br>Advanced probe to 14'<br>- Beginning Total Depth was 6.5'.<br>- Saturated, (w/oil) + gray stain, fine grain sand.<br>Sample Time 7-5B C<br>14:30<br>PID 34.8 ppm<br>- Pulled 2-3ft of bentonite from sample before determining C Horizon. |

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# WELL LOG



PROJECT INFORMATION: 5/6/15

CLIENT: _____ PROJECT NAME & NO: Yale Oil

WELL ID: 8- center grid RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-1 fill gravel; 1-2 ~~sandy silt~~ silt ~~sandy clay~~; med olive gray; slightly moist; slightly cohesive; |
| | | | | | Sampled | | 7-SB-A DH PID = 54.6 HH PID = 3070 ST = 1530 | 2-4' same as above |
| | | | | | | | 7-SB-A DH PID = 223 HH PID = 2960 ST = 1545 | 4-4.7 same as above 4.7-~~5.0~~ 5.7 clay; green/ subrounded; dark gray; moist; slightly cohesive TD @ 5.7 |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date 7/11/13 PROJECT NAME & NO: Yale Oil

WELL ID: SAK RECORDED BY: JPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Previously Augered Previously Sampled | | | | | | |
| 5.7 | | Not Sampled | | | | | | |
| 7.8 | | | 8-STB-B HHPID 995.2ppm Time: 13:45 | | | | Water @ 7.8' | 7.8-8.8 Gravel, med. round-sub round, Some sand present. Heavily stained & sheened Very Heavily odored |
| 8.8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:
~~CLIENT~~ Date: 7/31/13 PROJECT NAME & NO: Yale Oil
WELL ID: 8 Geo Probe RECORDED BY: JPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | Previously Sampled | | | | | | |
| 7.8' Silt 8.8' | | | | | | | *Water level (Oil) Rised to 6.25' ↳ Previously 7.8' | |
| 8.8 | | | | | | | | |
| 11.5 | | Not Sampled | | | | | | |
| | | | S-SB-C Time 11:10 | | | | HHPID: 1547 | @-11.5' (S-SB-C) Sand. Fine med grained white, tan, grey. Some small-med cobbles Odor & Stain. (less than above) |
| 15 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 5/16/13 PROJECT NAME & NO:

WELL ID: 9 RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | Not sampled | | | | | | | 0'-4.8' sandy silt; dry; lt Brown; No cohesion; very uniform |
| | 9-SB-A<br>AH PID = 4.0ppm<br>Time: 1430 | | | Sampled | | | | 4.8'-6.3' silt, sand; dry; lt Brown No cohesion; sand grains are subrounded; |
| 4 | 9-SB-A<br>AH PID = ~~4.0ppm~~ 3.3<br>DH PID = 0.0ppm<br>Time: 1450 | | | | | | | 6.3'-7' sandy gravel; moist; lt Brown No cohesion; rounded to subrounded; |
| 6 | 9-SB-A<br>AH PID = 1.0ppm<br>DH PID = 0.0ppm<br>Time: 1515 | | | | | | | |
| 7 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: 7/11/15 PROJECT NAME & NO: Nile Oil

WELL ID: 9 Ak RECORDED BY: JF

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | Previously Sampled & Augered | | | | | | | |
| 7.0 | Not Sampled | | | | | | | |
| 8 | | 9-SB-B HHPID: 0 Time: [illegible] | | | | | Water @ 8.0 | 8.0-9.0 Sandy gravel. Tan-Brown small-med, well rounded cobbles. No sheen or odor. |
| 9 | | | | | | | | |

H:\OFFICE\Forms\TEST HOLE LOG.doc

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 8/1/2013 PROJECT NAME & NO: Vale Oil

WELL ID: 9 - SB - geoprobe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously logged |
| | | | | | | | | 8'-11' gravelly sand, wet, red brown, poorly sorted |
| 2 | | | | | | | | |
| | | previously sampled | | | | | | |
| 4 | | | | | | | | |
| | | | | | | | Dry @ 5.5 | |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| | | 9-SB-C Time: 10:00 HNU BD 3.2 | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: Grid CNTR 10 RECORDED BY: JB

4/24/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 10' ~~West~~ South | Gravel surface cover |
| 2 | | | | | | | | Silty Sand, Moist, 2" Minus, Olive Brown Gravel, No Stain, No Odor |
| | | 10-SB-A 1125 | | (2-4) | | | Downhole VOC 0.0 Heated Headspace VOC 0.0 | Silty Clay, Sl. Moist, Lt Brown, 1/2" minus gravel No Stain, No Odor |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| | | 10-SB-A 1140 | | | | | Downhole VOC 0.0 Heated Headspace VOC 16.1 | 4.5-5 Silty Sand, Sl. Moist, Lt Brown No Stain, No Odor<br>5.5-6 Sandy Silt, Very Moist Lt Brown, No Stain, No Odor |
| 5 | | | | | | | | |
| 6 | | 10-SB-A 1200 | | | | | Downhole VOC 0.0 Heated Headspace VOC 41.8 | 6-7 Sandy Silt, Very Moist Lt Brown, No Stain, No Odor<br>7+ Cobbles Could Not Advance |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:
~~CLIENT:~~ Date 7/11/15 PROJECT NAME & NO: Yale Oil
WELL ID: 10 AK RECORDED BY: SPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0' | | Previously Augered Previously logged | | | | | | |
| 7' | | Not Sampled | | | | | No water | Cleared to 8.0 by Air Knife. No Samples taken. |
| 8' | | | | | | | | |
| | | | | | | | | Note: 10'S of grid Center |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT:~~ Date 7/30/13 PROJECT NAME & NO: Yale oil

WELL ID: 10 Geo probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| 2 | | | | | | | | 8'-14' Sandy gravel; moist to wet; med Brown; some fibers |
| | | Previously ~~logged~~ sampled | | | | | | |
| 4 | | | | | | | | 14'-16 silty sand; wet; med Brown; no cohesion |
| 6 | | | | | | | | |
| 8 | | | | | | | Dry @ 8' water @ 9.5' | |
| 10 | | 10-SB-B Time: 15:25 HH PID: 4.3 | | | | | | |
| 12 | | | | | | | | |
| 14 | | 10-SB-6 Time: 16:20 HH PID: 1.3 | | | | | | |
| 16 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: Exxon Mobil — PROJECT NAME & NO: Yale Oil / Still Brooks

WELL ID: 11 SB — RECORDED BY: L Bottcher — 5/16/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0 – 1.5 FILL; road bed plus 2-3" asphalt on top as cap moist |
| 2 | | | | | HH PID → 788 | | Sample @ 1430 | 1.5 – 2.0 SAND silty fine-medium grained, med. grey, slight HC odor, moist 20-35% cobbles and gravel |
| | | | | | DH PID → 380 | | | 2.0 – 2.5 Sandy silt, light brown w/gravels 2"-3" cobbles, slight odor, slight cohesive |
| 4 | | | | | DH PID → 278.0 | | Sample @ 1510 | 2.5 – 3.0 silty clay. Dark brown, slight odor Slight moisture, moderate cohesiveness |
| | | | | | HH PID → 1294 | | | 3.0 – 3.5 Dry light grey clay. med cohesiveness Slight odor |
| 6 | | | | | DH PID → 173.3 | | Sample @ 1545 | 3.5 – 4.0 ~~Sandy~~ silty sand to sand. med moist brown low odor |
| | | | | | HH PID → ~~755~~ 1256 | | | 4.0 – 4.5 Sand (Dark grey) to sandy silt (med grey) low moisture, no cohesiveness, low odor |
| 7.50 | | | | | | | | 4.5 – 5.0 light grey sandy silt to Dark grey sand moderate odor |
| | | | | | | | | 5.5 – 6.0 Sandy silt / Dark grey @ 6" light grey clay stained w/ Black. moderate moisture, moderate cohesiveness |
| 10 | | | | | | | | 6.0 – 6.5 Dark grey sand to Black silt. Moderate moisture, moderate odor |
| 12 | | | | | | | | 6.5 – 7.0 light grey clay (moderate moisture/cohes.) to Dark grey clay, Hydrocarbon saturated High cohesiveness, Heavy odor |
| | | | | | | | | 7.0 – 7.5 Dark grey silty clay, Heavy odor Hydrocarbon saturation |

Collected Sample A from 4'-6'

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 6/7/13 PROJECT NAME & NO: Yale oil

WELL ID: 11 AK RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | not sampled | | | | | | | 0'-7.5' previously logged |
| 1 | | | | | | | | 7.5'-8' Sandy silt; Dk gray; some cobbles; ocks + stick; slightly moist |
| 4 | Previously sampled | | | | | | | |
| 6 | Previously sampled | | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date 6/27/13 PROJECT NAME & NO: Yale oil

WELL ID: 11 Geoprobe RECORDED BY: TFJ

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| | | | | | | | | 8'-10 sandy gravel; moist; med gray; strong odor |
| 2 | | | | | | | | |
| 4 | | Previously sampled | | | | | | |
| 6 | | | | | | | | |
| | | | dry @ | 7.4' | | | | |
| 8 | | | | | | | | |
| | | 11-SB-B HAPID Time: 0850 | | | | | | |
| 10 | | | | | | | | |
| | | Refusal @ 10' | | | | | | |
| | | | Note | C sample | was | not obtained | | |
| | | | due to | Refusal | of | geoprobe | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 5/7/13

WELL ID: 12 Grid CNTR 12 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 10' South of Cat 0-6" | Compact Gravel, Brown & Sandy Silt, No Stain No Odor |
| | | | | | | | | 6"-2' 2-3" Gravels grizzly Brown, Sandy Silt Stain & Odor |
| 2 | | | 12-SB-A 1440 | | | | DH 222 HH 4000+ | ~2" gravel, grey clayey Silt Moist, Stain & Odor |
| 3 | | | | | | | | |
| 4 | | | 12-SB-A 1455 | | | | DH 144 HH 2240 | 1-3" gravels, Dark grey clayey Silt, Moist Stain & Odor |
| 5 | | | | | | | | |
| 6 | | | 12-SB-A 1505 | | | | DH 84.9 HH 1410 | 6-6.7 Same as above 6.7+ Could Not Advance |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/11/13 PROJECT NAME & NO: Yale Oil

WELL ID: 12 AK RECORDED BY: JPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Previously Augered Previously sampled | | | | | | |
| 6.7' | | Not Sampled | | | | | | |
| 8.0' | | 12-SB-B HHPID: 234.7 ppm Time: 9:50 | | | | | Water @ 8.0 | 8.0-9.0' Medium round cobbles Heavy odor & staining. Sandy Gravel |
| 9.0' | | | | | | | | Note: Previous hole location could not be exactly determined. Approximated. 10' S. Same as previous. Concrete at six feet Hole moved SW by 10' (from previous hole.) |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/31/13 PROJECT NAME & NO: Yale Oil

WELL ID: 12 geoprobe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously logged |
| | | | | | | | | 8'-15' sandy gravel, H Bone, wet, odor + stain |
| 2 | | | | | | | | |
| | | Previously | | | | | | |
| 4 | | sampled | | | | | | |
| 6 | | | | | | | Dry @ 7.7 | |
| 8 | | | | | | | | |
| | | not | | | | | | |
| 10 | | sampled | | poor Recovery | | | | |
| 12 | | | | | | | | |
| | | 12-SB-C | | | | | | |
| | | Time: 0730 | | | | | | |
| 14 | | HH PID: 149 | | | | | | |
| 16 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 5/7/13

WELL ID: Grid CNTR 13 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Asphalt Cover | 0-2" Asphalt<br>2"-1' Brown, Sl Moist, Sandy Gravel, No Stain, No Odor<br>1'-2' Clayey Silt, Grey, Sl. Moist, Stain & Odor |
| 2 | | | 13-SB-A 1250 | | | | DH 20.5<br>HH 1420 | 2-4 Clayey Silt Grey Sl. Moist Stain & Odor |
| 4 | | | 13-SB-A 1305 | | | | DH 52.4<br>HH 39.40 | 4-5 Moist Clayey Silt Grey Stain & Odor<br>5-6 Very Moist, Clay, grey Stain & Odor |
| 6 | | | 13-SB-A | 1315 | | | DH 166<br>HH 1690 | 6-6.6 Silty Sand 2" gravel grey, Very Moist Stain & Odor<br>6.6 + Could Not Advance |
| 8 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT:~~ Date 7/10/13 PROJECT NAME & NO: Yak oil

WELL ID: B Ak RECORDED BY: JPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Previously Augered & sampled to 6.6 | | | | | | |
| 6.6 | | Cleared to 8' No Samples taken | | | | | Water table Not reached | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: 7/31/13 PROJECT NAME & NO: Yale Oil

WELL ID: 13 geoprobe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously bagged |
| | | | | | | | | 8'-11.5' sandy gravel; wet; med gray; stain + odor; sub rounded to rounded |
| 2 | | | | | | | | |
| | | | | | | | | 11.5'-14' sand; wet; med gray; stain + odor; poorly sorted |
| 4 | | Previously sampled | | | | | | |
| | | | | | | | | 14'-14.5' sand gravel; wet; med gray; sub rounded |
| 6 | | | | | | | 7.30' dry water @ 8.5' | |
| 8 | | | | | | | | |
| | | 13-SB-B Time: 08:20 HA PID: | | | | | | |
| 10 | | | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | 13-SB-C Time: 08:30 HA PID: 365 | | | | | | |
| 14 | | | | | | | | |
| 14.5 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 4/29/13

WELL ID: Grid CNTR 14 RECORDED BY: GB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 5' South of CNTR | | | | 4" Asphalt Cover | Fill Sand, Wood debris in middle of Hole |
| 2 | | | 14-SB-A (2-4) | 1120 | | | Downhole VOC 317, 8% peak LEL Heated Headspace VOC 1450 | 2-3 2" Mina gravels Black, Stai, Odor Silty Clay, Dry 3-4 ~~Fm~~ clay Black Stai Odor, Sl. Moist |
| 3 | | | | | | | | |
| 4 | | | 14-SB-A (4-6) | 1125 | | | Downhole VOC 42.6 Heated Headspace VOC 2350 Downhole 100% LEL | 4-5.8 Black Clay 1" Mina gravels, Stai Odor Moist 5.8-6 Moist Sandy Clay 1" Mina gravels Stai Odor Moist |
| 5 | | | | | | | | |
| 6 | | | 14-SB-A (6-8) | 1155 | | | Downhole VOC 496 LEL 100% Heated Headspace VOC 3940 | Black 2" Mina gravel Stai Odor, Sand Moist |
| 7 | | | | | | | | |
| 8 | | | | | | | | Could not Advance (Refusal) |
| 9 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

6/6/13

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 14-SB-B RECORDED BY: CFL

14-SB-C

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | SWL - Caved into @ 6.3' BTOA.<br>- Advanced probe to 12', Oil @ 8.0 & 2.5ft thick.<br>Horizon B Sample Time 12:15<br>Sand, gravel<br>14-SB-B(6-12) PID 11.0<br>- Picked hole plug out of sample. Product in soil.<br>Horizon C Sample Time ~~12:40~~ 12:30<br>14-SB-C(12-15)<br>- Sand, silt, gravel PID 22.5<br>- Hit refusal @ 15'.<br>Saturated sand, silt gravel w/ oil.<br>GW Elevation 12-13' BTOAsphalt |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale Oil PROJECT NAME & NO:

WELL ID: GRID CENTER 15 RECORDED BY: 5/8/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Gravel to 1" Fill Gravelly Sand to 2ft |
| 2 | | | | | | | | 2-3: ~~2.00~~ gravel Sand, brown with gray spot grading to silty sand to ~~3:00~~ 3' |
| | | | | | | | DH PID: 74.9 | musty |
| | | | | | | | HH PID: ~~13:40~~ 1340 | 3-3.5 Silt gray odor |
| | | | | | | | Time 15:30 15:35 | 3.5 silty sand gray |
| 4 | | | | | | | | 3-5.3 silt, gray, odor w/ gravels |
| | | | | | | | DH PID 115ppm | |
| | | | | | | | HH PID 4000ppm | 5.3-6 Sand, brown gray odor, moist |
| | | 15-SB-A 15-SB-AD | | | | | Time: 15:45 15:47 | |
| 6 | | | | | | | DH PID: 180ppm | 6-6.5 Sand, brown gray moist odor, stain |
| | | | | | | | HH PID: 2970ppm | 6.5-6.8 Sandy gravel, brown/black, odor, stain moist |
| | | | | | | | Time: 16:00 16:03 | 6.8 Refusal |
| | | | | | 5/8/13 | | Rinsate Blank Yesp-1305-104 16:45 | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:
~~CLIENT~~ Date: 7/12/13 PROJECT NAME & NO: Yale Oil
WELL ID: 15 AK RECORDED BY: JPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | Previously Sampled previously Augered | | | | | | |
| 6.0 | | Not Sampled | | | | | | |
| 7.8 | | 15-SB-B HHPID: 47.3 Time 10:25 | | | | | | 7.8-8.8 — Sandy Gravel, small-med cobbles, round, sub-round. Heavily stained heavy odor. |
| 8.8 | | | | | | | | Note - Fibrous sheet at roughly 1.5' Punched through w/ permission from pipeline on site. |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Vale PROJECT NAME & NO: 8-7-13

WELL ID: Grid CNTR 15 RECORDED BY: SB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Cont. from Clearance Hole | Water @ 7.7'<br>TD @ 7.8' |
| 8 | | | 15-SB-C<br>1140 | | 8'-14' | | | Black, strong Odor<br>Stain/Sheen Oily<br>Sndy gravel |
| 12 | | | | | | | | |
| 16 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale G.I PROJECT NAME & NO: ____

WELL ID: GRID CENTER 16 RECORDED BY: 5/9/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | PID- Perkin Elmer Max Reading 2000 ppm |
| | | | | | | | | Surface 0-2 fill, sandy gravel stain @ 1'-2' odor black |
| 2 | | | | | | | HH PID: 2000+ ppm DH LEL 34% | 2-3.5 silty gravel poorly graded, black, stain odor, Brick |
| | | | | | | | 15:40 | 3.5-4 Silt |
| 4 | 16-SB-A | | Sample selected based on observation + PID response time | | | | HH PID 2000+ ppm DH LEL 100% 16:15 | clayey silt Black/gray - slightly cohesive odor / Stain CO 5, $H_2S$ 1.7, LEL 100%, O 15.0 |
| 6 | | | | | | | PID 2000+ ppm DH LEL 100% 16:35 | Clayey silt black/gray odor/Stain (Downhole) |
| 8 | 16-SB-B | | | | | | DH LEL PID 2000 ppm 16:55 | Silty clay black/gray water/oil @ 9:00 Gravels/Refusal @ 9.5 |

16

ID

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Vale PROJECT NAME & NO: 8-2-13

WELL ID: Grid CNTR 16 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Pulled Temporary Plug & Cont. From Clearance Hole | water/oil @ 8.3<br>Oil @ 7.3 |
| 8.3 | | | 16 | SB | C | 8-13' | | Black Sandy Gravel<br>Oil Stain & Odor |
| 13' | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale O.I PROJECT NAME & NO:

WELL ID: Grid Center 17 RECORDED BY: 5/10/13

Moved Pt. to N. side of YPL Building - too many utilities where marked on South Side of Building

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE (18') / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Surface - sod, silty sandy w/ gravel, some cobbles to 8", brown |
| | | | | | | | | 2 - 2.5 as above |
| 2 | | | | | | | | 2.5 - 3.5 stain, black ~~silty~~ sandy clay |
| | | | | | | | DH PID 2.4 ppm<br>HH PID 2000+ ppm | 3.5 - 4 gray/black silty clay |
| | | | | | | | 11:33 | |
| 4 | | | | | | | | |
| | | | 17-5.3-A | | | | DH PID 0.2<br>HH 2000+ ppm | silty clay to 5.5 black stain odor<br>5.5 to 6 gray clay stain/odor |
| | | | | | | | 12:00 PM ~~12:37~~ | |
| 6 | | | | | | | | |
| | | | | | | | DH PID 54.7 ppm<br>HH PID 1257 ppm | 6 - 8 Clayey silt to silty sand gray - moist @ ~8' odor/stain oil |
| | | | | | | | 12:27 | |
| 8 | | | | | | | | |
| | | | 17-SB-B | | | | HH 2000+ ppm | Silty sand to gravel, water @ 8.8 oil |
| | | | | | | | 12:50 | |
| 9.2 | | | | | | | | |

Sand saturated w/ oil w/ some gravel to 1"

17-SB-C

13:33

HH 2000+ ppm

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale Oil PROJECT NAME & NO: ____

WELL ID: GRID CENTER 18 RECORDED BY: 5/8/13

(YPL) #1 Offset ~20 E to avoid power line.
#2 offset 5 N of 1st hole
#3 Offset ~25 E of center grid pt.

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-2' Fill |
| 2 | | | | | | | | 2-2.5 Fill, brown, silty sand, some gravel to 1" |
| | | | | | | | DH PID: 350ppm<br>HH: 2950ppm<br>Time: 11:11<br>Split for RTI | 2-3.0 Black, silty sand, odor<br>3-4.0 Gray, silty sand, odor |
| 4 | | | | | | | | |
| | | 18-513-A | | | | | DH PID: 223ppm<br>HH PID: 4000 ppm<br>Time: ~~11:34~~ 11:33 | 2-4 Silty sand w/ some gravel to 1"<br>Gray / Black odor |
| 6½ | | | | | | | | |
| | | | | | | | DH PID: 152ppm<br>HH PID: 3340<br>Time: 11:57 | 6'-6½ as above<br>moist @ 6½ silt, gray sand & oil @ 7.0'<br>Refusal @ 7.7' |
| 8 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/12/15 PROJECT NAME & NO: Yale Oil

WELL ID: 18 AK RECORDED BY: JPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | Previously Sampled Previously Augered | | | | | | | |
| 7.5 | | | | | | | | |
| 7.7 | * 18-SB3-13 HHPID: ~~[illegible]~~ 1407 pm time 11:15 | | | | | | | 7.5-8.5 Sandy gravel - Small-med cobbles (round-sub round) odor, some sheen. brown-tan. |
| 8.5 | | | | | | | | |

Note: Previously Augered to 7.7', water table raised to 7.5' by time of Air Knifing

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: 8-2-13

WELL ID: Grid CNTR 18 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Cont from Clearance Hole | 7.5' PID 7.6' TD |
| | | | 18-SB-C 1310 | | 8-11.5' | | 18-SB-CD 1315 | Black Sandy Gravel Stain Oil & Med. Odor Not enough for Heated Headspace |

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# WELL LOG

5/2/13



PROJECT INFORMATION:

CLIENT: ___ PROJECT NAME & NO: ___

WELL ID: 19 SE Corner RECORDED BY: B. Maddock

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 20' W of Center | brown Sandy Silt topsoil Some organic matter – Small bits of Brick |
| 2 | | | | 1100 | | | 0.0 VOC down hole 7.2 VOC HH | Clayey Silt dark brown Slightly moist ~~moist~~ odor 3.5'–4' Some black Clay w/ odor |
| 4 | | | | 1230 | | | 51.8 VOC down hole 1680 VOC HH | Black Clayey Silt odor & Slightly moist 4.8' Refusal |
| 6' | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 8/9/13 PROJECT NAME & NO: Yale Oil

WELL ID: 19-SB RECORDED BY: TES JPS (Geoprobe)

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | Previously sampled | | | | | | | 0'-4.8' previously logged |
| 2 | | | | | | | | 4.8'-6' Sandy clay; ~~wet~~ moist; Dk gray to Black; stain & odor |
| 4 | | | | | | | | 6'-8' Sandy gravel; wet Dk gray to Black; stain & odor |
| 4.8 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 6.5 | 19-SB-B Time: 09:55 HHPID: 999.3 | | | | | | | |
| 8 | | 19-SB-C 10:55 HHPID: 22 | | | | | * Water standing at 7.0' TD at 8.0' | 8-15.5 Sandy gravel wet. Heavy stain & odor from 8-9. light stain & odor 9-15.5 |
| 15.5 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: Grid 20 CNTR RECORDED BY: JB

4/24/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 4' West | Gravel clay cover<br>Clayey Silt, Olive Brown, Moist No Stain, No Odor |
| 2 | | | 20-SB-A (2-4) 0905 | | | | Downhole VOC 0.0<br>Heated Headspace VOC 457 | Clayey Silt to Silty Clay w/ 1" min gravel<br>Lt Brown Sl. Moist No Stain, No Odor |
| 3 | | | | | | | | |
| 4 | | | 20-SB-A (4-6) 0930 | | | | Downhole VOC 0.0<br>Heated Headspace VOC 121 | Silty Clay, Lt Brown Sl. Mois No Stain, No Odor<br>@ 6' clay w/ mottling |
| 5 | | | | | | | | |
| 6 | | | 20-SB-B (6-8) 1000 | | | | Downhole VOC 0.0<br>Heated Headspace VOC 51.1 | 6-6.5 Clayey Silt Lt Brown Sl. Moisture w/ white mottling<br>6.5-7.5 Sandy Clay Lt. Brown Moist<br>7.5-8 wet Sandy Clay, Lt. Brown (No Stain, No Odor)<br>8+ Cobbles could not Advance |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT:~~ Date 8/1/13 PROJECT NAME & NO: Yale Oil

WELL ID: 20-SB Geoprobe RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| | | | | | | | | 8-15' Sandy gravel; red brown; wet; sub angular |
| 2 | | | | | | | | |
| 4 | | Previously logged | | | | | | |
| | | | | | | | Dry @ 7' | |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 12 | | 20-SB-C Time: 09:00 Hy PID: 2.5 | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: Yale Oil
PROJECT NAME & NO: 11108.002 Yale Oil Soil Boring
WELL ID: 21 SB
RECORDED BY: L Boettcher 5-13-2013

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0-1.5 | FILL, sandy silty gravel with road grade |
| 1 | | | | | | | 1.5-6 | SILT moderately cohesive, moist, no odor or stain, dark olive brown |
| 2 | | | | | | | | 3.75 - more clay content stiffer more cohesive |
| 3 | | | 10:40 | HHPID | 2000 ppm | | | 4.5 ft some iron staining/ mottling (in fractures?) |
| | | | | | | | | 5.2 ft becoming sandy; moist, as above (moderate cohesiveness) |
| 4 | | | | | | | 6-6.5 | SAND, fine, tan and black grains very moist - well sorted |
| 5 | | | 11:00 | HHPID | 2000 ppm | (A) | 6.5-7 | gravels and cobbles - V. loose gravel ~12" |
| | | | | | | | | refusal at 7.0 feet EOB |
| | | | | | | | | DHPID 4.5 ppm |
| 6 | | | 11:10 | HHPID | 361 ppm | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/11/13 PROJECT NAME & NO: Yk oil

WELL ID: 21 AK RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | not sampled | | | | | | | 0'-7' Previously logged |
| | | | | | | | | 7'-8 gravelly sand; wet; ~~[illegible]~~ med Brown; rounded to subrounded |
| 2 | Previously sampled | | | | | | | |
| 4 | | | | | | | | |
| 6 | Previously sampled | | | | | | | |
| 7 | 21-SB-B HNPID: Ø.9 Time: 1010 | | | | | | water @ 7.8' | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date: 6/27/13 PROJECT NAME & NO: Yale oil

WELL ID: 21 Geoprobe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0-8' Previously logged |
| | | | | | | | | 8'-11.5 sandy gravel; wet, gray to black; stain & odor |
| 2 | | | | | | | | |
| 4 | | Previously | | Sampled | | | | |
| 6 | | | | | | | | |
| 8 | | | 21-SB-C | | | | | |
| | | | HH PID | | | | | |
| 10 | | | Time: 1100 | | | | | |
| 11.5 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: Exxon Mobil — PROJECT NAME & NO: Yale Oil Spill Bunge

WELL ID: 22-SB — RECORDED BY: L Boettcher — 5/16/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0-2 | ~~FILL~~ Road bed, gravel, sand; dry at surface |
| 1 | | | | | | | 2-3.5 | Silty SAND with Gravel FILL moist dark brown, some clay, some vitrified asphaltic material - 2 ft solid (looks like cobble) with depth, less vitrified; some HC staining to depth, odor is intermittent. |
| 2 | | | | | | | 3.5'-10.5 | SILTY SAND moist, grey, HC stained no free HC product moist ~10% gravel sand color med grey 4.5 fine-med grained 5' non mottling |
| 3 | | 10:42 | | HHPID 55.9 ppm | | | | |
| | | DHPID 8.4 ppm | | | | | | |
| 4 | | | | | | | 6 ft | Clay content increasing - stun 2 times |
| | | | | | | | 7 ft | becoming more moist, either very moist or |
| 5 | | 11:05 | | 16.27 HHPID | | | 7.5 ft Top of capillary fringe | Saturated with water, also slight HC sheen - very strong HC odor HC product drum from 7.5 feet to top of water table @ 9.5 ft at 9.5 ft - product on auger last auger (10') |
| | | DHPID 65.5 ppm | | | | | | DHPID 66.4 ppm |
| 6 | | | | | | | | HC product odor, no product on augers last sample 10-10.5 ft refusal at 10.5 ft |
| 7 | | 11:32 | | 2310 ppm HHPID (A) | | | | |
| | | DHPID 31.2 ppm | | | | | | |
| 8 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon Mobil — PROJECT NAME & NO: Yale Oil Soil Borings

WELL ID: 22 SB — RECORDED BY: L Boettcher — 5/16/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 9 | | 8-10 | | | | | | |
| ▽ | | 11:55 | | (B) | HHPID | 2268 ppm | | |
| | | | DHPID 666.4 ppm | | | | | |
| 10 | | 12:20 | | (C) | | | | |
| | | HH PID 2167 ppm | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 5/16/13 PROJECT NAME & NO:

WELL ID: 23 RECORDED BY: JES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Not Sampled | | | | | | 0-1.5 Sandy gravel; dry; red brown; ~ 20% Fines; (Road Bed); subrounded |
| 2 | | 23-SB-A<br>DH PID: 46.3<br>HH PID: 1777<br>Time: 1106 | | | | | | 1.5-5 silty sandy gravel; moist; dark gray; No odor; subrounded; stain + odor; ~ 60% |
| 4 | | 23-SB-A<br>DH PID: 12.4<br>HH PID: 1704<br>Time: 1130 | | | | | | 5'-7.5' sandy silt w/gravel; moist dark gray to Black; silty cohesive; gravels are subrounded; stain + odor @ 7'; increase in moisture, gravels are ~ .5" |
| 6 | | 23-SB-A<br>DH PID: 21.7<br>HH PID: 1853<br>Time: 1150 | | | | | Sampled | 7.5'-9.75' sandy clay; v. moist; Black; some gravels; strong odor; 9.5'; hit free product @ |
| 8 | | 23-SB-B<br>DH PID = 22.5<br>HH PID = 1450<br>Time: 1270 | | | | WL = 9.5' | Sampled | 9.75-11.5' Sandy gravel; wet; Black; stain + odor; Subrounded to rounded; gravel size ~ 0.5" |
| 10<br>10.5<br>11.5 | | 23-SB-C<br>DH PID = 50.4<br>HH PID = 148.3<br>Time: 1300 | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 4/29/13

WELL ID: Grid 25 Center RECORDED BY: GM

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | 1' N of Center | | | | | | Loose Sand + gravel |
| 2 | | | 25-SB-A 1530 | (2-4) | | | Double VOC 494 17% LEL | 2-2.8' Sandy brown |
| 3 | | | 25-SB-AD 1532 | (2-4) | | | Wet Heated Headspace VOC 1410 | 2.8'-3.6' Gravels & Sand some black ~~Clayey~~ sandy soil odor slight sheen stain<br>3.6'-4' Same with more gravel clay lenses |
| 4 | | | | | | | | 4+ Could not Advace |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/10/13 PROJECT NAME & NO: Yale Oil

WELL ID: 25 AK RECORDED BY: JPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | Previously Sampled | | | | | | | → Cleared to 8', No water found. No samples taken |
| 4' | Not sampled | | | | | | | |
| 8 | | | | | | | | Note: Old pipe exposed on side of hole @ 2' → contains visible holes. obviously Not active |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Vale PROJECT NAME & NO: 8-8-13

WELL ID: Grid CWTR 25 RECORDED BY: AB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Cont. from Previous hand Augen Hole | Widen Hole w/ Air Knife & Vac Truck |
| 5.5 | | | | | | | | Sady, Gravel, Cobbles DRY |
| 7 | | 25-SB-B 0915 HH PID: 57.9 | | | | | Sample collected from 7-8' | Very Moist-Wet, Stain Odor, Product Black, Sandy Gravel w/ cobbles |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/31/13 PROJECT NAME & NO: Yale Oil

WELL ID: 25 geo probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously logged |
| | | | | | | | | 8'-11.5' sandy, gravel, wet, Dk gray, med odor + stain |
| 2 | | | | | | | | |
| 4 | | Previously grouted | | | | | | |
| 6 | | | | | | | water @ 7.3 | |
| 8 | | not able to sample GP-B due to the water level | | | | | | |
| 10 | | 25.5B-C Time: 09:20 HH PID: 27.8 | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: 4/30/13

WELL ID: 26 Grid CNTR RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | 2' South of CNTR | | | | | Grass Cover | Lt Brown Sandy Silt w/ 4" minus gravels, Sl. Moist No Stai, No Odor |
| 2 | | | 26-SB-A (2-4) 1130 | | | | Downhole VOC 36.7 Heated Headspace VOC 601 | 2-3.5 Sandy Silt, Olive Brown DRY, No Stain No Odor w/1 1" minus gravels 3.5-4 Dark Grey, Clay Sl. Moist, Stai, Stain & Odor |
| 3 | | | | | | | | |
| 4 | | | 26-SB-A (4-6) 1210 | | | | Downhole VOC 573 Heated Headspace VOC 2350 | Black, Clay, Moist Stai & Odor |
| 5 | | | | | | | | |
| 6 | | | 26-SB-A (6-8) 1225 | | | | Downhole VOC 1190 130% Peak LEL Heated Headspace VOC 3050 | 6-7.8 Dark Grey Clay Moist Stai & Odor 7.8-8 Black Silty Sand Very Moist Stai & Odor |
| 7 | | | | | | | | |
| 8 | | | 26-SB-A (8-10) | | | | Downhole VOC Heated Headspace | 8-8.1 Black silty sand Wet Stain Odor Not Enough to Sample 8.1 Cobble No Recovery |
| 9 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/31/13 PROJECT NAME & NO: Yale Oil

WELL ID: 26 Geo probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'- 8.1' previously logged |
| | | | | | | | | 8.1'- 14.5' sandy gravel, wet, Heavy odor + stain, sub angular to angular |
| 2 | | | | | | | | |
| 4 | | previously sampled | | | | | | |
| | | | | | | | Dry @ 6.6 | |
| 6 | | | | | | | | |
| 8.1 | | | | | | | | |
| | | 26-SB-B Time: 12:10 HNPID 274 | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | 26-SB-C Time: 12:30 HNPID: 311 | | | | | | |
| 14 | | | | | | | | |
| 14.5 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: 4/30/13

WELL ID: Gold CNTR 27 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 12' South of | | | Cedar | Grass | Silty, Sandy 2" Minus gravel red fire brick fragment Very compact |
| 2 | | | | | | | | |
| 3 | | | 27-SB-A 0925 | | | | Downhole VOC 83.5 Heated Headspace VOC 497 | 2-3.7 Olive Brown, Silty Clay Sl. Moist, No Stain, No Odor 3.7-4 Grey, ~~Silty~~ Clayey Silt Moist, Stain Odor |
| 4 | | | | | | | | |
| 5 | | | 27-SB-A 0950 | | | | Downhole VOC 1400 14% Peak LEL 1700 Heated Headspace VOC 3500 | Grey, Clayey Silt Moist, Stain & Odor ~~w/ Bm~~ |
| 6 | | | | | | | | |
| 7 | | | 27-SB-A 1010 | | | | Downhole VOC 2100 Heated Headspace VOC 4000+ | 6-7 Black w/ grey streaks Clayey Silt, Stain & Odor w/ 1" minus gravel |
| 8 | | | | | | | | |
| 9 | | | | | | | | Gold. Not Alluvial |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/9/10 PROJECT NAME & NO: Yabe OT

WELL ID: 27 AK RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-7' previously logged |
| | | | | | | | | 7'-7.5' silty sand; DK gray; odor + staining; moist. |
| 2 | | | | | | | water @ 7.5 | 7.5-8.5' sandy gravel; DK gray; wet; odor + staining; sub rounded to round; gravel sized from pea sized to +2" |
| 4 | | previously sampled | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 7.5 | | 27-SB-8 | | | | | | |
| 8 | | HHPID: 932.2 | | | | | | |
| 8.5 | | Time: 1433 | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/31/13 PROJECT NAME & NO: Yale oil

WELL ID: 27 geoprobe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| 2 | | | | | | | | 8'-13' sandy gravel, wet, dk gray to A gray, subrounded, Heavy odor & stain |
| 4 | | previously sampled | | | | | | |
| 6 | | | | | | | water @ 5' | |
| 8 | | | | | | | | |
| 10 | | 27-SB-C Time: 1310 | HA | PID | 275 | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |

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4/30/13

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 28 Grid Center RECORDED BY: B Muddock

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 18' | South of center | | | Hole Empty | |
| 1.5 | | | | 1420 | | | ~~Clayey Silt~~ | Clayey Silt brn 50/50 no odor |
| 2 | | | | 1426 | | | 0.0 VOC down hole<br>0.0 VOC HH | Clayey Silt 50/50 some orange staining mostly brn no odor |
| 4 | | | | 1435 | | | 104 VOC down hole<br>2520 VOC HH | Silty Clay 60/40 some grey orange @ 5.6' Dark grey & Heavy odor Clay moist |
| 5.6 | | | | | | | | |
| 6 | | | | 1500 | | | 963 VOC down hole<br>2840 VOC HH | Dark Grey Very Plastic Clay moist<br>Refusal @ 7.3'<br>odor<br>Brown petroleum liquid @ 7' |
| 7.3 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/9/13 PROJECT NAME & NO: Yale Oil

WELL ID: 28 NK RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-7.3' Previously logged |
| 2 | | | | | | | | 7.3'-8' silty gravel wet; Dk gray; free product; stain & odor; sub rounded to rounded |
| 4 | | Previously sampled | | | | | water @ 7.5' | |
| 6 | | | | | | | | |
| 7.3 | | 28-5B-B | | | | | | |
| 8 | | HH PID: 1772 ppm Time: 15:30 | | | | | | |
| 8.5 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/31/13 PROJECT NAME & NO: Yale oil

WELL ID: 28 Geo probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously logged |
| | | | | | | | | 8'-11.5' sandy gravel, wet, odor & staining, subrounded to Rounded |
| 2 | | | | | | | | |
| | | Previously Sampled | | | | | | |
| 4 | | | | | | | | |
| | | | | | | | water @ 5.6' | |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| | | 28-SB-C Time: HNPID: 300 | | | | | | |
| 10 | | | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | | | | | | | |

5/1/13

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# WELL LOG



PROJECT INFORMATION:

CLIENT: ___ PROJECT NAME & NO: ___

WELL ID: 29 Center Grid RECORDED BY: B. Muckbock

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 27' | South | east of ctr | | ~~Existing Hole 0.7' deep~~ BGM 5/1/13 ~~8' South~~ ~~Grass~~ | Grass / Top Soil Brown Some ~~Concrete~~ glass |
| 2 | | | | 1445 | | | 0.0 VOC Down Hole BGM 5/1/13 ~~3820 VOC HH~~ 0.0 VOC HH | Brown Silty Clay Some glass / rubber & plastic Shrapnel |
| 4 | | | | 1505 | | | 183 VOC down hole BGM 5/1/13 ~~3820~~ LEL 3% DH 755 VOC HH | 4 – Brown Silty Clay 4.5 – Changes to grey clay, odor, moisture and Sheen. |
| 6 | | | | 1520 | | | 680 VOC down Hole Refusal @ 6.7' 2480 VOC HH | dark grey black clay, odor, moist, & Sheen. Refusal at 6.7' |

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# WELL LOG

6/11/13

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon PROJECT NAME & NO: Yale

WELL ID: 29 - AK RECORDED BY: Joe Schmechel

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Previously sampled | | | | | 0-6.7' previously sampled - Previously Alex Day | |
| 6.7 | | | | | | | | 7.0' Water table<br>6.7-8.0' Sandy silt & medium to large size cobbles<br>-Ample product w/ very strong odor & sheen.<br>→Refusal at 8' |
| 7.0 | | 29-SB-8<br>time: 12:15<br>HHPID: 235.7 ppm | | *Only partial B; No metals. | | | | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~: Duke 6/28/13 PROJECT NAME & NO: Yale oil

WELL ID: 29 Geo probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| 2 | | | | | | | | 8'-11.5' sand w/ gravel; wet; Black; poorly sorted; subrounded; stain/odor |
| 4 | | Previously sampled | | | | | | |
| 6 | | water @ 5.40' | | | | | | |
| 8 | | 29-5B-C HA PID Time: 1230 | | | | | | |
| 10 | | | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 30-SB A RECORDED BY: _____

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| | | | | | | | PRE-LOGGED | |
| 2 | | | 30-SB-A-2'4' VPH | 09:45 | | | 2-4' HH:0 | Fine grained sand, gold occ pbls <1/2", light brown dry to damp: slightly damp @ 3.5' |
| 4 | | | | | | | | |
| | | | 30-SB-A 4'-6' | 10:00 | | SAMPLE SUBMITTED | 4-6' HH:1760 | 4.5' - damp blk. clay-strong PM odor |
| | | | | | | | | ~~PID @ 6'~~ |
| | | | | | | | | PID @ 1760 @ 4'-6' |
| | | | 30-SB-A-~~4'-8'~~ | 10:35 | | | HH-6-8':1120 | |
| | | | | | | | WATER @ 7.9' | WATER @ 7.9' |
| | | | 30-SB-B ~~8'-10'~~ | 10:50 | 8'-9.9' | | HH:8'-10':~~1870~~ 1570 | |
| | | | | | | | | TD @ 9.9' |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 8/14/13 PROJECT NAME & NO: Yale Oil

WELL ID: 30 SB - geoprobe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-9.9' previously logged |
| 2 | | | | | | | | 9.9'-15' Sandy gravel; wet; Dk gray to black; odor + stain; subrounded |
| 4 | | Previously Sampled | | | | | | |
| 6 | | | | | | | water @ 6.20' | |
| 8 | | | | | | | | |
| 9.9 | | | | | | | | |
| 10 | | | | | | | | |
| 12 | | 30-SB-6 Time: 0810 HH PID: 49.3 | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 5/2/13

WELL ID: Grid 7NTR 31 RECORDED BY: GB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | 20' South Offset | | | | | Grass | Olive Brown Silty Sand 70% 30% DRY No Stain No Odor 1" Mixed gravel |
| 2 | | | | | | | | |
| 3 | | | 31-SB-A 1115 | | | | Downhole VOC 0.1 Heated Headspace VOC 13.9 | Olive Brown Silty Clay 1" Mixed gravels, DRY No Stain No Odor |
| 4 | | | | | | | | |
| 5 | | | 31-SB-A 1145 | | | | Downhole VOC N/A Heated Headspace VOC 659 | 4-5 Same As Above & Moist 5-6 Black Silty Clay Very Moist, Stain & Odor |
| 6 | | | | | | | | |
| 7 | | | 31-SB-A 1150 | | | | Downhole VOC 18.7 Heated Headspace VOC 695 | 6-7.5 Very Moist Black Silty Clay Stain & Odor |
| 8 | | | | | | | | 7.5+ Could Not Advance |
| 9 | | | | | | | | |

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# WELL LOG

6/10/13

Page ___ of ___

PROJECT INFORMATION:

CLIENT: EXXon (AK)

PROJECT NAME & NO: Yale

WELL ID: Grid 31 Cntr

RECORDED BY: CJ

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Cleared by hand | | | | | 7.5-8.0 (Offset 4'S.) | Water table 1"-3" cobbles un-able to retrive any sampable material from hole. |
| 7.5 | | No Sample (un-able) | | | | | | |
| 8 | | Clear to 8'.0 | | | | | | Hit sewer pipe in original hole @ 4'. Offset to the South 4'. |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date: 6/28/13 PROJECT NAME & NO: Vobe a1

WELL ID: 31 geo Probe RECORDED BY: TKS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously sampled |
| 2 | | | | | | | | 8'-11.5' ~~sand~~ gravelly sand; wet; Black; poorly sorted; subrounded to rounded |
| 4 | | Previously sampled | | | | | | |
| 6 | | | | | | | | |
| | | water @ 6-60' | | | | | | |
| 8 | | | | | | | | |
| 10 | | 31-SB-c<br>HLH PID<br>Time: 1000 | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date 8/7/13 PROJECT NAME & NO: Vol. oil

WELL ID: 31-SB-B RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 5.5 - 7' sandy clay; Dk gray to Black; moist to wet; moderate skin + odor |
| 2 | | | | | | | | |
| 4 | | | | | | | | |
| 5.5 | | | | | | | | |
| 6 | | 31-SB-B Time: 09:40 HH 頂: 707.0 | | | | | | |
| 7' | | | | | | | | |
| 8 | | YOSD-1308-103 Time: ~~1020~~ 16:00 | | | | | | |

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5/2/13

# WELL LOG

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PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 32 Center Grid RECORDED BY: GM

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | 18" 24' | South of Center | | | | Small gravel. Parking/laydown area | Silty sand brown slightly moist no odor no stain<br>0.7 Same with a little clay and gravel |
| 2 | | | | 930 | | | 0.0 VOC down hole<br>126 VOC HH | 1.5 sandy clay dk brown moist no odor no stain<br>Sandy clay dk brown-black moist odor slight stain<br>3.7 black sand odor stain slightly moist |
| 4 | | | 32-SS-A | 945 | | | 1.3 VOC down hole<br>87.9 VOC HH | Sandy clay odor stain black-gray moist |
| 6 | | | | 1000 | | | 39 VOC down hole<br>2.0 VOC HH | Clayey sand odor some stain olive brown black + gray lenses moist 4% LEL 11 ppm CO |
| 8 | | | | | | | | Refusal at 8.1 wood |

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# WELL LOG



PROJECT INFORMATION:

6/6/13

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 32-5B-B ~~32-5B-BD~~ RECORDED BY: FFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 32-5B-B | Time: 1625<br>Interval: 5' - 7.5'<br>- Wood in sample<br>- clayey silt; moist; med olive gray; moderate cohesion<br>PID 5.6 ppm |
| | | | | | | | 32-5B-BD | Time: 1630<br>- Collected EPH, VPH & Metals |

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# WELL LOG



PROJECT INFORMATION:

6/6/13

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 32-SB-(12-15) RECORDED BY: CFL

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | SWL-6.30<br>BTOGS<br><br>Advanced probe to 15'<br>-Sample consisted of a fine grain sand w/ little visible product. Some mixed gravels also w/ sand.<br><br>-Note: B horizon hand augured to collect sample. Approx. 10 feet North of where "32" center point is found<br>PID 5.6ppm<br><br>-Chunks of wood also found in C sample in 8-12' interval.<br>PID 4.2ppm<br><br>Sample Time<br>16:00 |

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Consulting Scientists and Engineers

# WELL LOG

5/2/13

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 33 Center Grid RECORDED BY: B. Maddock / GM

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Small gravel Parking / laydown area Black asphaltic material 0-8" | Dk brown sandy silt some gravel slightly moist no odor possibly stained slight odor @ 0.6' |
| 2 | | | | 1340 | | | 0.0 VOC down hole 7.2 VOC HH | Brown sandy loam ~~some gravel~~ slightly moist slight odor no stain ~~2.5~~ ~~Gravelly sandy loam~~ 3.2 same with black clay lenses 3.4 tree roots |
| 4 | | | 33-SB-A | 1355 | | | 7.7 VOC down hole 7.13 VOC HH | Olive brown-black moist some stain slight odor clayey sand 5.2 black clay odor stain moist |
| 6 | | | | 1415 | | | 1.1 VOC down hole 470 VOC HH | Black sandy clay odor stain moist Metal can @ 6.5' 7.6 Gray-black sandy clay odor stain moist |
| 8 | | | 33-SB-B | 1430 | | | 134 VOC down hole 84.7 VOC HH | Liquid @ 8.2' Fine sandy gravel gray-black odor stain sheen |

Refusal @ 9.0'

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# WELL LOG



PROJECT INFORMATION:

6/6/13

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 33-SB-C(12-16) RECORDED BY: CTL

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 6/6/13 | Very little sample @ 8.3→12, advance to 16'. | 1.6' of product in well.<br>6.3' - Total depth of well<br>No water found, before probing.<br>- Black (Dark) oil standing @ 6<br>- Advanced probe to 16'<br>8.3' - Fine grain sand & free product (& gravel) (8.3-12)<br>(12-16) - Mixed gravel & sand, saturated w/ product<br>- Collected EPH, VPH & Metals & 2 pla.<br>Sample Time<br>17:35 |

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: 5/2/13

WELL ID: Grid CNTR 34 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | Offset 20'S of Center | | | | Road Salt Sand Cover | Very Compact Road Salt Sand w/ 2" minus gravels, DRY |
| 2 | | | 34-SB-A 1455 | | | | Downhole VOC 9.52-35 Headspace VOC 98.4 | Dark Grey Silty Clay w/ 2" minus gravels Moist, No Stain, No Odor |
| 3 | | | | | | | | 3.5+ Could Not Advance |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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# WELL LOG

6/10/13

Page ___ of ___

PROJECT INFORMATION:
CLIENT: Exxon
WELL ID: Grid 34 Cntr
PROJECT NAME & NO: Yale
RECORDED BY: CS

Duplicate taken

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0-6 Dark grey to black sandy clay and fine black sand. Heavy odor, Product Sheen |
| | | Cleared by hand. Concrete block @ 4.0 | | | | | | |
| 4 | | HH → 2626 | | | | | | |
| | | DH → X | | | | | | 6-8 Black, fine sand Heavy odor, Product Sheen |
| | | Sample @ 1220/1225 | | | | | | |
| 6 | | Hole cleared past 4' to 8' by hand. | | | | | | |
| 8 | | Edge of concrete block passed on east side. NO (B) or (C) Sample | | | | | | |
| | | HH → 3093 | | | | | | |
| | | DH → X | | | | | | |
| | | Sample @ 1245/1250 (A) Sample (6'-8') | | | | | | |
| | | | | | | | Submitted as 34-SB-DA 34-SB-DD A 34-SB-A previously submitted on 5/2/13 CHH 98.4 ppm | |

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# WELL LOG

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PROJECT INFORMATION:

~~CLIENT~~ Date: 6/28/13 PROJECT NAME & NO: Vale Oil

WELL ID: 34-SB- Geoprobe RECORDED BY: TPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| 2 | | | | | | | | 8'-10.5' silty clay; bd moist; Black to m. gray; stain + odor |
| | | Previously sampled | | | | | | 10.5'-15 Sand; wet; Black; poorly sorted; stain + odor |
| 4 | | | | | | | | |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| | | 34-SB-B 44 PID: Time: 1110 | | | | | | |
| 10 | | | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | 34-SB-C 44 PID Time: 1120 | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION: 5/6/13

CLIENT: _____ PROJECT NAME & NO: Yak oil

WELL ID: 35 grid center RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Note: started 8' North of grid center |
| | | | | | | | | 0-1" compacted sand & gravel; dry; medium<br>1"-6" sandy silt; dry; dark gray<br>.5'-2' sandy silt w/ gravels; dry; med gray; No cohesion; subrounded |
| 2 | | | | | | | 35-SB-A<br>DH PID = 1.4<br>HH PID = 1430<br>ST = 1110 | 2'-3.75' sandy silt; slightly moist; dark gray; slightly cohesive; odor + stain<br>3.75'-4' silty clay; slightly moist; medium gray; moderately cohesive; odor + stain |
| 4 | | | Sampled | | | | 35-SB-A<br>DH PID = 0.1<br>HH PID = +1000<br>ST = 1120 | 4-5.8 sandy silt; slightly moist; dark gray; slightly cohesive; odor + stain;<br>5.8'-6' silty sand; slightly moist; med gray; not cohesive; odor + stain |
| 6 | | | | | | | 35-SB-A<br>DH PID = 10.3<br>HH PID = 3140<br>ST = 1135 | 6-7 same as above<br>7-8 sandy clay; moist; dark gray; moderately cohesive; odor + stain<br>8-8.6 sand; moist; dark gray; subrounded; no cohesion; odor + stain |
| 8 | | | | | | | | |

8-8.6 DH PID = 11.2
HH PID = 3250
ST = 1155

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: EXXON PROJECT NAME & NO: Yale

WELL ID: 35 (Grid Center) RECORDED BY: W Erwine 6/7/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | liquid > 7.5' which is ID at arrival |
| 7.5 | open | | | | | | | petro contamination present but no free product sheen on B |
| 8.5 | bent 1' returns | | | | | | | B sample collected 8.5 – 09:40 hrs |
| 11.0 | got approx 1' of gravel & fine sand mixed black color (contaminated) | | | | | | | estimate water @ 9' |
| | | | | | | | | no free product or sheen after 11' |
| 15.0 | approx 1.8' return course gravel/sand mix light odor grey | | | | | | didn't collect | |
| 20' | 2' returns approx 8" of sand at top then very clean gravel course → fine gravel very faint odor | | | | | | didn't need the volume | all fairly easy driving w/ probe tooling |
| | | | | | | | | C sample 09:25 PID: 18.6 ppm |
| | | | | | | | | B sample is VPH & EPH only, not enough sample for test |

H:\OFFICE\Forms\TEST HOLE LOG.doc

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# WELL LOG



PROJECT INFORMATION:

CLIENT: Yale Oil — PROJECT NAME & NO: 11108.002 Yale Oil Soil Boring

WELL ID: 36 SB — RECORDED BY: LBoettcher 5-13-2013

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | Fill |
| | | | | | | | 0-1.5 | SAND silty, with gravel, coal pieces, brick fragments & glass sand in adjacent to tracks/rails |
| 2 | | | | | | | 1.5-5.5 | SILT occasional thin sand layers <1 inch, some clay, moderately cohesive, moist - damp olive brown |
| | | 12:00 | | | HHPID | 440 ppm | (A) | |
| 4 | | | | | | | 5.5 to 10 | SAND, fine, silty, moist, olive brown, moderately well sorted |
| | | 12:15 | | | HHPID | 270 ppm | | |
| 6 | | | | | | | | 7 ft - saturated with water some black mottling - Mn? |
| | | 12:30 | | | HHPID | 220 ppm | (B) | |
| | | | | | | | | 8 ft - becoming siltier highly iron oxidized throughout sample |
| 8 | | | | | | | | |
| | | 13:00 | | | HHPID | 50 ppm | (C) | 8.5 ft clay stringer <1 inch no odor to depth |
| 10 | | | | | | | 10 | gravel - refusal EOB |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: Yale Oil — PROJECT NAME & NO: 11108.002 Yale Oil Soil boring

WELL ID: 37 SB — RECORDED BY: L Boettcher 5-13-2013

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0-1.5 Gravel sandy, FILL silty road grade; at 6" layer of black material (petroleum ~~odor~~ - used for dust control?) brick fragments, glass; |
| 1 | | | | | | | | 1.5-4.5 SILT, some clay (minor, minor fine sand) moist dark olive brown, 3.5 slight mottling of silt (iron, ~~blacks~~ Mn?) more moist at 4' |
| 2 | | | | | | | | DHPID 1.2 ppm |
| 3 | | 15:00 | | HHPID | 2000 ppm | | (A) | 4.5-4.6 Sandy SILT, moist dark olive brown |
| 4 | | | | | | | | 4.6 Sand medium brown, moist, med-well sorted, some silt at 4.5 feet becoming mottled with iron stain at 5.2 ft trace silt below 5.2 |
| 5 | | 15:15 | | HHPID | 410 ppm | | | 5.6-6 grey silt at 5.6-5.8 ft lightly mottled, slight odor, increases with depth slight mottling with iron, no visible HC product, very moist to nearly wet - water |
| | | | | | | | | DHPID 8 ppm |
| 6 | | 15:30 | | HHPID | ~~51~~ 193 ppm | | | 6-7 SAND, grey - heavy petroleum odor fine-medium sand, moist - slightly moist (water); no visible HC product |
| 7 | | | | | | | | refusal at 7 feet |
| | | | | | | | | DHPID 68.9 ppm |

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# WELL LOG

6/10/13

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon (DK) PROJECT NAME & NO: Yale

WELL ID: Grid 37 CMTR RECORDED BY: CS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Cleared by Hand | | | | | 7-8 | Water @ T.O. cobbles 1"-8" unable to pass w/ hand auger |
| 7 | | | | | | | | Un-able to collect sample Cobbles & Water, NO SOILS |
| | | No Sample - Clear to 8' | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/22/13 PROJECT NAME & NO: Yale oil

WELL ID: 37 geoprobe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Previously sampled | | | | | | 0'-8' Previously bagged |
| 2 | | | | | | | | 8'-12' Sandy gravels; wet; dk gray to Black; odor + stain; submerged |
| 4 | | | | | | | | 12'-16' fine sand; some fine gravels; wet; Black; odor + stain; poorly sorted sand |
| 6 | | | | | | | | |
| 8 | | | 37-SB-B HH PID Time 11:35 | | | | | |
| 10 | | | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | | 37-SB-C 37-SB-CD Time: 12:25 Time D: 12:30 HH PID | | | | | |
| 14 | | | | | | | | |
| 16 | 15.5 | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: Exxon Mobil PROJECT NAME & NO: Yale Oil Soil Borings

WELL ID: 38-SB- RECORDED BY: L Boettler 5/16/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0-4 | FILL; Gravels, cobbles, silty sand, medium brown. dry at surface<br>moist at 1ft to depth<br>refusal at 4 feet<br>EOB<br>DH PID 0ppm |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | 09:10 A | | | | | HHPID ~~0ppm~~ 4B 1.6ppm | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |

Offset 2 feet to south of staked location

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/7/13 PROJECT NAME & NO: Yale oil

WELL ID: 38 A&B RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | not sampled | | | | | | | ~~Previously~~ 0'-4' previously logged |
| 2 | previously sampled | | | | | | | 4'-6' Gravels cobbles silty sand; moist; med Brown; |
| 4 | | 38-SB-D HH PID: 0.3 Time: 1200 | not submitted used 38-SB-A 5/16/13 | | | | Note: Had to move Hole 10' SW to avoid concrete further bottom of the Hole | 6'-7' sandy silt w/ clay; V. moist; Dk Brown; moderate cohesion; orange mottling; |
| 6 | | 38-SB-B HH PID: 0.5 Time: 1350 | | | | | | 7'-8' large gravels to Cobbels; same color + sheen; could not sample |
| 7 | | | | | | | water @ 7.5' | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/27/13 PROJECT NAME & NO: Yale oil

WELL ID: 38 ~~Geoprobe~~ RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously logged |
| 2 | | | | | | | | 8'-11' sandy gravel, ~~wet~~ wet, med gray to black, stain + odor |
| 4 | | | | | | | | |
| 6 | | Previously Sampled | | | | | | |
| | | | | water @ 7' | | | | |
| 8 | | 38-5B-C HH PID: Time: 1010 | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: 4/26/13

WELL ID: Grid CNTR 39 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Very Compact |
| 0 | | 5' East offset from Center | | | | Cover: Gravel w/ some grass | | 0-1' Silty Clay Gravel 4" Mixes Gravels, DRY, Lt. Brown |
| | | | | | | | | 1-1.5' Black Tar gravels 2" Mixing Stain Odor |
| | | | | | | | | 1.5-2.5' Cobbles & 2" mixing gravel Silty Clays, Black, Odor, ? Stain |
| 2 | | | 39-SB-A (2-4) 1520 | | | | Downhole VOC 8101 Heated Headspace VOC 1410 | Cobbles w/ Gravel Black Silty Sand Clay, Stain & Odor Slightly Moist, Very Compact (Hard Digging) |
| 3 | | | | | | | | |
| 4 | | | | | | | | 4+ Could not advance Due To Cobbles |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/27/13 PROJECT NAME & NO: Vale oil

WELL ID: ~~#~~ 39 Geo probe RECORDED BY: FFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| 2 | | Previously logged | | | | | | 8'-11.5' gravels; very little sand; wet Black; Free Product; no sample |
| 4 | | | | | | | | 11.5-15.5 Sandy gravels; wet; Black; Free Product |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| 10 | | 39-SB-C HH PID Time: 1415 | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | 39 ~~#~~-SB-C HH PID Time: 1335 | | | | | | |
| 14 | | | | | | | | |
| 15.5 | | | | | | | | |
| 16 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: 4/29/98

WELL ID: 40 Grid CNTR RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 2" | South | | | Sparse Grass | Silty Sand, Lt. Brown, Sl. Moist 3" Mixed gravel Tar 22"-24" |
| 2 | | | 40-SB-A (2-4) 1440 | | | | Downhole VOC 78.7 Heated Headspace VOC 110 | Black Silty Sand, Stain Odor, DRY |
| 3 | | | | | | | | |
| 4 | | | 40-SB-A (4-6) 1855 | | | | Downhole VOC 65.7 Heated Headspace VOC 165 | Black Clayey Silt, Moist Stain Odor |
| 5 | | | | | | | | |
| 6 | | | 40-SB-A (6-7.5) 1555 | | | | Downhole VOC 170 Heated Headspace VOC 855 | 6-6.8 Black Clay Silt Moist Stain, ~~Moist~~ Odor<br>6.8-7 Black Sand, Moist Stain, Odor<br>7-7.5 Black Clayey Silt, Moist Stain Odor |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | 7.5+ Could Not Advance |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon PROJECT NAME & NO: Yale

WELL ID: 40 AK RECORDED BY: Joe Galvarel 6/11/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0.0 | | Previously Sampled | | | | | | 0-7.5' ~~not sampled~~ previously sampled Hand Dug. |
| 7.5' | | | | | | | | 7.5-8.0', Not sampled No watertable, slight moisture, silty sand & medium cobbles - faint odor. |
| 8.0' | | | | | | | | |
| 8.0' | | | | | | | | |

Rinsate # 112

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 6/28/13 PROJECT NAME & NO: Yorke oil

WELL ID: 40 geoprobe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' - previously logged |
| 2 | | Previously sampled | | | | | | 8'-20' sandy sand; lt. moist; Dk gray to Black; Rock Detect; subrounded to rounded |
| 4 | | | | | | | | |
| 6 | | | Dry @ 7.98' | | | | | |
| 8 | | | | | | | | |
| 10 | | 40-SB-B HH PID: Time: 0715 | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | 40-SB-C HH PID Time: 0805 | | | | | | |
| 16 | | | | | | | | |
| 19.5 | | | | | | | | |
| 20 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION: 4/30/13

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 41 Center Grid RECORDED BY: GM

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | 3' South of center east | | | Grass<br>Gravelly loam | dry dk brn<br>slightly moist @ 1.8' |
| | | | 6" metal pipe buried | | | | 7" BGS at east | edge of hole |
| 2 | | | | 1255 | | | 152 VOC down hole | 2-2.7 dark brown slight odor moist clayey loam ~~stain~~ |
| 3 | | | | | | | 694 VOC HH | 2.7-4.0 Stronger odor moist silty clay stain some gray/black<br>~~Wood at 3.0~~<br>Green line at 3.8' |
| 4 | | | | 1315 | | | 520 VOC down hole | 4-4.7 Gray-brown clay moist odor stain |
| 5 | | | | | | | 2090 VOC HH | 4.7 fine sand ~~olive~~ brown odor ~~slight~~ stain slightly moist<br>5.9 Gray clay odor stain |
| 6 | | | | 1340 | | | 708 VOC down hole | Clayey sand odor stain dk brown-black slightly moist |
| 7 | | | | | | | 3930 VOC HH | Refusal at 6.6' |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date 7/10/13 PROJECT NAME & NO: Yale Oil

WELL ID: 41 AK RECORDED BY: JPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Previously Sampled Augered to 6.0' | | | | | | |
| 6.0' | | Not sampled | | | | | | |
| 8' | | 41-SR-B HHPID: 1503 ppm time: 1400 | | | | | Water @ 8.0' | 8.0'-9.2' (15) Small-med cobbles. Round to sub round Rocky Sand. Visible product & ~~sheen~~ staining dark brown to black. odor. |
| 9.0 9.2 | | | | | | | | |
| | | | | | | | | Note: Original hole abandoned due to cement. New hole started 1' SW. Due to 3' abandoned due to pipe (probably from trench) New hole started 6'W 1'S |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 7/31/13 PROJECT NAME & NO: Yale oil

WELL ID: 41 SeaRose RECORDED BY: TPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously logged |
| 2 | | | | | | | | 8'-16' sandy gravel; wet; Dk gray; odor & stain |
| | | previously sampled | | | | | | |
| 4 | | | | | | | water @ 6.2' | |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| | | NO Recovery | | | | | | |
| 10 | | | | | | | | |
| 12 | | 41-SB-C<br>41-SB-CD<br>Time: 1655<br>HH PID: 92.6 | | | | | | |
| 14 | | | | | | | | |
| 16 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION: 4/30/13

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 42 Center Grid RECORDED BY: B. Maddock

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | bare dirt cover 1ft South of center | Silty, Gravel 80% 20% dark brn No Stain No odor |
| 2 | | | | 0950 | | | 0.0 VOC down hole<br>0.0 VOC HH | Silty, Clay 60% 40% dark brn No Stain slightly moist No odor |
| 4 | | | | 1010 | | | 171 VOC down hole<br>240 VOC HH | Clay, Silt 90% 10% grey/some brn odor & Sheen Stain Moist |
| 6 | | | | 1025 | | | 84 VOC down hole<br>433 VOC HH | Clay grey odor & Sheen Stain Moist<br>Refusal at 7.0 |
| 7.0 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~: Date: 7/10/13 PROJECT NAME & NO: Yale Oil

WELL ID: 42 RECORDED BY: JPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Previously Sampled | | | | | | Previously Hand Augered and Sampled to 7.0'. 42-SB-A: 6'-7' |
| 7.0 | | | | | | | Water at 7.2' | |
| 7.2 | | 42-SB-B HNPID: 1846 ppm 10:55 | | | | | | 7.2-8.2 (R) Heavily odored & stained small-med cobbles. rounded to subrounded Silty sand dark, visible product |
| 8.2 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 7/31/13 PROJECT NAME & NO: Yale Oil

WELL ID: 42 Greenpoint RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously logged |
| | | | | | | | | 8'-11.5 sandy gravel; wet, Dk gray; odor + stain; subrounded |
| 2 | | | | | | | | |
| | | Previously sampled | | | | | | |
| 4 | | | | | | | | |
| 6 | | | | | | | water @ 6.30' | |
| 8 | | | | | | | | |
| | | 42-SP-C Time: 1515 HH PID: 101 | | | | | | |
| 10 | | | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: 4/30/13

WELL ID: 43 Grd ONTR RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | 1' West Offset | | | | | Gravel | 0-1.6 Lt. Brown Sandy Silt DRY No Stai No Odor<br>1.6-2.2 Tar Black Hard Stai Odor. |
| 2 | | | 43-SB-A 1445 | | | | Downhole VOC 1110 2% peak LEL Heated Headspace VOC 3400 | 2.2-3.5 Reddish Brown Sandy Silt DRY No Stai, No Odor<br>3.5-4 Dark Grey, Moist Stai Odor, Clay |
| 3 | | | | | | | | |
| 4 | | | 43-SB-A 1500 | | | | Downhole VOC 2811 Heated Headspace VOC 2980 | 4-5.5 Dark Grey Moist Clayey Silt Stai & Odor |
| 5 | | | | | | | | 5.5+ Could Not Advance |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/9/13 - 7/10/13 PROJECT NAME & NO: Yale 0.1

WELL ID: 43 AK RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-5.5' previously logged |
| 2 | | Previously sampled | | | | | | |
| 4 | | | | | | | | |
| 5.5 | | | | | | | | |
| 6 | Not sampled | | | | | | | |
| | Water at 7.3' | | (B) | 43-SB-B 08:40 (7/10/13) WHP 217: 1122 ppm | | | Water at 7.3 | 7.3'-8.3' 0841 Heavily graveled dark black, small-mid gravel heavily odored, stained Schily, Sub round to round. Cleared to 8.3' |
| 8 | | | | | | | | |
| 8.3 | | | | | | | | |

Note: started New Hole because we couldn't find old Hand Boring; placed in approximate grid center using Hand Held GPS.

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 7/31/13 PROJECT NAME & NO: Yale Oil

WELL ID: 43 Geo probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously logged |
| | | | | | | | | 8'-11.5' sandy gravel, wet, Dk gray, odor, oily |
| 2 | | | | | | | | |
| 4 | | Previously sampled | | | | | water @ 4' | |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| 8.3 | | | | | | | | |
| 10 | | 43-5 B-C Time 1440 HH PID 44.3 | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 44-SB RECORDED BY: _____

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | spl's taken in topographic low | 0-3.1: Blk PHC impacted sludge/clay |
| | | | | | | | | 3.1-4.5: Blk PHC impacted grvl. |
| | | | | | PID: 1590 | 2'-4' | 44-SB-B @ 12:25 | 4.5'-6': Blk PHC impacted sand w/ occ pbls |
| | | | | | PID: 2380 | 4-6' | 44-SB-C @ 12:30 | 6' - TD |
| | | | | | | | OFFSET TO edge of topographic depression to get an "A" spl | 0-3.3' silt w/ some sand: dry |
| | | | | | | | | 3.3-3.5' cly w/ slt, damp |
| | | | | | PID: 1890 | | 44-SB-A: 13:25 2'-4' | 3.5-4.0 PHC odor Blk to Dk Brown cly w/ slt & sludge? |
| | | | | | | | | 4' - TD |

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# WELL LOG

5/1/13

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 45 Center Grid RECORDED BY: GM

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | 9' | Northwest | & center | | | Bare Dirt | Black high organic slightly moist clayey loam odor stain |
| 2 | | | 45-SB-A | 1100 | | | 330 VOC downhole 2290 VOC HH | Black stain odor Clayey sandy loam very moist 68% LEL |
| 4 | | | 45-SB-B | 1135 | | | 228 VOC downhole 2020 VOC HH | Liquid at 4' Black stain odor Clayey Sand Very Moist Refusal at 4.9' 39% LEL |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: 8/9 PROJECT NAME & NO: L/n/c

WELL ID: 45-SB-C RECORDED BY: JPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Previously Dug Previously Sampled | | | | | | |
| 4.9 | | Not Sampled | | | | | | |
| 8 | water | | | | | | Water @ 8' | |
| 11.5' | | | 45-SB-C time 14:10 HHPI: 4.1 | | | | | 45-SB-C Sandy silt & Med sand/cobbles Heavily oiled, stained & sheen. Visible product. |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT:_____ PROJECT NAME & NO:_____

WELL ID: 46-SB RECORDED BY:_____

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCI 5/1/13 ? |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2'-4' PID = 0 | 2'-5 silt some sand |
| | | | | | | | 4'-6' PID = 860 | 5'-5.75' dusp, medium grained sand |
| | | | | | | | 6'-6.2' PID = 420 | 5.75'-6.2' sandy gravel, cobbles to 2". |
| | | | | | | 4'-6' | 46-SB-4 @15:05 | PHC impacted beginning at 6.0' |
| | | | | | | | | REFUSAL @ 6.2' |
| | | | | | | | | no water in hole |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/7/13 PROJECT NAME & NO: Yale oil

WELL ID: 46' A 16 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | not sampled | | | | | | 0-6.2' previously bgs |
| 2 | | | | | | | water @ 6.2 | 6.2'-8' gravel; wet; Black; pea size to 1.2"; odor + stain; ~ <1% Fines |
| 4 | | Previously sampled | | | | | | |
| 6 | | not able to sample due to lack of sand | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: 6/28/15 PROJECT NAME & NO: Vale Oil

WELL ID: 46 Geoprobe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| | | | | | | | | 8'-12' gravelly sand; wet; Dk gray to Black; rounded to subrounded; stain + odor |
| 2 | | | | | | | | |
| 4 | | Previously sampled | | | | | | |
| 6 | | | | | | | | |
| | | Water @ 6.80' | | | | | | |
| 8 | | | | | | | | |
| | | 46-S8-C | | | | | | |
| | | 44 PID | | | | | | |
| 10 | | Time: 0850 | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 8/6/13 PROJECT NAME & NO: Yale Oil

WELL ID: 46-SB-B 46-SB-BD RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 5'-6.2 Sandy clay (gray, moist to wet) stain to odor |
| 2 | | | | | | | | |
| 4 | | | | | | | | |
| 5' | | 46-SB-B<br>46-SB-BD<br>Time: 11:25<br>Time Rep: 11:30<br>HNPID: 1944.7 | | | | | | |
| 6 | | | | | | | | |
| 6.2 | | | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG

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PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 5/2/13

WELL ID: Yorid 47 CNTR RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | offset | | 3'NE | | | Bare Black silty gravel cover | Black. Silty Sand w/ 1" Mina gravels No Stain No Odor |
| 2 | | | 47-SB-A | | | | Downhole VOC 0.1 Heated Headspace | 2-2.2 Same As Above |
| 3 | | | 0915 | | | | VOC 0.1 | 2.2-4 Olive Brown, Sl. Moist 40% Clayey ~~Silt~~ 60% Sand, No Stain No Odor, Sl. cohesion |
| 4 | | | | | | | Downhole VOC 0.0 Heated Headspace | 4-5.5 Same As Above |
| 5 | | | 47-SB-A 0930 | | | | VOC 23.5 | 5.5-6 Very Moist Clay 80% Sand 20% Dark Brown, Odor, No Stain |
| 6 | | | | | | | Downhole VOC 0.0 Heated Headspace | 6-6.5 Same As Above w/ Stain & Odor |
| 7 | | | 47-SB-A 0945 | | | | VOC 2.48 | 6.5-7.7 Sandy clay Dark Grey Very Moist Stain & Odor |
| 8 | | | | | | | | 7.7+ Could Not Advance |
| 9 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/7/13 PROJECT NAME & NO: Yale oil

WELL ID: 47 AK RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Auk down to 8' water @ 7.5' Tried to sample but not enough soil |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/12/13 PROJECT NAME & NO: Vale Oil

WELL ID: 47 Geo Probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| 2 | | | | | | | | |
| 4 | | Previously sampled | | | | | | |
| 6 | | | water @ | | 6.6 | | | |
| 8 | | | 47-5B-C | | | | | |
| 10 | | | HA PID | Time: 1650 | | | | |
| 11.5 | | | | | | | | |
| 12 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 8/6/13 PROJECT NAME & NO: Yle Oil

WELL ID: 47-SB-B 47-SB-BD RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 5'-7' Sandy clay! Dkgray moist to wet/stain + odor |
| 2 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | 47-SB-B | | | | | | |
| 6 | | 47-SB-BD | | | | | | |
| | | Time: 14:25 | | | | | | |
| | | Time Dup: 14:30 | | | | | | |
| 7 | | HNPID: 11.5 ppm | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 4/25/13

WELL ID: 48-~~SB~~-A ONTR GRND RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0-6" | Black Silty Clay Sl. Moist |
| | | | | | | | 6"-2' | Tan Silty Sand Sl. Moist |
| | | | | | | | | No Stain, No Odor |
| 2 | | | 48-SB-A (2-4) | | | 1400 | Downhole VOC 0.0 Heated Headspace VOC 0.0 | Lt. Tan silty Sand sl. Moist, Minor black specs, likely cover cave in, No Stain, No Odor |
| 3 | | | | | | | | |
| 4 | | | 48-SB-A (4-6) | | | 1420 | Downhole VOC 0.0 Heated Headspace VOC 0.0 | Tan Sandy Silt, Moist No Stain, No Odor |
| 5 | | | | | | | | |
| 6 | | | 48-SB-B (6-8) | | | 1435 | Downhole VOC 0.0 Heated Headspace VOC 0.0 | 6-6.8' Tan Sandy Very Moist; 6.8-8 Wet Dark Tan Sandy } No Sta No Od |
| 7 | | | | | | | | |
| 8 | | | 48-SB-C (8-9.2) | | | 15:00 | Downhole VOC 0.0 Heated Headspace VOC 0.0 | 8-9.2 Dark Tan Wet, small spaced Sand. No Stain, No Odor |
| 9 | | | 48-SB-CD | | | 15:03 | | 9.2 + Could not Advance |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 49 GRID CWTR RECORDED BY: JB

4/25/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 8' SE of center | Silty Clay, Sand w/½" mins gravel Dark Grey Odor, No Stain |
| 2 | | | ✓ | 49-SB-A 1145 | | (2-4) | Downhole VOC 53.8 Heated Headspace VOC 178 | 2-3.8 Olive Brown & Dark Grey, Silty Clay 2" minor gravels, Moist No Stain, Odor |
| 3 | | | | | | | | 3.8-4 Black, Silty Clay 2" Mins gravels Moist Odor & Stain |
| 4 | | | | 49-SB-A 1205 | | (4-6) | Downhole VOC 39.6 Heated Headspace VOC 610 | Black Silty Clay, Very Moist. stronger odor Stain |
| 5 | | | | | | | | |
| 6 | | | | 49-SB-A 1230 | | (6-8) | Downhole VOC 202.7 Heated Headspace VOC 899 | 6-7 Black, Stain, Odor, Silty Clay Very Moist |
| 7 | | | | | | | | 7-7.2' Sandy Silt Black gravels 1-2", Stain, Odor |
| 8 | | | | | | | | 7.2+ Could Not Advance |
| 9 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/6/13 PROJECT NAME & NO: Yale oil

WELL ID: 49 RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Air knifed Down to 8' |

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# WELL LOG



PROJECT INFORMATION:
~~CLIENT~~ Date: 6/27/13 PROJECT NAME & NO: Yakeoil
WELL ID: 49 Geo Probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| 2 | | | | | | | | 8'-12 sandy gravels; wet; Dk gray; subrounded; odor + stain |
| 4 | | Previously sampled | | | | | | 12-14.5 sand w/ Pea gravel; wet; Dk gray; subrounded to rounded; odor + stain |
| | | | | O2 @ 5.4' | | | | |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| | | 49-SB-B HH PID: Time: 1515 | | | | | | |
| 10 | | | | | | | | |
| 14.5 | | | | | | | | |
| 12 | | 49-SB-C HH PID Time: 1600 | | | | | | |
| 14 | | | | | | | | |
| 14.5 | | Refusal @ 14.5 | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 50 Grid CNTR RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Tried 5' East but encountered ~~Black~~ Red Brick in ~~Black~~ Dark Grey Sandy Silt, No Stain No Odor<br>Moved 7' South, Dark Grey Silty Clay, Red Brick 0-6"<br>~~0-6"~~ Odor, No Stain, Slo Moist | |
| 2 | | | 50-SB-A 0955 | (2-4) | | | Downhole VOC 12.9<br>Heated Headspace VOC 188 | Dark Grey Clayey Silty Sand Slo Moist w/ 1" minus gravels<br>Odor, No Stain |
| 3 | | | | | | | | |
| 4 | | | 50-SB-A MD:15 | (4-6) | | | Downhole VOC 2.6<br>Heated Headspace VOC 80.4 | 4-5.5 Silty Clay Sl. Moist, Dark Grey w/ brick fragment, Sl. Odor, No Stain<br>5.5-6 Very Moist Clay, Dark Grey, No Stain, Odor |
| 5 | | | | | | | | |
| 6 | | | 50-SB-A 1040 | (6-8) | | | Downhole VOC 18.8<br>Heated Headspace VOC 258 | 6-7.5 Very Moist Clayey Silt, Dark Grey No Stain, Odor<br>7.5-8 Sandy Silt Very Moist Dark Grey, No Stain, Odor |
| 7 | | | | | | | | |
| 8 | | | | | | | | 8+ Could Not Advance |
| 9 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 7/31/13 PROJECT NAME & NO: Yale Oil

WELL ID: 50 Geo probe RECORDED BY: TFS & JS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously logged |
| 2 | | | | | | | | |
| 4 | | Previously sampled | | | | | | |
| | | | | | | | PID @ 2.8' | |
| 6 | | | | | | | | |
| 8 | | | | | | | HHS: 14.1 | 8-11.5' Sandy gravel, grey-tan, Medium odor. Cohesive. Water at approx 9' |
| | | 50-SB-B Time: 9:55 DH PID: NA | | | | | | |
| 11.5 | | | | | | | | |
| | | | | | | | HHS 23 | 11.5-14' Sandy gravel, tan-light grey. Fine grained small-med cobbles. No odor. Some staining |
| | | 50-SB-C Time 1010 | | | | | | |
| 14 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: S1 GRID CNTR RECORDED BY: QB

4/24/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Asphalt Cover | Silty Sand, Black, Moist No Odor, Stain? |
| 2 | | | S1-SB-A (2-4) 1440 | | | | Downhole VOC 0.0 Heated Headspace VOC 6.5 | Dark Grey, Silty Sand, Sl. Moist 3" minus gravels, & Red Brick |
| 3 | | | | | | | | |
| 4 | | | S1-SB-A (4-6) 1500 | | | | Downhole VOC 38.4 Heated Headspace VOC 1450 | 4-5.5 Silty Clay, Sl. Moist Dark Grey, Stain & Odor 5.5-6.0 Sandy Silt, Sl. Moist Black, Stain & Odor |
| 5 | | | | | | | | |
| 6 | | | S1-SB-A (6-7) 1555 | | | | Downhole VOC 6.9 Heated Headspace VOC 940 | 6-7 Clay, Black, Moist Stain & odor |
| 7 | | | | | | | | 7+ Cobbles Could not Advance |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 6/6/13 PROJECT NAME & NO: Yale oil

WELL ID: 51 Alc RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Air knife down to -8' |

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon PROJECT NAME & NO: Yale Oil

WELL ID: 51 RECORDED BY: Walter Crane

6/7/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | % CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 8'-9' | | | | | | | | course gravel some sand black w/ contamination took 6 core samples getting very little returns due to so much gravel |
| 9'-12' | | | | | | | | sheen on water lot of sand w/ some various sized gravel medium grey color 2 core samples |
| | | | | | | | | 7.7' WL upon arrival |
| | | | | | | | | 8' TD |
| | | | | | | | | No free product |
| | | | | | | | | B Sample 10:45 PID: 41.3 ppm |
| | | | | | | | | C sample 11:00 PID: 36.7 ppm |

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# WELL LOG

5/17/13 Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: Yale

WELL ID: Grid 52 Ctr RECORDED BY: CS.

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS / DRILLING FLUID / DRILLING RATE / WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0-18" | unconsolidated Tan Sand w/50% gravels & cobbles. ~~Dry~~ (¼"-6") Dry, no odor |
| | | | | | | | 18"-2' | loam to sandy silt. Med dark brown Dry, no odor |
| 2 | | DH | PID | 0.0 | | | | |
| | | HH | PID | 0.0 | | | | |
| | | Sample@ | | 1500 | | | 2'-4' | med dark, fine grain sandy silt low moisture, low cohiseveness, NO odor, no gravels |
| 4 | | DH | PID | 0.0 | | | | |
| | | HH | PID | 0.3 | (A) | Sample | | |
| | | Sample@ | | 1520 | | | 4'-6' | Same as 2'-4' interval |
| 6 | | DH | PID | 0.0 | | | 6'-7' | Same as above, w/ wet sand ~2" of gray clay @ 7'. No odor |
| | | HH | PID | 6.1 | (B) | Sample | | |
| | | Sample@ | | 1605 | | | 7'-8' | Saturated brown sand. No odor |
| 8 | | DH | PID | → NA | | | 8'-10' | Saturated coarse brown sand, No odor |
| | | HH | PID | → 2.4 | (C) | Sample | | |
| | | Sample@ | | 1640 | | | | |
| 10 | | | | | | | | |

1700 - Hole Plugged w/ Bentonite, Topped w/ Sand

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# WELL LOG



PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 53-CNTR RECORDED BY: LMJ 5/21/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 0'-1' lt tan, silty clay: damp | Hole offset from marker 25' South (toward road) to avoid utilities |
| | | | | | | | 1'-2.9' dry, sandy gravel - silt ~~darker~~ darker brown @2.5', sand still dry: traces of black ~~brown~~, widespread ~~blks~~ = coal? cinders? | |
| | | | | | | | 2.9' = refusal | |
| | | | | | | | PHPID=0 2.0-2.9' 53-SB-A PHPID=1.9 ppm 11:00 am | |
| | | | | | | | | TD @ 2.9' |

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# WELL LOG

5/23/12 Page ___ of ___

PROJECT INFORMATION: (AK)
CLIENT: Exxon PROJECT NAME & NO: Yale
WELL ID: Grid 53 cntr RECORDED BY: CJ

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 4 | | HH PID Sample @ | 1.1 | | | | 4-6 | Red/Brown ~~sandy~~ Silty Sand moderate moisture, No odor 40% gravels & cobbles |
| 6 | | HH PID Sample @ | 3.8 | (B) Sample | | | 6.0-6.5 | Same as above |
| | | | | | | | 6.5-8.0 | liquefied grey clay, saturated, 70% gravels <1", 30% cobbles 1"-2" Some sands, Product Sheen on water table, Strong odor |
| 8 | | | | | | | | |
| 9 | | Air Knife to 6.5'; Augered through "B" zone Ended auger boring @ 9' | | | | | 8.0-9.0 | Gravel/gravels/cobbles |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 6/5/13

WELL ID: 53-SB-C(10-12) RECORDED BY: CTL

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 10 | | | | | | | SWL ~ 6.50<br>TA ~ 8.0 | -Sample time 15:10<br>PID: 14.9 ppm<br>Depth 10-12, advanced Geo Probe 3x into hole. First two tries collected only enough sediment to ~~sampl~~ fill two jars. Third attempt enough sand/sediment was pulled to fill three new jars<br>-Total jars filled - 5<br>Last 3 from last pull located in 2x ziploc bags<br>-Sheen & free product in sample/GW |
| 12 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: S4 RECORDED BY: CMS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-2.7' silt, dry, black & ~~[illegible]~~ cinders from IRR! chunks of wood, charcoal |
| | | | | | | | 2-4' @ 13:00 OH PID = 0 ppm 13:00 HHS-54 ppm | 2.7'-4.5 silt w/ cly, dry, white mottling on fines gypsum? |
| | | | | | | | 4'-6' OH PID = 150 ppm 13:30 HHS-546 | 4.5-6.0 dk to med gry, silt w/ sand +/- loose clay. Strong odor starting @ 5.5' |
| | | | | | | | | 6.0-7' pk gry to blk sand, strong PHC odor |
| | | | | | | | 6-7' OH PID = 205 HHS-1046 S4-50-1 @ 7' @ 14:05 | 7' = HIT REFUSAL, big rock |
| | | | | | | | | TD @ 7.0' |
| | | | | | | | | Rinsate sample from auger ~~[illegible]~~ 4/05B-105-106 @ 15:00 5/20/13 |

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# WELL LOG

5/23/13 Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon PROJECT NAME & NO: Yale

WELL ID: Grid 54 Cntr RECORDED BY: CS.

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 1 | | Hand augered to 7.0' | | | | | 8.0-8.5 | water @ 8.0; sands, gravels <1" & cobbles 1"-2" aprox 60% Product Sheen on water. liquified clays/silts Strong odor. |
| 4 | | Clear to 8.5' | | | | | Split taken | |
| | | HH PID 1314 (ICOI) | | | | | | |
| | | Sample @ 1545 | | | | | | |
| | | HH PID 37900 (H.M) | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

6/5/13

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 54-SB-6(7.5-10) RECORDED BY: CR

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 7.0 ↓ 10.0 | | | | | | | SWL-7.0' | Sample Time 16:40<br>PID: 78.2ppm<br>- Advanced probe to 10 ft 5 times to fill 3 sample jars & 2 ziploc bag.<br>- Note: Oil sheen on collected water and visible product. |

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# WELL LOG

5/21/13 Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon PROJECT NAME & NO: Yale

WELL ID: Grid Cntr 55 RECORDED BY: CJ

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Offset Center by 15' South | | | | | 0 - 12 | Fill. Some gravels |
| | | | | | | | 12-24 | med-dark brown silt. Dry → No odor |
| | | | | | | | 2.0-3.0 → | |
| | | | | | | | 3.5 - 4.0 | Silty Clay. Dark brown. Dry. No odor. → |
| 2 | | DH | PID | - 0.1 | | | 4.0-5.0 → | |
| | | HH | PID | - ~~[illegible]~~ 5.0 | | | 5.0-5.5 | Sandy Silt. Med dark brown dry moist |
| | | Sample @ 940 | | | | | 5.5 ~~[illegible]~~ → | Slight odor |
| 4 | | DH | PID | → 14.3 | (A) Sample | | 5.5 ~~6.0~~ 5.75 | Fine grain grey sand, transitioning to grey clay and black clay @ 6'. med to strong odor moderatly moist, moderatly cohesive. |
| | | HH | PID | → 613.9 | | | | Slight sheen Refusal @ 5.75' |
| | | Sample @ 1000 | | | | | | |
| 5.75 | | | | | | | | |

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# WELL LOG

5/23/13 Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon (AK) PROJECT NAME & NO: Vale

WELL ID: Grid 55 Cntr RECORDED BY: C.S.

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 6 | | Original hand auger to 5.75 | | | | | 6.0-8.0 | un-able to retrive soil @ 6'. Cobbles (1"-2") and dark grey sand, heavy odor @ 7'. un-able to pull enough for adiquate sample |
| 8 | | Clear to 8 feet | | | | | | Air lance started creating white smoke @ 7.0' |
| | | | | | | | | DH PID ⇒ 67.8 |
| | | | | | | | | Hole completed @ 8' (1430) |
| | | | | | | | | No sample taken |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 6/5/13

WELL ID: SS-SB-C(8-10) RECORDED BY: CTL

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | SOIL - 6.60<br>TD - 8.0' | Sample Time<br>17:40<br>PID: 8.0 ppm |
| | | | | | | | B-4'-6<br>C 6-8 | - Advanced tubing to 10 ft BGS. After 5th time enough sediment was collected to fill all jars & ziploc bag.<br>- No B Horizon was sampled due to soil being 6.60'<br>- Visible sheen & product on soil. |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 8/8/13 PROJECT NAME & NO: Vale oil

WELL ID: SS-SB-B RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 6.5 - 7.5 sandy gravel; moist to wet; stain and odor; Dk gray |
| 1 | | | | | | | | |
| 4 | | | | | | | | 5.5-6.5 clay; moist; med gray; stain + odor |
| 5.5 | | SS-SB-B Time: 15:25 HH PID. 16.4 ppm | | | | | water @ 7' | |
| 6 | | | | | | | | |
| 7.5 | | | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: 8/12/13 PROJECT NAME & NO: Yale oil

WELL ID: ~~B~~ 56-SB-C RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | Previously sampled | | | | | | | 0.0'-6.5' previously logged |
| 2 | | | | | | | | 6.5'-8.5 Sandy clay; moist to wet; med gray to Black / Slight odor and stain / Moderate cohesion |
| 4 | | | | | | | | |
| 6 | | | | | | | | |
| 6.5 | 56-SB-B Time: 10:40 HHPID: 532.2 | | | | | | | |
| 8 | | | | | | | | |
| 8.5 | | | | | | | | |

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# WELL LOG

5/21/13 Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon PROJECT NAME & NO: Yale

WELL ID: Grid 57 Cntr RECORDED BY: CJ.

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Offset south 25' | | | | | | 0-.5 loam, black, moist. no odor |
| | | | | | | | | .5-1.0 Silts, silty sand. Red/Brown Slightly moist. No odor |
| 2 | | DH PID | | .4 | | | | 1.0-2.0 Red/Brown to brown ~~sand~~ silty sand |
| | | HH PID | | 21.3 | | | | 2.0-2.5 Brown Sandy silt. Dry. No odor |
| | | Sample @ | | 1135 | | | | 2.5-3.0 Red/Brown sand w/10% gravels |
| 4 | | DH PID | | 3.5 | | | | 3.0-4.0 (3/4"-1½") moist. No odor |
| | | HH PID | | 470.2 | (A) Sample | | | 4.0-4.5 Coarse Red/Brown, moist very slight odor. 10% gravels |
| | | Sample @ | | 1200 | | | | |
| 6 | | DH PID | | 2.6 | | | | 4.5-6.0 Wet coarse Dark grey sand. odor 15% small gravels (¼"-1½") |
| | | HH PID | | 850.0 | (B) Sample | | | |
| | | Sample @ | | 1235 | | | | 6.0-6.5 Coarse Dark grey wet sand/gravels to Black coarse sand. Saturated. strong odor |
| 7.0 | | Refusal @ 7.0'. Sand liquefaction at water table. Unable to pass sluff zone | | | | | | 6.5-7.0 Black saturated coarse sand. (side slough) |

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# WELL LOG

5/24/13 Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon (AK) PROJECT NAME & NO: Yale

WELL ID: Grid 57 cntr RECORDED BY: C.S.

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Cleared by Hand to 7.0' (5/21). Hole had Slufted in to 3' BGS on 5/24. AK Started @1110. Reached water @ 7.0' EXTREAME Slufting occured @ 7.0'. Hole under cut, and voids created to 8' at angle No Sample taken. Hole covered w/Plywood & concrete well cut out | |
| 20 | | | | | | | | unconsolidated sands & gravels, Red/Brown & loose |
| 6.0 | | | | | | | | |

Hole Clear to 8'

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/2/13 PROJECT NAME & NO: Valve oil

WELL ID: 57 Geo Probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' primarily bagged |
| 2 | | | | | | | | 8'-12' gravelly sand; wet; DK gray to black; subrounded to rounded; stain & odor |
| 4 | | Previously sampled | | | | | | |
| 6 | | DNQ @ 3.6 | | | | | | |
| 8 | | | | | | | | |
| 10 | | 57-SB-C 44 PID : 338.1 Time: 0925 | | | | | | |
| 12 | | | | | | | | |

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# WELL LOG

5/22/13 Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: Yale

WELL ID: Grid 58 Cntr RECORDED BY: CJ. 5/22/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Off set South 10 feet | | | | | 0 - 2.0 | Black Cinder/loam moist No odor |
| | | | | | | | 2.0-4.0 | Black loam, slightly moist 5% gravels and interspersed cinders (coal/tar) No odor |
| 2 | | DH PID ⇒ .2<br>HH PID ⇒ 4.1<br>Sample @ ⇒ 940 | | | | | 4.0-4.5 | Black loam (as above) to silty sand. (light brown, no odor) |
| 4 | | DH PID ⇒ 0.0<br>HH PID ⇒ 57.6<br>Sample @ 1000 | | | | | 4.5-5.0 | Silty sand to silty clay w/ mottled White particulate (gypsum?) |
| | | | | | | | 5.0-6.0 | light brown silty sand. med moist No odor to sandy silt |
| 6 | | DH PID ⇒ 209.9<br>HH PID ⇒ 216.0<br>Sample @ 1040 | | | (A) Sample | | 6.0-6.5 | Silty sand, light brown. moist No odor to light brown moist clay. Highly cohesive |
| 8 | | DH PID ⇒ 313.6<br>HH PID ⇒ 184.6<br>Sample @ 11:15 | | | | | 7.0-7.5 | light grey to dark grey fine sands strong odor followed by light grey to black clay. Strong odor w/ sheen |
| 10 | | DH PID ⇒ ~~[illegible]~~<br>HH PID ⇒ ~~[illegible]~~ 1131<br>Sample @ ⇒ 1140 | | | 310.4 (B) Sample | | 7.5-8.0 | grey to black clay. Odor & sheen moist & cohesive |
| 10.8 | | Refusal @ 10.8<br>Note: loose black loam from 0-2' slurried into most auger barrells | | | | | 8.0-8.5 | grey clay, moist, slight odor Root hairs present |
| | | | | | | | 8.5-9.0 | Fine dark grey sand. wet. Some odor |
| | | | | | | | 9.0-9.5 | Black fine sand, wet, some odor |
| | | | | | | | 9.5-10.0 | grey clay. wet, moderate odor |
| | | | | | | | 10-10.8 | med. grain dark grey sand Liquified clay (Dark grey/Black) |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 8/1/13 PROJECT NAME & NO: Yale oil

WELL ID: 56 geoprobe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-10.8 Previously logged |
| | | | | | | | | 10.8'-14' sandy gravel, wet, black; strong odor & stain! |
| 2 | | | | | | | | |
| 4 | | Previously sampled | | | | | | |
| 6 | | | | | | | | |
| 8 | | | | | | | water @ 7.80 | |
| 10 | | 56? | | | | | HH PID: 1929 | |
| 12 | | (54) 53-C time: 12:15 HH PID | | | | | | |
| 14 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 59 RECORDED BY: L Zij

5/22/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-0.3 ASPHALT |
| | | | | | | | | 0.3-1.2 dnp sand/gravel |
| | | | 2 | | | | | |
| | 13:00 | H/S 0.1 | | | | | | 1.2' - 5.3 dnp sand w/ silt medium brown |
| | | | | | DH PID | Ø | | 5.3' ~~[illegible]~~ CBGS/Gravel / REFUSAL |
| | | | 4 | | | | | |
| | 13:15 | H/S 0.2 | | | | | 59-SB-1 @ ~~13:45~~ 13:15 Ø'-5.3' | |
| | | 5.3 | | | | | | TD @ 5.3' |
| | | | 6 | | | | | |
| | | H/S | | | | | | |
| | | | 8 | | | | | |

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# WELL LOG

5/28/13 Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon (AK) PROJECT NAME & NO: Yolo

WELL ID: Grid 59 Cntr RECORDED BY: CS & JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0 - 5.3 | Completed by Hand Auger |
| 5.3 | | | | | | | 6-8' | Med coarse Dark brown Sands 40% gravels & cobbles (½"-2") Saturated w/ Dark brown Product skim on water moderate odor |
| 6 | | HH PID | | | (B) Sample | | | |
| | | Sample @ 1140 | | | | | | |
| 8 | | | | | | | | All to 6', Hand Auger 6-8 |
| | | Hole Clear to 8' | | | | | 8-8.7 | Sandy Wet 2" Gravel moderate Odor & Stain |
| | | | | | | | 8.7+ | Could not Advance |
| | | Sampled @ 1500 | | | (C) Sample | | Starting Plug | water @ 6' BGS |
| | | Did not collect HH due to PID issues | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: G0 RECORDED BY: [illegible] 5/22/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0'-2' = GRAVEL: ~~[illegible]~~ Yellowish by consi [illegible] |
| | | | | 2 | | | | 2'-2.5 dmp, dk brown, sndy, grvl: |
| | | 9:15 | AB5 11.0 | | | | | 2.5-5.0 dmp, dk gry to black silty clay, PHC odor |
| | | | | 4 | | DH PID | ~~[illegible]~~ 49.9ppm | |
| | | 9:45 | [illegible] 1/16 3/12 | | | | 100-53-4 @ 9:45 4'-5.3' | |
| | | 5.3' | | | DH | PID | 183.5 | 5.0'-5.3 blk, damp, grvl w/sud, cobb to 3", PHC odor |
| | | | | | | | | 5.3 - Refusal - Bldrs? |
| | | | | | | | | TD @ 5.3' |

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# WELL LOG

5/28/13 Page ___ of ___

PROJECT INFORMATION: (AK)

CLIENT: Exxon PROJECT NAME & NO: Yale

WELL ID: Grid GO Cntr RECORDED BY: CS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 0-5.3 | Cleared by hand Auger |
| | | | | | | | 6-8 | Coarse Black / Dark grey Sands, 50% gravels / cobbles (1/2"-2 1/2") Saturated, moderate odor |
| 6.0 | | HH PID [36060] | | | | | | (AK) to 6.0' |
| | | Sample @ 1100 | (B) Sample | | | | | Hand auger to 8' |
| 8.0 | | Hole clear to 8' | | | | | | |

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# WELL LOG



PROJECT INFORMATION:
~~CLIENT:~~ Dale 7/1/13 PROJECT NAME & NO: York oil
WELL ID: 60 geo probe RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| 2 | | | | | | | | 8'-15.5' generally sandy wet, Dk gray, subtle oily stain + odor, poorly sorted |
| 4 | | Previously sampled Water @ 5.4' | | | | | | |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| 10 | | | | | | | | Rinsate Blank YOSD-1307-100 Time: 1705 |
| 12 | | 60-SB-C HH PID: 191.7 Time: 1640 | | | | | | |
| 14 | | | | | Prove an extra 4' Because not enough sample was collected in first push | | | |
| 15.5 | | | | | | | | |
| 16 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 61 LMOR RECORDED BY: LMJ 5/21/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-0.7' Concrete |
| | | | 2 | | | | | 0.7'-2.1' Rep damp, dk brown to black clay w/silt 5% gravel, angular Backfill? |
| | | HS 412 | | 15:25 | | | 61-SB-A | |
| | | | 4 | | DRIPPING 43 | | | 2.1'-6' damp black clay locally light gray |
| | | HS 388 | | 15:40 | | | | |
| | | | 6 | | DRIPPING | 193.3 | 61-SB-B @ 15:45 | 6'- ~~Blk, sand & silt~~ ~~Wet (in water)~~ Slight PHC odor |
| | | HS 179 | | 15:45 | | | | |
| | | | 8 | | DRIPPING | 154.1 | 61-SB-C @ 16:00 | 6'-9' silt w/ clay, black, wet (HNU 120 @ 6') locally sandy beds |
| | | HS 189 | | 16:00 | | | | |
| | | | 9 | | DRIPPING | 200 | | |
| | | | | | | | | TD @ 9 FT |

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# WELL LOG

5/21/13 Page ___ of ___

PROJECT INFORMATION:

CLIENT: EXXON PROJECT NAME & NO: Yale

WELL ID: Grid G2 Cntr RECORDED BY: CJ

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0-1.0 Silty sand. moderatly moist. No color med/Dark brown |
| | | | | | | | | 1.0-2.0 Same as above, with Brown to grey Silty clay |
| 2 | | DH PID → 107.4<br>HH PID 527.6<br>Sample @ 1430 | | | | | | 2.0-4.0 Fine grey moist sand moderate moisture/od to black Fine sand w/ strong odor & petro sheen. Some sandy clays. 10% 1/2" - 1" gravels @ 4' |
| 4 | | DH PID 112.5<br>HH PID 1013<br>Sample @ 1500 | | (A) Sample | | | | 4.0-5.0 Coarse black sand, Heavy Stain / heavy odor<br>Fine black sand @ 5.0' |
| 6 | | DH PID: 160.4<br>HH PID: 1008<br>Sample @ 1505 | | (B) Sample | | | | 5.0-6.0 Fine & med black sand. Heavy odor Heavy stain. Wet @ 6.0' |
| | | | | | | | | 6.0-6.5 Saturated black sand. Clay manner @ 6.5' |
| 8 | | Refusal @ 8 ft. | | | | | | 6.5-8.0 Saturated black coarse sand. 10% small gravels moderate odor |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 8/1/13 PROJECT NAME & NO: Yale a/

WELL ID: 62 Geoprobe RECORDED BY: TPD

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously [illegible] |
| | | | | | | | | 8'-9' sandy gravel; wet; DL gray to Black; Heavy stain & odor |
| 2 | | | | | | | | |
| | | | | | | | | Refusal @ 9' |
| 4 | | Probe sl Sample | | | | | | |
| 6 | | | | | | | | |
| 8 | | 62-SB-C | | | partial | 5 wet | only VOC not enuff sample to get PAH/EPH + metals | |
| | | Time: 1300 | | | | | | |
| 9 | | HH PID 32.5 | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 03 UNTR (QT200) RECORDED BY: _____ 5/21/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-0.3' CONCRETE |
| | | | | | | | | 0.3'-3.7' CLY W/SILT, BLACK, STRONG PHC ODOR |
| | | | | 03 SB A | 14:15 | 14/15 PPM= 942 | 28T @14:15 | 3.7-5.3 GRVL, WET, STRONG PHC ODOR |
| | | | | | | | 91 - DH PID=200 PPM | |
| | | | | 03 SB B | 14:35 | 14/15 | 592 | |
| | | | | 5.3 | | | 5.3 - 233.5 PPM | 5.3 - REFUSAL |

H:\OFFICE\Forms\TEST HOLE LOG.doc

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# WELL LOG

5/28/13 Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon (AK) PROJECT NAME & NO: Yale

WELL ID: Grid G3 Cntr RECORDED BY: CJ.

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | Cleared by Hand auger | | | | | | 6'-8' | Coarse Dark Grey / Black Sand 50% gravels & cobbles (2"-2'6") Fully saturated, Strong odor Product Sheen/Skim Air Knife to 6.0' Hand auger to 8.0' |
| 5.3 | | | | | | | | |
| 6 | H+ PID: [42540] Sample @ 1000 (C) Sample | | | | | | | |
| 8 | Hole Clear to 8' | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 5/21/13

WELL ID: 64 CWGR RECORDED BY: LMS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-1.3': Fill, Bricks/ concrete |
| | | | | | | | | 1.3-1.9: damp, lt brown silt w/sand |
| | | | | | | | 2-4' HNS-661 | 1.9-3.8 damp, brown sand w/silt increasing moisture @ 3.0 |
| | | | | | | | 4-6' OHPID-660 HNS PID=641 | 3.8-4.5: damp sand w/ clay: Trens black 4.2' strong PHC odor |
| | | | | | | | 4-6' 64-SB-A @12:15 | 4.5-6: damp, blk, silt sandy, strong PHC odor |
| | | | | | | | ~~6-7' OHPID 660~~ HNS PID=661 6'-7' 64-SB-B 12:35 | 6'-7 - wet, green gr, sandy visible product 7' - Refusal |
| | | | | | | | | TD @ 7' |

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# WELL LOG

5/24/13 Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon (AK) PROJECT NAME & NO: Vale

WELL ID: Grid G4 Cntr RECORDED BY: CK

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Hand Cleared to 7' (A) (B) Samples taken (5/21) | |
| | | | | | | | AK Started @ 1230 | |
| 1 | | | | | | | Water @ 7'. Hole cleared to 8'. Water flooded | |
| | | | | | | | to 4' No (C) Sample taken | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/2/13 PROJECT NAME & NO: Tele call

WELL ID: 64 geo probe RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously logged |
| 2 | | | | | | | | 8'-15.5' gravelly sand; wet; Dk gray; gravel is pea sized; skunk odor |
| 4 | previously sampled | | | | | | | |
| 6 | | | water @ 5.3' | | | | | |
| 8 | | | | | | | | |
| 10 | | 64-58-C<br>HH PID: 86.2<br>Time: 0845 | | | | | | |
| 12 | | | | | | | | |
| 14 | | | | | | | | |
| 15.5 | | | | | | | | |
| 16 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date 5/28/13 PROJECT NAME & NO: Yale Gil

WELL ID: 65 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Not sampled | | | | | | 0'-1' Sandy loam; Dark Brown; moist; organic; Topsoil<br>1' Silty sand; med to light Brown; slightly moist; some gravels.<br>2' - Fine sandy silt, light brown<br>3' - Some rust staining<br>4' - Still light brown silt/sand some consolidation.<br>5' - Brown, Damp, Roots.<br>5.5' Scattered cobbles<br>6' Increased Dampness<br>7' - More damp, Brown silt<br>7.2' - Gravel cobbles<br>8.0' - Increased cobbling & moisture content. Small-medium sized gravel<br>8'-0 - Refusal |
| 2 | | time 15:50 PID HIS: 6.1 | 65-SB-A | 15:25 | | | | |
| 4 | | time 15:50 PID 2.3 ppm HIS | 65-SB-A | | | | | |
| 6 | | time-16:10 PID HIS: 6.2 | 65-SB-A | | Sampled | | | |
| 8 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 8/1/13 PROJECT NAME & NO: Yale Oil

WELL ID: 65 Geoprobe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously logged |
| | | | | | | | | 8'-11' silty clay, wet, olive brown. |
| 2 | | | | | | | | 11'-15'. sandy gravel, wet, med Brown, |
| 4 | | previously sampled | | | | | | |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| | | 65-SB-B Time: 11:30 HH PID: 1.7 | | | | | | |
| 10 | | | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | 65-SB-C Time: 11:40 HH PID 13.9 | | | | | | |
| 14 | | | | | | | | |
| 15' | | | | | | | | |
| 16 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Vale Oil PROJECT NAME & NO: 11108.002

WELL ID: Grid CNTR 66 RECORDED BY: JB 6-30-13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | Offset 100' North (opposite side of street) | | | | | 0-1' Black Stain Silty gravel, Stain No Odor, Sl. Moist |
| 2 | | | 66-SB-A (2-4) | | | | HH 1.2 ppm | 1-2 Rd. Brown Silty Silt DRY, No Stain, No Odor |
| 3 | | | 1420 | | | | | 2-4 Same as Above |
| 4 | | | 66-SB-A (4-6) | | | | HH 3.1 ppm | 4-6 - Same As Above |
| 5 | | | 1500 | | | | | |
| 6 | | | 66-SB-A (6-7) | | | | DH 0.0 HH 3.9 1530 | 6-7 Same As Above |
| 7 | | | 1530 | | | | | 7+ Could Not Advance |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 5/31/13 PROJECT NAME & NO: Yale oil

WELL ID: 66 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | not sampled | | | | | | 0'-0.8' clayic silt; moist; Dk Brown cohesive; organic |
| | | | | | | | | 0.8'-4.2' silty clay; moist; lt Brown cohesive; non-organic; orange + gray mottling; |
| | | | | | | | water @ 3.0" | |
| 2 | | 66-SB-B PH PID: 0.0 HH1: 2.3 Time: 09:30 | | | | | | 4.2'-5.5 gravelly clay; wet; lt olive Brown to Black; cohesive light ocher stain; |
| 4 | | 66-SB-C PH PID = 0.0 HH PID = 2.6 Time: 0945 | | | | | | TD = 5.5' Refusal |
| 5.5 | | | | | | | | |

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# WELL LOG

5/30/13

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon PROJECT NAME & NO: Yale

WELL ID: Grid G7 Ctr RECORDED BY: CJ

Duplicate taken (A) & (B)

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | Center offset 30' N, across creek/ditch | | | | | | 0-2 | Silty Sands, need moisture light brown No odor |
| | | | | 09/10 | Times V | | | |
| 2 | DH PID - 0<br>HH PID - 0<br>Sample @ 1020/1025 | | | | | | 0-3 | Silty Sand, same as above |
| 4 | DH PID - 0<br>HH PID - 1.0<br>Sample @ 1050/1055 | | | | (A) Sample | | 3-4 | Sand. Light brown slight moisture, No odor. @4' light grey w/mottled black sandy clay w/ some gravels. No odor |
| | | | | | | | 4-4.5 | Sandy clay (light grey) w/ gravels No odor |
| 6 | DH PID - 0<br>HH PID - .5<br>Sample @ 1120/1125 | | | | (B) Sample | | 4.5-5.0 | Silty Sand (light brown) need moisture, No odor |
| 10 | | | | | | | 5.0-5.5 | Clay light brown, highly cohesive |
| | | | | | | | 5.5-6.0 | light grey streaked w/ white clay wet, sticky No odor |
| | | | | | | | 6.0-7.0 | Brown saturated clay mottled w/orange, black. Some saturated light brown silts. No odor |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date: 6/6/13 PROJECT NAME & NO: Yale Oil

WELL ID: 67 AK RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Air Knifed down to 8' |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Duke: 8/2/13 PROJECT NAME & NO: Yale oil

WELL ID: 67 geo probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| 2 | | | | | | | | 8'-12' sandy gravel; wet; Dk Brown to Reddish Brown; |
| 4 | | Previously sampled | | | | | | 12-16 gravely sand; wet Dk gray; slight odor + stain |
| 6 | | Water @ 6.3' | | | | | | |
| 8 | | | | | | | | |
| 10 | | | | | | | | |
| 12 | | 67-SB-C MM PID: 10.0 Time: 1010 | | | | | | |
| 14 | | | | | | | | |
| 16 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date 5/30/13 PROJECT NAME & NO: Yale 01

WELL ID: 68 RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | no sampled | | | | | | 0'-1.5' sandy loam; dk Brown; moist; lots of organics |
| | | | | | | | | 1.5'-40' gravely sand; med Brown; most'l subrounded to rounded; gravels from 1/4" to 6" |
| 2 | | 68-SB1 DH PID = 0.0 ppm HH PID Time = 1245 | | | | | | |
| 4 | | | | | | | | 40' Refusal |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date 6/6/13 PROJECT NAME & NO: Yale Oil

WELL ID: 68 Ak RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Not Sampled | | | | | | 0'-4' - previously sampled |
| 2 | | Previously Sampled | | | | | | 4'-8' gravelly sand; med brown; wet; subrounded to rounded; ~30% gravel; poorly sorted sand |
| 4 | | 68-SB-B HH PID: 3.7 ppm Time: 1130 | | | | | | |
| 6 | | 68-SB-D HH PID: 1.9 ppm Time: 1145 | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG

5/30/2013

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PROJECT INFORMATION:

CLIENT: Exxon

PROJECT NAME & NO: Yale

WELL ID: Grid 69 Cntr

RECORDED BY: CS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Offset 10' N. | | | | | 0-1 | Sandy loam, Dark brown moist, some gravels, No odor |
| | | | | | | | 1'-2' | Very fine silts, Tan, dry No odor |
| 2 | | DH PID - 0<br>AH PID - 1.4<br>Sample @ 1310 | | | (A) Sample | | 2'-3.5' | Same as 1'-2' |
| 4 | | | | | | | 3.5-4 | med dark silty sand some moisture No odor 40% gravels & cobbles (3/4" - 8") |
| | | | | | | | | Refusal @ 4' |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/6/15 PROJECT NAME & NO: Yolo 0.1

WELL ID: 69 AK RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | not sampled | | | | | | 0'-4' previously logged |
| 2 | | previously sampled | | | | | | 4'-5.5' sandy gravels: med Brown, subround to round w 20% sand |
| 4 | | 69-SB-B HH PID: 0.6 ppm Time: 1040 | | | | | water @ 5.5' | 5.5'-8' gravels + cobbles, subround to round |
| 6 | | not able to sample due to lack of soil | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: 7/2/13 PROJECT NAME & NO: Yale Oil

WELL ID: 69 - Geoprobe RECORDED BY: JS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0-8' previously Logged |
| | | | | | | | | 6-8' - rocky gravel |
| 2 | | | | | | | | 8' - Large grained sand |
| | A | | | | | | | 9' - Aprox water |
| | | | | | | | | 9-11' - small-med gravel dark grey, No odor or stain |
| 4 | B | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 10 | | | | | | | | |

Previously Sample

~~6-8~~ 6-8
HHPID: 15.9 ppm
Time: 11:15

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# WELL LOG

5/30/13 Page ___ of ___

PROJECT INFORMATION:

CLIENT: Exxon PROJECT NAME & NO: Yale

WELL ID: Grid 70 Cntr RECORDED BY: CS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | offset | | 10' | North | | | | 0-1' Sandy loam, med. moisture |
| | | | | | | | | 1'-2' Sand. light brown coarse grain dry No odor |
| 2 | DH PID - 0 | | | | | | | 2'-4' Sand, gravels & cobbles 50/50 (1/2"-4") light brown, No odor |
| | HH PID - 1.0 | | | | (A) | Sample | | |
| 4 | Sample @ 1445 | | | | | | | |
| | | | | | | | | Refusal @ 4' |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 6/6/13 PROJECT NAME & NO: Yale oil

WELL ID: 70 A k RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Not Sampled | | | | | | 0'-4' Previously logged |
| 2 | | Previously Sampled | | | | | Water @ 4.5 | 4'-8' Sandy gravel; moist to wet; med to dk Brown; Subrounded to rounded; Poorly Sorted |
| 4 | | 70-SB-B HH PID: 2.0 ppm Time: 9:40 | | | | | | |
| 6 | | 70-SB-C HH PID: 1.1 Time: 10:00 | | | | | | |
| 8 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date 5/30/13 PROJECT NAME & NO: Yale Oil

WELL ID: 71 RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Not Sampled | | | | | | 0'-0.5' sandy silt; lt. moist; dk Brown; some subrounded gravels + cobbles; slightly cohesive<br>0.5'-2.5' sandy silt; slightly moist; Brownish Red; angular gravels; No cohesion |
| 2 | | | 71-SB-A + 71-SB-AD<br>time: 1025 + 1030<br>DUP PID: 0.0 ppm<br>HAS PID: 0.8 ppm | | | | | 2.5-3.5 silt; dry; med Brown; No cohesion; fairly consolidated |
| 4 | | | | | | | | 3.0-3.5 same as above but w/ subrounded 1"-2" gravels<br>3.5-4.4 coarse sand w/ gravels; med Brown; No cohesion; unconsolidated; subrounded gravels<br>4.4 Refusal due to sluffing |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/3/13 PROJECT NAME & NO: Yale oil

WELL ID: 71 AK RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-4' Previously Recorded |
| | | not sampled | | | | | | 4'-6.5' Sandy cobbles; moist; med Brown; subrounded to rounded; gravel to cobbles |
| 2 | | | | | | | | water @ 6.5' |
| | | | | | | | | 6.5'-8' Sand; wet; med Brown; well sorted; subrounded; some gravels |
| 4 | | 71-SB-D HA PID: 1.0 ~~Time: 1345~~ | | | | | not submitted used 71-SB-A on 5/30/13 PIDs essentially same | |
| 6 | | 71-SB-B HA PID: 1.3 Time: 1405 | | | | | | |
| 8 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/28/13 PROJECT NAME & NO: Yale oil

WELL ID: 71 geo probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| | | | | | | | | 8'-11.5' sandy gravel, wet, med brown, sand to sub-round |
| 2 | | | | | | | | |
| | | Previously sampled | | | | | | |
| 4 | | | | | | | | |
| 6 | | | PY @ 6.2 | | | | | |
| 8 | | | | | | | | |
| | | 71-58-C HHRID: Time: 1330 | | | | | | Note! While probing smell rotting flesh when sampled was collected noticed Hair in sample [redacted] |
| 10 | | | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 5/29/13 PROJECT NAME & NO: Yale Oil

WELL ID: 72 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Not sampled | | | | | | 0'-1' gravelly sand w/silt; moist; Black; no cohesion; (Road fill) |
| | | | | | | | | 1'-5' sandy silt; moist; light Brown; no cohesion; |
| 2 | | 72-SB-H DH PID: 0.0 ppm HH PID: 2.5 ppm Time: 09.50 | | | | | | 5'-6' silty clay; V. Moist; light Brown; moderate cohesion; |
| 4 | | 72-SB-A DH PID: 0.0 ppm HH PID 5.7 ppm Time: 1010 | | | Sampled | | water @ 6.5 | 6'-9.5 silty sand; wet; light Brown slight cohesion; |
| 6 | | 72-SB-B DH PID: 0.0 ppm HH PID: 2.5 Time: 1020 | | | Sampled | | | |
| 7.5 | | 72-SB-C DH PID: 0.0 ppm HH PID: 6.0 Time: 1050 | | | Sampled | | | |
| 9.5 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 73 RECORDED BY: LMS 5/22/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0' dry, sandy grvl, concrete, ~~bricks~~ bricks, backfill rubble |
| | | | | 2' | | | 7353-A @ 11:35 2'-3.7' | |
| | | DH PID | HMS 3.5 | ppm | 32' | | | REFUSAL @ 3.2' |
| | | | | 4' | | | | |
| | | DH PID | HMS | | | | | |
| | | | | 6' | | | | |
| | | DH PID | HMS | | | | | |
| | | | 8 | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date 6/28/13 PROJECT NAME & NO: Yale oil

WELL ID: 73 geoprobe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| 2 | | | | | | | | 8'-10.5 sand; wet; Black; odor + stain; some gravels |
| 4 | | Previously sampled | | | | | | |
| 6 | | | | | | | | |
| | | Water @ 5.0 | | | | | | |
| 8 | | 73-SB-C HHRP Time: 1430 | | | | | | |
| 10 | | | | | | | | |
| 10.5 | | Refusal @ 10.5 | | | | | | |
| 12 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 8/12/13 PROJECT NAME & NO: Yale oil

WELL ID: 73-SB-B RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0' – 7.5' previously logged |
| 2 | | | | | | | | 7.5' – 8.5 silty gravel; wet; Dk gray to Black; sheen + slight odor |
| 4 | | Previously Sampled | | | | | | |
| 6 | | | | | | | | |
| 7.5 | | 73-SB-B Time: 09:30 HH PID: 36.2 ppm | | | | | | |
| 8 | | | | | | | | |
| 8.5 | | | | | | | | |

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# WELL LOG

5/22/13 Page ___ of ___

PROJECT INFORMATION:

CLIENT: EXXon PROJECT NAME & NO: Yale

WELL ID: Grid 74 Cntr RECORDED BY: CJ.

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Offset 25' south to avoid Building concrete | | | | | 0-2 | Back fill, cobbles (up to 8"), gravels, Silty sand. No odor moderate moisture |
| 2 | | DA PID: 0.0<br>HH PID: 3.0<br>Sample @1500 | (A) Sample | | | | 2-4 | Concrete pieces (up to 8") cobbles (up to 8") 50% gravels Silty sand (Tan/Brown) moist @ 3.5' No odor |
| 4 | | Duplicate Collected<br>74-SB-AD<br>Refusal @ 4' | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~: 8/1/13 PROJECT NAME & NO: York Oil

WELL ID: 74 ~~Geo probe~~ RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-4' previously sampled |
| | | | | | | | | 4'-8' lost Alk log |
| 2 | | previously sampled | | | | | | 8'-11.5 sandy gravel; wet; Dk gray; stain and odor. |
| 4 | | | | | | | water @ 5.7 | |
| 6 | | lost Alk log | | NO | B sample taken | | | |
| 8 | | | | | | | | |
| | | 74-SB-C | | | | | | |
| 10 | | Time: 1330 | | | | | | |
| | | HA PID 207.4 | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: 8/12/15 PROJECT NAME & NO: Yale Oil

WELL ID: 74 AK (round 2) RECORDED BY: JPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Previously dug & sampled | | | | | | |
| 4.5 | | | | | | | | |
| 5.0 | | | 74-SB-B | Time: 11:10 | HNPID: 3.4 ppm | | Water @ 5.0' | 74-SB-B Exceptionally Rocky. Many artificial concrete chunks present through out boring Very limited amounts of fines → No stain. No odor. |
| 6.0 | | | | | | | | |
| | | | YOS D-1308 | Time: 1320 | | 106 | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 75 RECORDED BY: Lm

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Hole offset 12.5 w Beam point |
| | | | | | | | | 0-2' gravel, chips to 8", concrete, rubble |
| | | 2 | | | | | | |
| | | 1445 | 2 | 13:55 | | | 75-SB-A 2-4' @ 13:55 | 2'-4' native soil @ 2.0' ? Med brown turns damp @ 2.5' strong odor @ 4.0 |
| | | 1.0 | | | DH PID | Ø | | |
| | | 4 | | | | | | |
| | | 1445 | | 1455 | | | 75-SB-B 4'-5.7' @ 14:55 | 4-5.7 coarse sand gravel - mostly ~~water~~ water, rock |
| | | 1.0 | 5-7 | | DH PID | Ø | | |
| | | | | | | | Refusal at 5.7' | 5-7 - Refusal |
| | | 1445 | | | | | | |
| | | | | | | | | TD @ 5.7 |
| | | 8 | | | | | | |
| | | | | | | | | Samples are mostly water w/ some silt/sand & pebbles |
| | | | | | | | | no odor or black color & no PHC ?? |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/4/13 PROJECT NAME & NO: Valdez

WELL ID: 75 AK RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-4' previously logged |
| | | | | | | | | 4'-5' Rubble; chunks of concrete, silt, sands + Rock |
| 2 | | not sampled | | | | | | |
| | | | | | | | | 5'-6' sandy gravel, wet; Dk gray; subrounded; slight stain today |
| 4 | | 75-SB-B HH PID: 6.5 ppm Time: 1330 | | | Provionsly Submitted 5/22/13 | | water @ 5.5 | |
| | | | | | | | | 6'-8' gravel; wet; subrounded to rounded; ~ 2% sand; |
| 6 | | not able to sampled due to lack of soil | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date: 7/1/15 PROJECT NAME & NO: Yacke oil

WELL ID: 7.5 Geo probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| | | | | | | | | 8'-12 Sandy gravel; wet; Dk gray; subrounded; slight odor |
| 2 | | | | | | | | |
| | | Previously Sampled | | | | | | |
| 4 | | | | | | | | |
| 6 | | | | | | | | |
| | | Dry @ 3.7' | | | | | | |
| 8 | | | | | | | | |
| | | 7.5-SB-C HNU PID = 37.1 Time: 1105 | | | | | | |
| 10 | | | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION: 5/27/13

CLIENT: Yale PROJECT NAME & NO: ____

WELL ID: 76 Grid Center RECORDED BY: GM

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | 20' | SE | of center | | | Vegetation Scattered debris | Dry gravelly loam brown |
| 2 | | | 76-SB-A | 935 | | | DH PID ∅ HH PID 2.5 | Slightly moist dk brown Sandy silt some gravel 3.3 moist dk brown Clayey loam no odor or stain |
| 4 | | | 76-SB-B | 950 | | | DH PID 0.4 HH PID 6.3 Water table at 5.3' | 3.8 dk brown to black same 4.2 brown moist no odor no stain Clayey sandy loam 5.0 very moist same |
| 6 | | | 76-SB-C | 1010 | | | DH PID 0.3 HH PID 4.8 | Very moist brown fine sand no odor or stain 7.1 gravelly sand |
| 7.4 | | | | | | | | 7.4 refusal gravel |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: ___ PROJECT NAME & NO: ___

WELL ID: 77 CNTR RECORDED BY: LMJ 5/24/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-3.5' rubble, concrete +/- gravel |
| | | HHS | 2 DH DID | 77 SB-A @ 11:55 | | | | 3.5'-4.5 dmp dk brn silty clay +/- sand |
| 11:55 | | 1:5 | 0 | | | | | |
| | | | 4 | 77 SB-B @ 12:15 | | | | 4.5'-6.0' silty clay +/- pbls, dk brn, wet |
| 12:15 | | HHS | | | | | | water @ 4.5' |
| | | 1:9 | | | | | | |
| | | | 6 | | | | | |
| | | HHS | | | | | | 6.0' coarse gravel, can't advance hole - refusal |
| | | | 8 | | | | RINSATE SPLE YDSD-1305-108 14:00 5/24/13 | no apparent PHC stain or odor |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Pole: 6/5/13 PROJECT NAME & NO: Yuk oil

WELL ID: 77 AK RECORDED BY: TKS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | not sampled | | | | | | | 0'-6' Previously logged |
| 2 | Previously sampled | | | | | | | 6-8 Washed cobbles; wet; 2" - 8" in size; <1% fines |
| 4 | Previously sampled | | | | | | | |
| 6 | not able to sample due to lack of soil | | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/1/13 PROJECT NAME & NO: Yale oil

WELL ID: 77 Geo Probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| | | | | | | | | 8'-12' gravel w/ little sand; wet; dk gray; some stain; |
| 2 | | | | | | | | |
| | | | | | | | | 12'-16 sand w/ gravel; wet; dk gray; some stain; poorly sorted |
| 4 | | Previously Sampled | | | | | | |
| 6 | | | Water | @ 5.7' | | | | |
| 8 | | | | | | | | |
| 10 | | | 77-SB-C HH PID: 4.6 ppm Time: 11:20 | | | | | |
| 12 | | | | | | | Note: Poor recovery on first 4' push (8'-12') Had to push another 4' to obtain enough sample | |
| 14 | | | | | | | | |
| 15.5 | | | | | | | | |
| 16 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ DATE: 5/24/13 PROJECT NAME & NO: Yale Oil

WELL ID: 78 RECORDED BY: T. S.

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | not sampled | | | | | | 0'-1' Sandy loam w/ gravels + cobbles; moist; med Brown; No cohesion |
| | | | | | | | | 1'-4.8 sand silt; moist; ~~med~~ dk Brown; moderatly cohesive; strong modeling; |
| 2 | | 78-SB-A PID DH: 0.2 PID HH: 2.1 Time: 1150 | | | | | | |
| | | | | | | | | 4.8-5.5 Gravels; wet; dk Brown; No cohesion; sub round |
| 4 | | 78-SB-B RID DH: 5.8 PID HH: 1.4 Time: 1215 | | | | | | |
| 5.5 | | | | | | | | TD 5.5 Refusal |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: 6/5/13 PROJECT NAME & NO: Yale oil

WELL ID: 78 AK RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | not sampled | | | | | | 0'-6' Previously logged |
| 2 | | Previously sampled | | | | | | 6'-8 sandy gravel; wet; med Brown w/ Black flecks; subrounded to rounded; -- |
| 4 | | | | | | | | |
| 6 | | 78-SB-C HHPID: 0.3 Time: 0945 | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG

5/23/13

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 79 Grid Center RECORDED BY: GM

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Offset | | 22' South of center | | | Vegetation Organics 0-0.6' | Dk brown moist gravelly loam |
| 2 | | 79-SB-B | | 1105 | DH PID<br>HH PID | 0.2<br>4.1 | Water at 2.0' | Dk brown Very moist clayey loam No odor No stain<br>3.7 brown fine sandy Very moist Some red mottling |
| 4 | | 79-SB-C | | 1125 | DH PID<br>HH PID | 0.6<br>3.9 | | Very moist brown some black & reddish clayey fine sand no odor or stain |
| 6 | | | | | | | | |

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**Hydrometrics, Inc.**
Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: BO RECORDED BY: 5/23/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | 9.2 | | | 10:15 BO-SB-A | | A SAMPLE IS FROM 2'-2.5' WATER @ 2.5' | 0'-2' Silt w/clay, 10% small pebbles, dk brown, moist |
| | | 1445 | 2 DH21 PID | | | | | 2'-2.5' moist, lt brown sand HIT WATER @ 2.5' |
| | | 1470 | 2.19 | | BO-SB B | | BO-SB-B @ 2'-4' @ 10:00 | 2.5'-3.5': sandy gravel lt brown |
| | | | | | 10:00 | | | |
| | | 1445 | 3 DH 210 | | | | | 3.5'-3.9' Black PHC contaminated clay |
| | | 1260 1210 | 3.8 | | BO-SB C 10:45 | | BO-SB-C @ 10:45 4'-5.8' | 3.9'-5.8 Black, silt w/clay, strong PHC odor |
| | | ~~1445~~ | ~~DH PID~~ | | | | | 5.8' - Gravel - refusal |
| | | | 5.8 | | | | | REFUSAL @ 5.8' |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: Exxon Mobil — PROJECT NAME & NO: 11108.002 Yale Oil Soil Borings

WELL ID: 81 SB — RECORDED BY: LBrethauer — 5-14-2013

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0- | Silty SAND with cobbles and gravel |
| 1 | | | | | | | | SAND gravelly; fine-coarse sand, fine to coarse gravel dark brown, moist, gravel to >2", well rounded about 45%; poorly sorted |
| 2 | | | | | | | | 3 feet - hydrocarbon-coated black gravels and sand light odor slight sheen - interstitial HC - not enough to seep from particles - |
| 3 | | 1525 | (A) | | HHPID | 573ppm | | about 3.75 feet silty clayey lens about 2" thick - black saturated with HC - odor strong cobbles to 4 or 6" diameter some rock fragments; HC present in macropores & liquid - not free draining from soil - coating on particles refusal at 4 feet EOB |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |

offset 45' west of marker - otherwise in fill

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Vale PROJECT NAME & NO: 6-11-13

WELL ID: Grid CNTR 81 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | Continuing from hand digging Removed 5 gallon bucket (seals held) |
| | | | 81-SB-B | 1345 | | | 5-6 | 5" mixing cobbles and gravels wet @ 5' Black, stain & Odor silty Sand |
| | | | 81-SB-C | 1410 | | | 6-7 | 5" mixing cobbles & gravels Black, stain & Odor, w/ Sand |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 5/15/13

WELL ID: Grid CNTR 82 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 36' offset west | | | | Fill | Brown, Silt, Sl. Moist No Stain, No Odor |
| 2 | | | 82-SB-A 0835 | | | | OH 0.0 HH 5.1 | 2-2.5 Same As Above |
| 3 | | | 82-SB-AD 0836 | | | | | 2.5-3.5 Brown Sand, Sl. Moist No Stain No Odor |
| 4 | | | | | | | | 3.5-4 Brown, Sandy Gravel 4" Minus gravels, No Stain No Odor |
| | | | 82-SB-A | 0835 | | | OH 0.0 | 4-4.5 Same As Above |
| 5 | | | 82-SB-AD | 0836 | | | HH 7.9 | 4.5-4.9 Brown Sandy Gravel 1"-6" Gravels, No Stain No Odor, |
| 6 | | | | | | | | 4.9 + Could Not Advance |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Vale PROJECT NAME & NO: 6-11-13

WELL ID: 82-Grid CNTR RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Cont. from hand Digging |
| | | | 82-SB-B 1430 | | | | 5-6 | Wet @ 5' Lt Brown Sand, 5" minus cobbles w/ ½" + 1" gravels No Stain, No Odor, sl. Sheen |
| | | | 82-SB-C 1450 | | | | 6-7 | Wet, Black Stain & Odor 5" minus cobbles w/ 1" gravels & Sand |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date: 5/15/13 PROJECT NAME & NO:

WELL ID: 83 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Not Sampled | | | | | | Off set 12' East of wisker |
| | | | | | | | | 0-3.5 Sandy silt w/ gravel; slightly moist med Brown; more + larger subrounded gravels @ surface |
| 2 | | 83-SB-A Time: 0915 HH PID: 3.2 | | Sampled | | | | 3.5-3.9 Well sorted sand w/ gravels; moist; light tan to dark Brown; gravels w .25" to 1"; subrounded |
| 4 | | | | | | | | 3.9-4.2 silty sand w/ gravel; moist; med Brown; no cohesion; |
| | | | | | | | | TD = 4.2 |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: 6-11-13

WELL ID: 83 Grid CWTP RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| | | | | | | | | Wet @ 6' |
| | | | | 83-SB-B 1520 | | | 6—7 | Dk Brown 3" minus gravels & sand No Stain, No Odor |
| | | | | | | | 7-8 | 6" minus cobbles & gravels, Black Stain Odor Sand |
| | | | | 83-SB-C 1550 | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 5/15/18

WELL ID: Grand CNTR 84 RECORDED BY: GJB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 10' East | 0-1 6" mixed gravels Lt Brown, silty Sand No Stain No Odor DRY |
| 2 | | | | | | | | 1-2 Lt Brown Sand, Sl. Moist No Stain No Odor |
| | | | 84-SB-A 1015 | | | | DH 0.0 HH 5.9 | 2-4 ~~Brown~~ Sand, Sl. Moist ~~No Stain~~ No Odor ~~Slight~~ Stain |
| 3 | | | | | | | | |
| 4 | | | 84-SB-A 1105 | | | | DH 0.0 HH 23.6 | 4-4.5 cobbles, gravel Sand Sl. Moist No Stain No Odor |
| 5 | | | | | | | | 4.5f Could Not Advance |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/12/13 PROJECT NAME & NO: Yak Oil

WELL ID: 84 AK RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-4.5' Previously logged |
| | | | | | | | | 4.5'-8' Sandy gravels w/ cobbles, moist, 1/4 to DK Brown; poorly sorted sand; rounded to subrounded gravels + cobbles ~20% fines |
| 2 | | Previously logged | | | | | | |
| 4 | | | | | | | | |
| 4.5 | | | | | | | | |
| | | | | | | | water @ 7.5' | |
| 6 | | | | | | | | |
| 7.5 | | 84-SB-B | | | | | | |
| 8 | | 44 PID: 2.1 ppm | | | | | | |
| 8.5 | | Time: 1030 | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Date 8/9 PROJECT NAME & NO: Yale Oil

WELL ID: 84 Geo probe RECORDED BY: APS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0' | | Previously Sampled Previously Cleared | | | | | | |
| 7' | | | | | | | Hole initially dry at 7'. | |
| 5'ft | | | | | | | | |
| 8' | | | | | | | | |
| | | Not Sample | | | | | Water at 10.5' | |
| | | 10.5 | | | | | | 84-SB-C (10.5-15.5') water level dropped significantly to 10.5' |
| 10.5 | | 84-SB-C 9:10 HHPID: 2.1 | | | | | | Sandy gravel. Med-large cobbles. Loose Sand. No stain. Odor |
| 15.5 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 5/15/13 PROJECT NAME & NO:

WELL ID: B5 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Not sampled | | | | | | Offset 8' to the west |
| | | | | | | | | 0-0.5' silt w/gravel; dry; med Brown No cohesion; some staining |
| 1 | | | | | | | | 0.5'-1.5 sandy silt; slightly moist; med Brown; No cohesion |
| | | B5-SB-A Time: 1150 HNPID: 238 | | | | | | 1.5-2 silty sand w/gravel; slightly moist olive gray; odor + stain; mild cohesion |
| 4 | | | | | | | | 2-3.5 gravelly sand; moist; Med dark Brown; some fine ~5%; gravel clasts 0.25" to 5"; stain + odor |
| | | | | | | | | TD 3.5 Refusal |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Pete 6/12/13 PROJECT NAME & NO: Yale 0.1

WELL ID: 8.5 AK RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | Previously sampled | | | | | | | 0'-3.5' Previously Recorded |
| 2 | | | | | | | | 3.5'-7.5 Sandy gravels w/ cobbles; wet to moist; Dk gray; slight odor + stain; rounded to sub rounded; |
| 3.5 | | | | | | | | |
| 4 | | | | | | | water @ 5.5 | |
| 5.5 | 86-SB-B HH PID: 6.7 ppm Time: 1420 | | | | | | | |
| 6 | | | | | | | | |
| 6.5 | 86-SB-C HH PID: 3.7 ppm Time: 1040 | | | | | | | |
| 7.5 | | | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Duke: _____ PROJECT NAME & NO: _____

WELL ID: 86 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Not Sampled | | | | | | Off set 18.5' East |
| | | | | | | | | 0'-3.2 silty sand w/cobbles; med Brown; slightly moist; subrounded; cobble size 4" to 12"; unconsolidated |
| 2 | | 86-S3-A Time: 1450 HH PID: 0.6 | | Sampled | | | | |
| | | | | | | | | TD 3.2 |
| 4 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date 6/12/13 PROJECT NAME & NO: Yale Oil

WELL ID: 86 AK RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-3.2' Previously logged |
| 2 | | Previously sampled | | | | | | |
| 3.2 | | | | | | | | |
| 4 | | | | | | | | 5.5-6.5 - Water @ 5.5' silty sand & many small-medium cobbles no odor or sheen |
| 5.5 | | 86-5B-B | | | | | | |
| 6 | | HH PID 1.0 ppm Time: 1550 | | | | | | |
| 6.5 | | 86-6BG MC/PID time: 16:05 | | 0.8 ppm | | | | 6.5-7 - Silty Sand light-brown, Small cobbles No odor or sheen |
| 7.5 | | | | | | | | |
| 8 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 5/28/13 PROJECT NAME & NO: Yale 0.1

WELL ID: 87 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Not Sampled | | | | | | 0'-0.5' sandy loam; moist; dk Brown; lots of organics; not cohesive |
| | | | | | | | | 0.5'-3.0' silty sand; slightly moist; lt Brown; not cohesive; some white calcium specks; |
| 2 | | 87-SB-A | | | Sampled | | | 3.0'-3.8' clayic silt; slightly moist; med Brown; orange mottling; slightly cohesive |
| | | ~~DH~~ PID: 1.9 ppm; ~~DH~~ PID: N/A; Time: 1055 | | | | | | |
| 4 | | 87-SB-B | | | Sampled | | | 3.8'-4.5' sand; slightly moist; med olive Brown; not cohesive; some silt |
| | | HH PID: 2.7 ppm; DH PID: N/A; Time: 1115 | | | | | | |
| 6 | | | | | | | | 4.5'-5.5' sandy silt; v. moist; olive Brown; mild cohesive; orange mottling; |
| 6.5 | | 87-SB-C | | | Sampled | | | 5.5'-~~6.5~~ 6.5' sand; ~~v. moist~~ wet; med Brown; no cohesion; sand grains are subrounded; some orange mottling |
| | | HH: 1.0 ppm; Time: 1140 | | | | | | Water @ 5.5 |
| 7.2 | | | | | | | | 6.5'-7.2' gravelly sand; wet med Brown; no cohesion; rounded to subrounded; gravel size .25" to 1" |
| | | | | | | | | TD = 7.2' |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 5/24/13 PROJECT NAME & NO: Yale Oil

WELL ID: 88 RECORDED BY: TF + J.S. Joe Schmechel

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Not sampled | | | | | | 0'- silt; med. Brown; moist; slightly cohesive |
| 2 | | 88-SB-A + 88-SB-AD<br>DH PID: 0.0<br>HH PID: 1.7<br>Time: 14:50 | | (A) | | | | 2.5 orange staining |
| 3.6 | | | | | | | | 3.6 - Increased moisture fine grained silty sand |
| 3.8 | | | | | | | | 3.8 - water table & gravel |
| 4.2 | | 88SB-B<br>DH PID 0.0<br>HH PID 2.3<br>time 15:20 | | | | | | 4.2 - refusal for large cobble |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date 6/3/13 PROJECT NAME & NO: Yale 01

WELL ID: 88 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0-4 Previously Recorded |
| | | not sampled | | | | | | 4-5.5' sandy gravels; wet; med Brown; subround to rounded; |
| 2 | | | | | | | water @ 4.5' | |
| | | | | | | | | 5.5-8 cobbels; wet; w/ 2"-1' cobbels; subround to rounded |
| 4 | | 88-SB-B HH PID: 0.7ppm Time: 15:30 | | | previously submitted on 5/24/13 | | | |
| 6 | | not able to sampled due to lack of soil | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/2/13 PROJECT NAME & NO: Yale O.I

WELL ID: 88 geo probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously Recorded |
| 2 | | | | | | | | 8'-11.5' sandy gravel, wet; med Brown; subrounded; no stain or odor |
| 4 | | Previously sampled | | | | | | |
| 6 | | ~~Bail @ 2-3'~~ water @ 4.6 | | | | | | |
| 8 | | 88-3B-C PH PID: 8.1 Time: 0735 | | | | | | |
| 10 | | | | | | | | |
| 11.5 | | | | | | | | |
| 12 | | | | | | | | |

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# WELL LOG

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PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 80 CMTR RECORDED BY: LMG 5/24/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0' – Dsilty fn grnd snd w/10% cbb up to 6"; dk brn, dmp |
| | | | | | | | | 2.0' – As grvl & silty snd, becoming moist at 3.00'; water in hole @ 3.7' |
| | | | 2 | | | | | |
| | | HB | | BH PID | 80 BB A: 10:15 | | | |
| | | 0.5 | | | | | | 4.3 – 5.7' lt brn, wet snd w/cly |
| | | | | 0.0 | | | | 5.7 – sndy grvl: can't advance hole past grvl |
| | | | 4 | | | | | |
| | | HB | | DH PID | 80 SB B | 4–5.9' | | |
| | | 1.7 | | 0.0 | 10:50 | | | – Refusal @ 5.9' |
| | | | 6 | | | | | |
| | | HB | | DH PID | | | | Duplicate samples by RT |
| | | | | | | | No apparent staining or odor | |
| | | | 8 | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date 6/4/13 PROJECT NAME & NO: Yale oil

WELL ID: 89 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-4' previously Recorded |
| 2 | | not sampled | | | | | | 4'-6' silty sand w/ gravels; v. moist to wet; Dk Brown; mild cohesion; stones up to 2" in diameter; subrounded; water @ 4.5' |
| 4 | | 89-SB-B HH PID: ~~7.7 ppm~~ Time: ~~0920~~ | | | Previously Submitted 5/24/13 | | | 6'-8' Cobbles; wet; subrounded to rounded; 2" to 12" in diameter |
| 6 | | no able to sample due to large cobbles not enough soil | | | | | | |
| 8 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 7/1/13 PROJECT NAME & NO: Yale Oil

WELL ID: 89 geo probe RECORDED BY: TPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| | | | | | | | | 8'-11' Sand (w/ gravel) wet pea gravel, (subrounded) mod Brown w/ Black flecks) no stain or odor |
| 2 | | | | | | | | |
| | | | | | | | | 11'-11.5 gravel to cobbles) wet very little soil; no stain or odor |
| 4 | | Previously sampled | | | | | | |
| 6 | | | water | @ 4.40 | | | | |
| 8 | | | | | | | | |
| 10 | | | 89-S8-C HH PID: 5.7 ppm Time: 1240 | | | | | |
| 11.5 | | | | | | | | |
| 12 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 5/24/13 PROJECT NAME & NO: Yale oil

WELL ID: 90 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | not sampled | | | | | | 0'-3.5' sandy loam w/gravel; moist; med Brown; subrounded gravels; some organics; some orange modeling |
| 2 | | 90-SB-A<br>PID DH: 0.0<br>PID HH: 2.3<br>Time: 1000 | | | | | | 3.5'-5.3' sandy silt; V. Moist; med Brown w/some orange modeling; moderately cohesive |
| 4 | | 90-SB-B<br>PID DH: 0.0<br>PID HH: 2.3<br>Time: 1075 | | | | | | 5.3'-5.8' Gravel, wet; med Brown; rounded to subrounded; .75 inch to 2" clasts |
| 6 | | 90-SB-C<br>PID DH: 0.1<br>PID HH: 0.6<br>Time: 1100 | | | | | | 5.8'-7.0' coarse sand w/gravels; wet; med Brown; subrounded |
| 7 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date 6/4/13 PROJECT NAME & NO: Yale O.I

WELL ID: 90 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-4' Previously logged |
| | | not sampled | | | | | | 4'-8 silty sand w/ Pea gravel; med Brown; wet; rounded to well rounded; |
| 2 | | | | | | | | water @ 4.5 |
| 4 | | 90-SB-B | | | | | | |
| | | ~~HH PID: 1.3~~ Time: 1025 | | Previously Submitted 5/24/13 | | | | |
| 6 | | 90-SB-C | | | | | | |
| | | ~~HH PID: 3.3~~ Time: 1040 | | Previously Submitted 5/24/13 | | | | |
| 8 | | | | | | | | |

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# WELL LOG

5/23/13

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 91 Grid Center RECORDED BY: GM

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | ~~1345~~ | | | Vegetation<br>Organics 0-0.9' | Dk brown loam slightly moist<br>1.0 Brown silt loam slightly moist some cobbles |
| 2 | | | | 1345 | | DH | PID Ø | Grey clay and orangish horizons |
| | | | | | | HH | PID 2.0 | 2.0-2.7 same as above |
| 4.6<br>4.2 | | | | — | | DH | PID Ø<br>no HHS | 2.7-4.0 brown sandy silt slightly moist no stain or odor<br>4.0-4.2 gravelly fine sand slightly moist<br>Refusal at 4.2<br>Not enough material to sample |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/4/13 PROJECT NAME & NO: Yak oil

WELL ID: 91 AK RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0-4' Previously Recorded |
| | | not sampled | | | | | | 4'-6' sand w/gravel; wet; med Brown; subrounded to rounded |
| 2 | | | | | | | water @ 5' | 6'-8' gravel; wet; subrounded to rounded, ~5% sand |
| 4 | | 91-SB-8 | | | | | | |
| | | HH PID: 1.7 | | | | | | |
| | | Time: 1110 | | | | | | |
| 6 | | Not sampled due to lack of soil | | | | | | |
| 8 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:
~~CLIENT~~ Date: 7/1/13 PROJECT NAME & NO: Vale oil
WELL ID: 91 geo probe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously logged |
| 2 | | | | | | | | 8'-14.5' gravelly sand, wet Pk Brown w/ Black specks; slight odor; poorly sorted |
| 4 | | Previously sampled | | | | | | |
| 6 | | | water @ | | 6.0' | | | |
| 8 | | | | | | | | |
| 10 | | | 91-SB-C HH PID: 20.2 Time: 1340 | | | | | |
| 12 | | | | | | | Note: poor recover Had to make 2 pushes to 12' and 1 push to 14.5' | |
| 14 | | | | | | | | |
| 14.5 | | | | | | | | |

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# WELL LOG

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PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 92 RECORDED BY: 5/23/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-0.5' dk brown silt loosely damp |
| | | | 2 | | | | | 0.5'-2.8' lt tan fn grnd sand w/ silt, dry |
| | | | | | | | 92-SB-1 @ 13:00 | |
| | | HLS | | | | | 2'-2-3.1' | 2.8'- grvl, sndy, crs so 3": refusal @ 3.1' |
| | | 0.4 | | | | | | |
| | | | 3.1' | | | | | |
| | | | 4 | | | | | |
| | | | 6 | | | | | |
| | | | 8 | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date 6/4/13 PROJECT NAME & NO: Yale Oil

WELL ID: 92 AIC RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-4' Previously logged |
| | | not Sampled | | | | | | 4'-6' Sandy gravel; wet; med Brown; subrounded to rounded; w 40% Sand |
| 2 | | | | | | | water @ 5.0' | |
| 4 | | 92-SB-B | | | | | | 6'-8 gravels w/ cobbles; wet; subrounded to rounded; 2"-8" cobbles; |
| | | HH PID: 2.6 Time: 11:50 | | | | | | |
| 6 | | not Sampled due to lack of Soil | | | | | | |
| 8 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Pete: 7/1/13 PROJECT NAME & NO: Yale OT

WELL ID: 92 geo probe RECORDED BY: TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' Previously Sampled |
| | | | | | | | | 8'-10.5' ~~SS~~ gravelly sand; wet; Pk Brown to Pk gray; subrounded to rounded; poorly sorted; slight odor |
| 2 | | | | | | | | |
| 4 | | Previously Sampled | | | | | | |
| | | | | Water @ | 5.50' | | | |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| | | 92-SB-U HH PID: 1.1 Time: 1430 | | | | | | |
| 10 | | | | | | | | |
| 10.5 | | | | | | | | |
| 12 | | | | | | | | |

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# WELL LOG

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PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

~~WELL~~ ID: 093-SB 1/5/13 RECORDED BY: _____

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-1.9 - dry lt brown sand silt |
| | | | | | | | | 1.9-3.1' gr Aca, sndy chips to 4" |
| | | | | | | | 2' | |
| | | | | | | HH= 0.1 | 93-SB-A 12:10 | v coarse grvl, chips to tbl's very little sand, |
| | | | | | | | 3.1' | |
| | | | | | | | | can't get augers past 3.1', hole sloughing in |
| | | | | | | | | END HOLE @ 3.1' |

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# WELL LOG

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PROJECT INFORMATION:

~~CLIENT~~ Date: 6/5/13 PROJECT NAME & NO: Yale oil

WELL ID: 93 AK RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Not Sampled | | | | | | 0'-3.1' Previously logged |
| 2 | | Previously Sampled | | | | | | 3.1-8 Sandy gravel; moist to wet; med Brown; Subrounded to Rounded; Pea size to +2"; |
| 4 | | 93-SB-B HH PID: 3.5 ppm Time: 1515 | | | | | water @ 6.5' | |
| 6 6.5 | | 93-SB-C HH PID: 1.3 ppm Time: 1530 | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 94 RECORDED BY: [illegible] 5/24/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-0.5, dk brn silty sand<br>0.5-4.0 dry dkn to lt brn sand w/gravel |
| | | | 2 | | | | | 4.0-4.4 gravel, loose, hole caving, cons difficult, hole = refusal @ 4.4' |
| | | HAS | | | | | | |
| | | 0.8 ppm | PH P10 0.0 | 9:15 | 94 75 A 2.0-4.0' 5/24/13 | | | |
| | | 4 HAS | 0.0 P10 | | | | | |
| | | | 4.4 | | | | | |
| | | HAS | 6 | | | | | |
| | | | 8 | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/5/13 PROJECT NAME & NO: Yale oil

WELL ID: 94 A/C RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | not sampled | | | | | | 0'-4.4' Previously Recorded |
| 2 | | Previously sampled | | | | | water @ 5.5 | 4.4'-5.5' sandy gravel, ~~[illegible]~~, V.moist, Med Brown, subrounded to rounded; |
| 4 | | 94-SB-B HH PID: 3.4ppm Time: 1030 | | | | | | 5.5'-8' poorly sorted Sand, wet, Med Brown to Dk Brown, some gravels, Slight sheen on water |
| 6 | | 94-SB-C HH PID: 2.2ppm Time: 1045 | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG

5/23/13

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 95 Grid Center RECORDED BY: GM

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Offset | | 34' NE center | | | Vegetation<br>Organics 0-0.8 | 0-0.8 dk brown silt loam slightly moist<br>Orange horizon @ 0.8<br>0.8-2 ~~light~~ brown fine sand very slightly moist to few gravels ~~& cement rubble~~ |
| 2 | | | | 1530 | | | DH PID Ø<br>HH PID 4.2 | 2-2.7 fine sandy silt brown dry no odor or stain<br>2.7-4 same as above but slightly moist, some gravel light brown to brown |
| 4 | | 95-SB-A | | 1545 | | | DH PID Ø<br>HH PID 4.7 | 4-5.8 brown fine sandy silt slightly moist no odor or stain orange horizon @ 4.9<br>5.8 moist gray-black clay slight odor |
| 6 | | 95-SB-B | | 1605 | | | DH PID 0.9<br>HH PID 4.2<br>Water @ 6.8' | dk brown to black silty clay some gravel moist slight odor & stain<br>6.8-8.0 very moist dk brown to black gravelly sandy clay<br>Refusal at 8.0 sloughing gravel |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: 6/5/13 PROJECT NAME & NO: Yale oil

WELL ID: ~~EE~~ 95 AK RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Air knifed down to 8' |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Pete: 7/1/13 PROJECT NAME & NO: Yale oil

WELL ID: 95 see profile RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously logged |
| | | | | | | | | 8'-11' sandy gravel; wet; Dk Brown; subrounded to Rounded; no strong odor. |
| 2 | | | | | | | | |
| 4 | | Previously Sampled | | | | | | |
| 6 | | water @ 5.30' | | | | | | |
| 8 | | 95.58'C HH PID 21.1 Time: 1510 | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 96 RECORDED BY: 5/23/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Didn't find survey marker measured half way between SE qu; NW qu; put hole on line w/ 97; 80 |
| | | | | | | | | 0'-2' tan to lt gray fn grained sand, dry |
| | | | 2 | | | | 96-SB-A | |
| | | 11/15 | D1 PID | | | | 2.0-2.6' | 2'-2.6 gravel; very loose, hole keeps caving, |
| | | 1.1 | | 2.6 | | | 15:15 | Can't stone hole. no odor or stain |
| | | | | | | | | Refusal - 2.6' |
| | | | 4 | | | | | |
| | | 11/15 | D1 PID | | | | | |
| | | | 6 | | | | | |
| | | 11/15 | | | | | | |
| | | 8 | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT:~~ Date: 6/5/13 PROJECT NAME & NO: Yale Oil

WELL ID: 96 A R RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-2.5' Previously logged |
| | | Not sampled | | | | | | 2.5'-4.5' large cobbles; v. moist; ~40% sand + gravels; subrounded |
| 2 | | Previously sampled | | | | | | |
| | | | | | | | water @ 4.5' | 4.5'-8' sandy gravel; wet; ~30% sand; rounded & subrounded; med Brown |
| 4 | | 96-SB-B HH PID: 0.7 ppm Time: 1245 | | | | | | |
| 6 | | 96-SB-C HH PID: 14.3 ppm Time: 1300 | | | | | | |
| 8 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 5/14/13 PROJECT NAME & NO:

WELL ID: 97 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | 0-2 | not | sampled | | | | Off set hole 15' East to avoid power line<br>0-4 gravel, sand; v. slight moist; Med Brown; gravels subrounded No cohesion; ~ 15% fines (silt) drown 0'-2' leaving after 2'; rock size between .5" to 6" Becomes slightmoist at ~ 2" |
| | | 2-4 | 97-5B-A | Time: 1610 | HNPID: 8.6ppm | | | |

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# WELL LOG

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PROJECT INFORMATION:

CLIENT: Yale Oil PROJECT NAME & NO: 6-10-13

WELL ID: Grid CNTR 97 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Continuing w/ Vac Truck | Air Knife from 3' BGS |
| 3 | | | | | | | 3-4 | 4" minus cobbles & gravels Lt Brown sandy silt, No Stain, No odor Moist |
| 4 | | | 97-SB-B | | (4-6) | | 4-6 | 5" minus cobbles & gravels Brown, sand, No Stain Wet No Odor & 5' slight Odor |
| 5 | | | 1050 97-SB-B(B) 1055 | | | | | |
| 6 | | | 97-SB-C 1115 | | | | 6-7 DH 4.2 VOC | 6" minus cobble flat rounded & gravels, sand, DK Brown Wet, No Stain, Odor |
| 7 | | | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: Yale Oil — PROJECT NAME & NO: 11108.002 Yale Oil Soil Boring

WELL ID: 98 SB — RECORDED BY: LBoettcher 5-14-2013

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0-3.4 | SAND dk olive brown fine-med gr, silty with gravel and cobbles moist<br>at 1 ft - out of gravel and cobbles<br>at 3 ft slight increasing silt, slight HC odor |
| 1 | | | | | | | 3.4-4 | SILT + sandy, dark olive brown, very moist, visible saturation on broken one iron stained, black (Mn?) gastropod shells |
| 2 | | | | | | | | |
| 3 | | 10:15 | | HHPID 1.2 ppm | | (A) | 4-4.3 | GRAVELLY SAND, dk brown, poorly sorted, fine sand to gravel >1 inch (multi-size, well rounded), moist<br>note: jarred VOH sample from interval @ 10:00 |
| 4 | | 10:40 | | HHPID 0 ppm | | | | 4.3 feet gravelly - refusal |

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# WELL LOG

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PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: 6-11-13

WELL ID: Grid 98 ONTR RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | Continued from Hand Digging... |
| 3.5 | | | 98-SB-B | 1035 | | | 3.5-4.5 | Wet silty 10%, sand 90% Lt Brown, No Stain, No Odor 3" minus gravels |
| 4.5 | | | 98-SB-C | 1045 | | | 4.5-5.5 | wet sandy gravels Lt Brown No Stain No Odor (Not as much sediment as gravels) |
| 5.5 | | | | | | | | Plugged w/ 3/8 Bentonite |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 5/14/13

WELL ID: Grid CNTR 99 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Offset 15' SW | 0-1.5 Gravel/Cobbles 8" Minus Olive brown, No Stain No Odor sl. Moist, Silty Sand |
| 2 | | | | | | | | 1.5-2 Gravel, Brown, Silty Sand, Odor No Stain |
| 3 | | | 99-SB-A 1020 | | | | DH 404 HH 2000+ DH 3% LEL | 2-3.5 Same as above w/ stain 3.5-4 Sand, DK Grey Stain & Odor, Moist |
| 4 | | | | | | | | |
| 5 | | | 99-SB-A 1035 | | | | DH 386 HH 1377 | 4-5 Same As Above 5-5.5 Silty Clay, Dark Grey wet; Stain & Odor 5.5 + Collected Not Advance |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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# WELL LOG

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PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: 6-11-13

WELL ID: Grid CNTR 99 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | Cont. fr a hand digg... |
| | | | | | | | 3.5 - 4 | DRY ~~Sandy silt~~ w/ Rootlets Lt Brn 3" minus gravels, No Stain or Odor |
| | | | | | | | 4 - 4.5 | Very Moist Gray silt, 3" minus gravels w/ Rootlets |
| | | | | | | | 5% LEL | Stain & Odor |
| | | | | | | | 4.5 - 5 | Same As Above |
| | | | | | | | 5 | wet, cont. to 5.5 (see hand digging) |
| | | | | 99-SB-B 1140 | | | 5.5 - 6.0 | Black wet stain Odor 10" minus cobble & gravels some sand 20%, mostly 1-2" gravels 80% |
| | | | | 99-SB-C 1200 | | | 6.0 - 7.0 | Black wet stain & Odor, 8" minus cobbles & gravels some sand 15%, mostly 1-2" gravels 65% |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: Exxon Mobil PROJECT NAME & NO: Soil Boring Yale Oil

WELL ID: 100 SB-A RECORDED BY: L Boettcher 5/15/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0-3 | Cobbles and gravel; 20% fine-coarse sand, medium brown moist; appears somewhat imbricated cobbles to 8" diameter up to 8 percent |
| 1 | | | | | | | | refusal at 3' EOB |
| 2 | | | 14:55 | | A | | HHPID 1.7 ppm | |
| 3 | | | | | | | | |

Original number offset 60 feet; offset of sample location 25 feet NW; total offset 85 feet NW.

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 6/12/13 PROJECT NAME & NO: Yale oil

WELL ID: 100 AL RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-3' Previously logged |
| 2 | | Previously sampled | | | | | | 3'-7.5' sandy gravels w/cobbles; moist; lt to Dk Brown; poorly sorted sand; n 20% Fines; rounded to subround gravels & cobbles |
| 3' | | | | | | | water @ 5.5' | |
| 4 | | | | | | | | |
| 5.5 | | 100-SB-B HH PID: 0.2 ppm Time: 0915 | | | | | | |
| 6 | | | | | | | | |
| 6.5 | | 100-SB-C 100-SB-C-D HH PID 1.3 ppm Time: 0935 | | | | | | |
| 7.5 | | Dup Time: 0940 | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

CLIENT: Exxon Mobil — PROJECT NAME & NO: Vale Oil Site Bmt/1

WELL ID: 101-SB — RECORDED BY: LBoettcher 5/15/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0 - 0.5 | Silty Sand, dry. |
| | | | | | | | 0.5 - 3 | Cobbles and gravel, 65% - 75% very coarse with fine - v coarse sand, poorly sorted 25 - 35% medium brown, moist, no odor noted. |
| 1 | | | | | | | | |
| 2 | | 16:20 | (A) | | | | HAPID 3.7 ppm | |
| 3 | | | | | | | | |

offset due south of ~~Southwest~~ Capture system well 11 feet; 27 feet due W of fenceline - between either side of access road

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date: 6/12/13 PROJECT NAME & NO: Yale Oil

WELL ID: 101 Ak RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Previously Sampled | | | | | | 0'-3'. Previously logged |
| 1 | | | | | | | | 3'-8.2' Sandy gravel w/cobbles; wet to moist; med Brown; poorly sorted sand; subrounded to Rounded cobbels |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 6.2 | | 101-SB-B HHPID: 0.9 ppm Time: 1355 | | | | | | |
| 7.2 | | 101-SB-C HHPID: 0.7 ppm Time: 1410 | | | | | | |
| 8 | | | | | | | | |
| 8.2 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date: 5/28/15 PROJECT NAME & NO: Yale

WELL ID: 102 RECORDED BY: SPS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | 0' | | | | | | | 0'-2' - unsampled<br>1.7' - Enter gravel layer<br>2.4 - Heavily cobbled medium to large stones unconsolidated.<br>3' - large cobbles<br>33' - td. |
| | 9' | 102-SB-A<br>time: 1455<br>DIP: 0.8 ppm<br>HHS: | | | Sampled | | | |
| | 3'<br>33' | | | | | | | |

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# WELL LOG

5/28/13 Page ___ of ___

PROJECT INFORMATION:
CLIENT: Exxon (AK) PROJECT NAME & NO: Yale
WELL ID: Grid 102 Cntr RECORDED BY: C.J

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0-3' | Cleared by Hand auger |
| 2 | | | (A) Sample | | | | 3'-4' | Unconsolidated sands/gravels/cobbles (Tan sand, 1/4"-2" G & C) No odor, moderate moisture |
| 3 | | | No Sample | | | | 4'-6' | Same as above, med. coarse Tan sand, 50% (1/4"-2") G & C moderate moisture, No odor |
| 8' | | | Hole Clear to 8' | | | | 6'-7' | Same as above |
| | | | | | | | 7'-8' | Water @ 7'. Cobbles. 1"-3" No Sand/Silt/gravels No odor. No Sample (No Soil/Sand/Silt to sample) |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yal PROJECT NAME & NO: 8/2/13

WELL ID: 102 Grid CNTR. RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Cont. Clearance Hole w/ Power Probe | DRY @ 5.7' Total Depth (Silt) |
| ~~5.8~~ | | | | | | | | |
| 8 | | | 102-SB-B 0910 | | HH: 5 | | | Sandy Gravel, Lt Brown, Wet No Stain, No Odor |
| ~~10~~ 11.5 | | | 102-SB-C 0920 | | HH: 5 | | | More Sand than Gravel, Lt Brown Wet, No Stain, No Odor Not enough for Heated Headspace |
| ~~14~~ 15 | | | | | | | | |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT~~ Date: 5/28/13 PROJECT NAME & NO: Yale O.T

WELL ID: 103 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | Not Sampled | | | | | | | 0'-0.8' Sandy loam; dk Brown; moist; lots of organics; Not cohesive |
| | | | | | | | | 0.8'-1.8' silt; slightly moist; lt Brown; not cohesive; |
| 2 | | HTD 103-AB-A Hits: 1.0 time: 13:30 | | Sampled | | | | 1.8'- Sandy silt w/ gravels; slightly moist; lt Brown; not cohesive; Subround clasts; clast size 1/8" to 4" |
| 3 | | | | | | | | 1.8'-3' unconsolidated sand & gravel, w/ medium to large assorted cobbles |
| | | | | | | | | 3' - Continuous Shutin |

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# WELL LOG

5/28/13

Page ___ of ___

PROJECT INFORMATION:

CLIENT: EXXon (AK) PROJECT NAME & NO: Yale

WELL ID: Grid 103 cntr RECORDED BY: CJ

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0-3' | Cleared by Hand auger |
| 2 | | (A) Sample (Hand auger) | | | | | 3'-7' | unconsolidated Sand & gravels/ cobbles. (97% G. & C. 1/4"-2") Tan Sand, round cobbles Water @ 7' No odor |
| 3 | | | | | | | | |
| 7 | | | | | | | 7.0-8.0 | Same as above w/ water saturation. Material unsuitable for sample. No sample collected (insufficent amount of sand/soil to collect) |
| 8 | | Hole clear to 8 | | | | | | Note: excessive staging at site |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: 8/2/13

WELL ID: 103 Grid CNTR RECORDED BY: GB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Cont. Clearance Hole | DRY 0 6.0' |
| 6 | | | 103-SB-B 1000 | | HH: 5.7 | | 8-11.5 | Silty Sand, Brown, Wet gravel, No Stain, No Odor |
| 11.5 | | | 103-SB-C 1010 | | HH: 4.3 | | 11.5-15 | Sandy gravel, Brown wet, No Stain, No Odor |
| 14 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

~~WELL~~ ID: SITE 104 RECORDED BY: LMT

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-1.5 silty sand |
| | | | | | | | | 1.5'-2' sandy gravel; cbls to 3" |
| | | | | | | | 2' | |
| 2 | | | PID 0.1 | 10:40 | | | 104-SB-A 10:40 5/3/13 | 2'-4' sndy grvl, dry, cbls to 3" |
| | | | | | | | 3.5' | Increasing sand @ 3.25' |
| 4 | | | | | | | | HOLE CAVING, CANT GET PAST 3.5'. TOOK 'A' SAMPLE @ 2'-3.5' |

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# WELL LOG



PROJECT INFORMATION:

~~CLIENT:~~ Date: 6/5/13 PROJECT NAME & NO: Yale Oil

WELL ID: 104 Ak RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | Not Sampled | | | | | | 0'- 3.5' Previously Recovered |
| | | | | | | | | 3.5- 8 sandy gravel, moist to wet, med Brown subrounded |
| 2 | | previously sampled | | | | | | |
| 4 | | | 104-SB-B HH PID: 0.7 ppm Time: 1430 | | | | water @ 5.5 | |
| 6 6.5 | | | 104-SB-C HH PID: 1.4 ppm Time: 1445 | | | | | |
| 8 | | | | | | | | |

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# WELL LOG

5/3/13

Page 1 of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: 105 Center RECORDED BY: B. Maddock

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | Grass<br>offset from Center 4' West | Silt w/ few gravels. Very Fine. Dry, tan. |
| 2 | | | | 1015 | | | 0.0 VOC down Hole<br>0.0 VOC HH | Silt w/ gravels. Very Fine. Dry, Tan<br>↓ increasingly more gravels up to 2" in size |
| 4 | | | | 1040 | | | 0.0 VOC down Hole<br>0.0 VOC HH<br>4.8' Gravel & Sand Cave in's, refusal due to Constant Sluffing & large gravels. | Sand w/gravels up to 2"+. Moist, Brown. 50% 50% |
| 6 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

~~CLIENT~~ Date: 6/5/13 PROJECT NAME & NO: Yale oil

WELL ID: 105 AK RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | not sampled | | | | | | 0'-4.8' Previously Recovered |
| | | | | | | | | 4.8-6' Sandy gravelly w/ cobbles; V. Moist; med Brown; subrounded |
| 2 | | Previously Sampled | | | | | water @ 6.5' | |
| | | | | | | | | 6'-8' Sand; wet; med Brown; some sm gravels; poorly sorted; |
| 4 | | Previously Sampled | | | | | | |
| 6 | | 105-SB-B HH PID: 0.5 ppm Time: 1340 | | | | | | |
| 8 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:
~~CLIENT~~ Date: 7/1/13 PROJECT NAME & NO: Yale oil
WELL ID: 105 geoprobe RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0'-8' previously logged |
| 2 | | | | | | | | 8'-10.5' sand; wet; med Brown; poorly sorted; no stain or odor |
| | | | | | | | | 10.5'-11 gravel w/ sand; wet med Brown; |
| 4 | | Previously sampled | | | | | | |
| 6 | | | PFY @ | 5' | | | | |
| 8 | | 105-SB-C HH PID 15.6 Time: 1555 | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 4/26/3

WELL ID: Grid CNTR 106 RECORDED BY: [illegible]

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 4' West of center | | | | Grass Cover Roots 0-3" | Sandy Silt, Olive Brown 3" Minus gravels, No Stain No Odor, Sl. Moist |
| 2 | | | 106-SB-A (2-4) | 0930 | | | Downhole VOC 0.0 Heated Headspace VOC 0.0 | Sandy Silt, Olive Brown Sl. Moist to very Moist 1" minus gravels No Stain, No Odor |
| 3 | | | | | | | | |
| 4 | | | 106-SB-B (4-6) | 1000 | | | Downhole VOC 0.0 Heated Headsp VOC 44.3 | Wet Sandy Silt Olive Brown, 1" Minus gravels No Stain, No Odor |
| 5 | | | | | | | | |
| 6 | | | 106-SB-C (6-8) | 1035 | | | Downhole VOC 0.0 (6-8) Heated Headspace VOC 2.1 | Wet Silty Sand, Olive Brown Minimal material w/ Stain Odor |
| 7 | | | | | | | | |
| | | | | | | | Grid Not Advanced | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: 4/26/13

WELL ID: V07 GRID CNTR RECORDED BY: J.B

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | Offset 2' from CNTR | | | Grass & Weed Cover | Slightly Moist, Silty Clay Olive Brown, No Stain, No Odor 4" Minus Gravels |
| 2 | | | 107 | -SB-A (2-4) 1120 | | | Downhole VOC 0.0 Heated Headspace VOC 0.0 | Moist to very Moist Silty Clay, Olive Brown 2" Minus gravels, No Stain or Odor |
| 3 | | | | | | | | |
| 4 | | | 107 | -SB-B (4-6) 1135 | | | Downhole VOC 0.0 Heated Headspace VOC 3.4 | 4-5 Very Moist, Olive Brown, 1" Minus gravel Silty Sand, No Stain or Odor 5-6 Wet, Olive Brown, 1" Minus gravel Silty Sand, No Stain or Odor |
| 5 | | | | | | | | |
| 6 | | | 107 | -SB-C (6-8) 1155 | | | Downhole VOC Heated Headspace VOC | 6-8 WET, Silty Sand Olive Brown w/ some Black wetland organic No Stain, No Odor 1"-2" ~~Minus~~ Gravels |
| 7 | | | | | | | | |
| 8 | | | | | | | Water in Hole | ~5' Below Ground Surface |
| 9 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

CLIENT: Yale Oil — PROJECT NAME & NO: 11108.002 Yale Oil Soil Borings

WELL ID: 105 SB — RECORDED BY: LBoettcher — 5-14-2013

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 0-.6 | Fill Cobbley Gravelly Sand, some silt |
| | | | | | | | 0.6-2.0 | SAND, silty fine to medium gr olive brown, some iron mottling occ gravel 1/2" poorly sorted, moist |
| 1 | | | | | | | 2-3 | 2' - increasing gravel content to 25 to 35% increasing silt GRAVELLY SAND |
| 2 | | | | | | | 3-3.9 | 3ft - SAND out of gravel silty sand, moist moderately to well sorted quartz grains moisture content higher than above |
| 3 | | | 11:50 | | HHPID | 0.0 ppm | (A) | 3.9 gravelly no HC odor apparent |
| | | | | | | | | refusal at 4 feet EOB |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |

Surveying stake 13 m pipeline - moved sampling location, 10 feet to north offset

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yak O.C/e PROJECT NAME & NO: 6-10-13

WELL ID: Grid CNTR 108 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | Metal EPH VPH / DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | ~~Well stuffed into~~ 6" BGS Temporary Bentonit Plug 6"-12" Continue W/ Air knife & Vac Truck after 3' | |
| 3' | | | | | | | 3-4 | Moist, silty sand, 4" mix gravel, No Stain, No odor |
| | | | 108? | | | | | |
| 4 | | | 102-SB-B | | | | 4-4.5 | Wet, Lt Brown silty sand, 3" mixed gravel |
| | | | 1205 | | | | 4.5-6 | No Stain, No Odor |
| 5 | | | | | | | DH 0.0 Vac | Wet Brown, sand 3" mixed gravel, No stain, No Odor |
| | | | 108? | | | | | |
| 6 | | | 102-SB-C 1430 | | | | 6-7 | Wet Brown sand 3" mixed gravel, No Stain, No Odor |
| 7 | | | | | | | | |
| 8 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: 5/14/13

WELL ID: Grid CWTR 109 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 15' North | offset | | | 1" | Brown Silty Sand Gravel & Cobbles, No Stain No Odor DRY |
| 2 | | | 109-SB-A | 1145 | | | DH 0.0<br>HH 4.2 | Brown Sandy Gravel 1"-3", No Stain, No Odor, Sl. Moist |
| 3 | | | | | | | | |
| 4 | | | 109-SB-A | 1225 | 20 ov | | DH 0.0<br>HH 7.3 | 4-5 Dark Brown Sandy Gravel 3" Mixing, Moist, No Stain, No Odor |
| 5 | | | | | | | | 5+ Could Not Advance |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

2 Rigs

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Val PROJECT NAME & NO: 6-10-13

WELL ID: Grid CUTR 109 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | 10' North of carts | | | | | Continued from previous hand digging using Air Knife / Vac Truck | |
| 3 | | | | | | | | |
| 4 | | | 109-SB-B | 1510 | | | 4-6 | Wet, 5" minus cobbles & gravels, Brown Sand No Stain No Odor |
| 5 | | | | | | | | |
| 6 | | | 109-SB-C No Sample | | | | ~~6-7~~ 6# | Hole filled to 5.5' BGS w/ water while waiting on Vac Truck drop. Wet 6" minus cobbles w/some pancake cobbles, El gravels wet Brown Sand, No Stain No Odor |
| 7 | | | | | | | | |
| 8 | | | | | | | | Hole sloughed to 5' Could not Advance due to sloughing |
| 9 | | | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: 6-11-13

WELL ID: Grid CNTR 109 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Moved 10' West of previous hole for 2nd sample |
| | | | 109-SB-C | | | | | water @ ~3.5-4.0 |
| | | | 1020 | | | | | Sampled @ 5' |
| | | | | | | | | Same as previous Hole |

# SUBSURFACE OPPORTUNITY SAMPLES

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Vale Oil PROJECT NAME & NO: ___

WELL ID: 1-ST-A RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | 1-ST-A | | | | | west Trench East End (+3) Station 193' | 0-2.2 Clayey Silt Lt Brown, DRY, 3" Minus gravels, No Stai No Odor |
| 1 | | 6-5-13 | | 1345 | | | | 2.2-3 Clayey Silt Black Stai & Odor Visible Product |
| 2 | | | | | | | | 3+ Bottom of Trench |
| 3 | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale Oil PROJECT NAME & NO: 6/7/13 1150

WELL ID: 2-ST-A RECORDED BY: John Bergin JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | East Trench Center upstream ~2' end of Abandoned YPL Pipeline |
| 1 | | | | | | | | |
| 2 | | | | | | | | -2 Hole started in Trench ~2' Deep |
| 3 | | | | | | | | 2.3.4' sandy silt, no stain, no odor, dry (1) grey; brown |
| 4 | | | | | | | | 3.4-4- dark grey, stain & odor, Sl. moist |
| | | | | | | | 3-4'- sampled - | 2-ST-A 1150 |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale Oil PROJECT NAME & NO: Interim Action Opportunity Sampling

WELL ID: 3-ST-A 3-ST-B RECORDED BY: KA 6/12/13

West End of East Trench

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 0-0.5 fill, dark brown |
| | | | | | | | | 0.5-2 - brown sandy gravel, roots |
| 2 | | | | | | | | 2-3 silty clay, brown |
| | | | | 3-ST-A | | | | |
| 3 | | | | | 10:26 | | | 3-4 gray silty clay stain odor wood debris few gravels |
| 4 | | | | | | | | |
| | | | | | | | | 4-6 silty clay. to sandy silt, stain, odor, gray wood debris |
| 6 | | | | | | | | 6-7.3 sandy silt, gray wood debris, stain odor (gas) |
| | | | | 3-ST-B | | | | |
| 7.3 | | | | | 10:56 | | | Refusal @ 7.3 |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale Oil PROJECT NAME & NO: Interim Action Opportunity Sampling

WELL ID: 4-ST-A RECORDED BY: KA 6/12/13

East End Separator Sump ~(10' E from end)

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | 1 | 0 | | | | | | 0-1 silt cobbles, brown<br>1-2 silt, cobbles to 8", gravels sheen odor,<br>2-4 silty clay wet @ ~3' w/ product - soft sediments 3½-4' odor, saturated sludge black |
| | | 2 | | | | | | |
| | | 3 | | 4-ST-A | | 12:20 | | |
| | | 4 | | | | | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale Oil PROJECT NAME & NO: Interim Action Opportunity Sample

WELL ID: 5-ST-A RECORDED BY: KA 6/12/13

N. Side (where crack in drop off between East Trench and Separator exists)

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | 0 - 1½' hard silty clay brown, musty odor |
| | | | | | | | | 1½'-3 silty clay, brown |
| | | | | | | | | 3-4 grey, silty clay |
| | 4 | | | 5-ST-A 13:33 | | | | 4 -5.2 stain odor black silty clay |
| | 5.2 | | | | | | | |

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# MONITORING WELL SURFACE SOIL SAMPLING FORMS

# SURFACE SOIL SAMPLING

Grid Number YMW-10

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-10-SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 4-18-13 | C | 4' West | No | Gravel | N/A | ~~Sandy~~ Silty/Sandy w/ 1' minus | gravel, OR Brown, Damp |
| Time 0930 | SW | | | | | | |
| | SE | | | | | | |
| YMW-10-SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date 4-18-13 | C | | No | | N/A | Silty Sand w/ gravel & cobbles | , OR Brown, DRY |
| Time 0935 | SW | | | | | | |
| | SE | | | | | | |
| YMW-10-SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date 4-18-13 | C | | No | | N/A | Silty Sand w/ gravel & cobbles | , ~~Dark~~ Light Brown, DRY |
| Time 0950 | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number YMW-11

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-11 -SS-A | NE | 4' North | ~~O~~ | loose gravel | | Gravelly silty clay, brown, sl. moist | green flakes, few |
| Date 4/18/13 | NW | | | | | | |
| Time 0935 | C | 4' North | | Loose | | | |
| | SW | | | Gravel | | | |
| | SE | | | | | | |
| YMW-11 -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date 4/18/13 | C | " | ~~O~~ | " | | Gravelly, silty clay | |
| Time 0945 | SW | | | | | Brown, slightly Moist | |
| | SE | | | | | | |
| YMW-11 -SS-C | NE | | ~~O~~ | | | Gravelly silty clay, brown, sl. moist to ~18" | |
| | NW | | | | | ~18-24" Dk. brown clay, sl. moist | |
| Date 4/18/13 | C | " | | " | | | |
| Time 0950 | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B.= 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number YMW-12

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-12-SS-A | NE | | | | | | |
| Date 4/11/13 | NW | | | | | | |
| Time 11:55 | C | 4' N | | | | Sandy silt, brown, some gravel | / Fill |
| | SW | | | | | | |
| | SE | | | | | | |
| YMW-12-SS-B | NE | | | | | | |
| Date 4/11/13 | NW | | | | | | |
| Time 1200 | C | an | odor/stain | | | Sandy silt, brown, pebbles, angular gravel, pieces of soft asphalt | |
| | SW | | | | | | |
| | SE | | | | | | |
| YMW-12-SS-C | NE | | | | | | |
| Date 4/11/13 | NW | an | odor/stain | | | 1-1½' sandy silt, brown pebbles/gravel | 1½-2' black clay stain odor |
| Time 12:05 | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number YMW-13

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-13 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 4/10/13 | C | SW .5' | NO | Grass/Fill | N/A | Sandy Clay w/some gravels | |
| Time 0930 | SW | | | | | Olive Brown | |
| | SE | | | | | Slightly Moist | |
| YMW-13 -SS-B | NE | | | | | | |
| | NW | | | | | Clayey Silt w/ Some Gravels | |
| Date 4/10/13 | C | SW 5' | No | | N/A | Olive Brown | |
| Time 0945 | SW | | | | | Slightly Moist | |
| | SE | | | | | | |
| YMW-13 -SS-C | NE | | | | | | |
| | NW | | | | | | Hard @ 1.5' |
| Date 4/10/13 | C | SW 5' | Stain/Odor | | 60 | Sandy Clay Gravel | Stain/Odor after 2.5' |
| Time 1010 | SW | | | | | Olive Brown | |
| | SE | | | | | Slightly Moist | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number YMW-14

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-14 -SS-A | NE | | | | | | |
| Date 4/9/13 | NW | 3" | | | | | |
| Time 1050 | C | 2' South | Stain/Odor | 3" Asphalt | HS | Sandy Gravely Silty dark gray | 3" or high water ~~some stain/odor~~ Moist, Slight Cohesive |
| | SW | | | | 0-4 Gas | | |
| | SE | | | | | | |
| YMW-14 -SS-B | NE | | | | | | |
| Date 4/9/13 | NW | | | | | | |
| Time 1059 | C | 11 | Stain/Odor | 11 | 48 | Sandy Gravely Silt w/ Clay Gravels < 2" | Moderately Cohesive, Moist, Black |
| | SW | | | | | | |
| | SE | | | | | | |
| YMW-14 -SS-C | NE | | | | | | |
| Date 4/19/13 | NW | | | | | | |
| Time 1105 | C | 11 | Stain/Odor 11 | | 90 | Clay w/ Some Gravel | Very Cohesive, Moist ~~Black~~ Dark Gray |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number _____

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-~~20~~ 15-SS-A | NE | | No | | | Gravely Sand w/ some silt | started sampling 6" below |
| Date 4/18/13 | NW | | | | | Olive Brown ; / some clay ; moist | asphalt |
| Time 1300 | C | | | | | | 5 FT |
| | SW | | | | | | |
| | SE | | | | | | |
| YMW-~~20~~ 15-SS-B | NE | | No/Yes | | | From 6"-9" Same as above | meas dimensions hit @ 16" Rock |
| Date 4/18/13 | NW | | | | | 9"-12" Black tarry sandy dry | Top of asphalt |
| Time 1310 | C | | | | | silt w/ odor | |
| | SW | | | | | | |
| | SE | | | | | | |
| YMW-~~30~~ 15-SS-C | NE | | Yes/Yes | | | 12-20 Same as above dry | |
| Date 4/18/13 | NW | | | | | 20-24 silty clay ; dark gray | |
| Time 13~~35~~ 35 | C | | | | | ; Moist ; some small gravels | |
| | SW | | | | | stain + odor | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number YMW-16

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-16 -SS-A | NE | 4' West | ~~O~~ | soil/veg. | | lt. brown silty clay, sl. moist, few gravels | common roots, |
| Date 4/11/13 | NW | | | | | | ~~brk~~ |
| Time 1400 | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| YMW-16 -SS-B | NE | | ~~O~~ | | | lt. brown silty clay, sl. moist, | few roots |
| Date 4/11/13 | NW | | | | | brick bits, few gravels | brick at ~8", refusal |
| Time 1410 | C | | | | | | excavate, auger 8-12" |
| | SW | | | | | | |
| | SE | | | | | | |
| YMW-16 -SS-C | NE | | ~~O~~ | | | lt. brown silty clay, dry, few | v. few roots |
| Date 4/11/13 | NW | | | | | brick bits, few gravels | |
| Time 1420 | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

A = 0"-6"; B = 6"-12"; C= 12"-24".

Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number YMW-17

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-17 -SS-A | NE | | | | | Top Soil Sandy silty loam | |
| | NW | | | | | Dark Brown to Med Brown | |
| Date 4/15/13 | C | | | | | dry | |
| Time 1205 | SW | | | | | | |
| | SE | 4 ft SE | | | | | |
| YMW-17 -SS-B | NE | | | | | Sandy Silt ~~[illegible]~~ Med Brown | |
| | NW | | | | | Dry | |
| Date 4/15/13 | C | | | | | | |
| Time 1210 | SW | | | | | | |
| | SE | | | | | | |
| YMW-17 -SS-C | NE | | | | | Sandy silt; Med Brown; Dry | |
| | NW | | | | | Dark Brown layer ~1" thick | |
| Date 4/15/13 | C | | | | | @ 1.5' | |
| Time 1215 | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number YMW-18

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-18-SS-A Date 4/23/13 Time 0750 | NE | | | | | | |
| | NW | | | | | | |
| | C | South 4' | Stain & Odor | 6" Cover | 0.0 | Black clayey silt sl. Moist | |
| | SW | | | | | | |
| | SE | | | | | | |
| YMW-18-SS-B Date 4/23/13 Time 1000 | NE | | | | | | |
| | NW | | | | | | |
| | C | | Stain/Odor | | 0.0 | Same As Above | |
| | SW | | | | | | |
| | SE | | | | | | |
| YMW-18-SS-C Date 4/23/13 Time 1030 | NE | | | | | | |
| | NW | | | | | | |
| | C | | Stain/Odor | | 6.2 | Same As Above | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number YMW-19

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-19-SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 4/23/13 | C | 5' West | No | Grass/weeds | N/A | Silty Sand Olive Brown, Sl. Moist | |
| Time 1300 | SW | | | | | | |
| | SE | | | | | | |
| YMW-19-SS-B | NE | | | | | | |
| | NW | | | | | Sandy Silt, Olive Brown | |
| Date 4/23/13 | C | | No | | N/A | Sl. Moist, w/ 1" minus gravel | |
| Time 1305 | SW | | | | | | |
| | SE | | | | | | |
| YMW-19-SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date 4/23/13 | C | | No | | N/A | Same As Above | |
| Time 1315 | SW | | | | | w/ Black streaks | |
| | SE | | | | | (probably organic layer) | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number YMW-20

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-20 -SS-A | NE | | NO | | | clay silt w/ some gravel ; | Started 6" below asphalt |
| Date 4/18/13 | NW | | | | | dark gray ; moist | |
| Time 1540 | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| YMW-20 -SS-B | NE | | NO | | | clay silt w/ sand ; dark gray | |
| Date 4/18/13 | NW | | | | | to Brown ; damp | |
| Time 1600 | C | | | | | | |
| | SW | | | | | | |
| | SE | | | | | | |
| YMW-20 -SS-C | NE | | | | | Sandy silt w/ some clay ; dark Brown | Took dup |
| Date 4/18/13 | NW | | | | | ; damp | |
| Time 1610 1615 | C | | NO | | | | |
| | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material , Cobbles , Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

Grid Number YMW-21

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-21-SS-A Date 4/19/13 Time 1410 | NE | | | | | | |
| | NW | | | | | Silty Clay w/ roots | slightly Moist |
| | C | 5' North | No | Grass | N/A | Olive Brown | |
| | SW | | | | | | |
| | SE | | | | | | |
| YMW-21-SS-B Date 4/19/13 Time 1415 | NE | | | | | | |
| | NW | | | | | Silty Clay w/ roots | |
| | C | | No | | N/A | Lt Brown, DRY | |
| | SW | | | | | | |
| | SE | | | | | | |
| YMW-21-SS-C Date 4/19/13 Time 1420 | NE | | | | | | |
| | NW | | | | | | |
| | C | | No | | N/A | Silty Clay some roots | |
| | SW | | | | | Lt Brown, DRY | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number YMW-22

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-22 -SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 4/17/13 | C | 4' West | NO | Black Gravel | N/A | Silty/Sand Loam Dark Brown | DRY |
| Time 1020 | SW | | | | | | |
| | SE | | | | | | |
| YMW-22 -SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date 4/17/13 | C | | No | | N/A | Silty/Sand Loam Dark Brown | Dry |
| Time 1025 | SW | | | | | Gravel begin @ 1' | |
| | SE | | | | | | |
| YMW-22 -SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date 4/17/13 | C | | NO | | N/A | Silty/Sand Loam Dark Brown | DRY |
| Time 1035 | SW | | | | | Gravel Block 1.5-2' | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# SURFACE SOIL SAMPLING

Grid Number YMW-23

YALE OIL OF SOUTH DAKOTA CECRA SITE, Billings, Yellowstone County, Montana

| Sample Location Number (Grid No.-SS-Interval) | Grid Location | Location Moved / Offset (ft / direction) | Stain/ Odor | Surface Material Cover | PID / OVA (ppm) | Soil Type | Comments: Materials removed, Objects encountered, etc, |
|---|---|---|---|---|---|---|---|
| YMW-23-SS-A | NE | | | | | | |
| | NW | | | | | | |
| Date 4/17/13 | C | 4' West | No | Grass | N/A | Sandy Silt w/ Gravel Dark | Brown Damp |
| Time 1300 | SW | | | | | | |
| | SE | | | | | | |
| YMW-23-SS-B | NE | | | | | | |
| | NW | | | | | | |
| Date 4/17/13 | C | | No | | N/A | Sandy Silt w/ more Gravel | Dark Brown Damp |
| Time 1305 | SW | | | | | | |
| | SE | | | | | | |
| YMW23-SS-C | NE | | | | | | |
| | NW | | | | | | |
| Date 4/17/13 | C | | No | | N/A | ~~Sandy Silt~~ Silty Sand w/ Gravel | Dark Brown Damp |
| Time 1310 | SW | | | | | | |
| | SE | | | | | | |

*A = 0"-6"; B = 6"-12"; C= 12"-24".*

*Fill Material, Cobbles, Gravel, Sand, Clay, Bedrock, etc.*

Reserved Space for Graphical Sample Location inside Sample Grid:

# MONITORING WELL SUBSURFACE SOIL WELL LOGS

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: YMW-10 RECORDED BY: JB

4/18/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS DRILLING FLUID DRILLING RATE WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 2 | | YMW-10-SB-A (2-4) 1120 | | | | | Silty Sand w/ Gravels, Cobbles, & red concrete slabs DRY, Tan | |
| 3 | | VOC 126 ppm | | | heated headspace | | No Odor, No Stain | |
| 4 | | | 1135 | | 44 | | Could not Advance past Rubble | |
| 5 | | | | | | | | Hole was plugged with 1½" of bentonite and had 8" of sand placed on top of bentonite at land owners Request |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

* Submitted for analysis

H:\OFFICE\Forms\TEST HOLE LOG.doc

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# WELL LOG YMW-10



RECORDED BY: AGH, JB TYPE: (Test Pit, Bore Hole, Monitor, Etc.)

DATE STARTED: 4-23-2013 DATE FINISHED:

**PROJECT INFORMATION:**

CLIENT: Yale PROJECT NAME & NO: Yale Oil PLP – Project # 11108

COUNTY: Yellowstone, MT PROPERTY OWNER: Yale - 1

**WELL INFORMAITON:** HOLE NAME YMW-10 DEPTH: ELEVATION:

LEGAL DESCRIPTION: DESCRIPTIVE LOCATION Adj Maple Car lot

**DRILLING INFORMATION:** TARGET AQUIFER: Alluvium HOLE DIAMETER: 9 5/8"

DRILLING CO. S. K. Geotechnical DRILLER NAME: John M.

DRILLING METHOD: H.S. Auger DRILLING FLUID: None PURPOSE: Monitor Well
(Soil Sample, Geotech., monitor Well, Collect Water, Etc.)

STATIC WATER LEVEL: STATIC WATER DATE:

MP DESCRIPTION: MP HEIGHT EMP ELEVATION:

**CONSTRUCTION DETAIL:** WELL DESC: (ie: 2-inch, flush threaded, Sch 40, PVC): 2" flushmount

WELL SURF DETL (Flush, Stickup, Etc.) Flush — WELL INTERVAL 0-15

SURF CASING HEIGHT — RISER HEIGHT 0.0

SURFACE CASING N.A. — SURFACE CASING INTERVAL N.A. Manhole

SCREEN DESCRIPTION 20 Slot Sch 40 PVC-2" — SCREEN INTERVAL 5-15 BGS

SAND PACK DESCRIPTION 10-20 Colorado SS — SAND PACK INTERVAL ~~[illegible]~~ 3.3-15 Some 5 bag at Top

DEVELOPMENT DESCRIPTION — DEVELOPMENT INTERVAL —

WATER SAMPLE DESCRIPTION — ~~WATER SAMPLE~~ Annular Completion INTERVAL Bentonite ~~[illegible]~~ 3.5 to 0.5 Concrete 1-5 surface manhole

REMARKS Water Clearance to 8' on 4-24-2013.
SPUD hole at 1330. Drill out 10AD Bet backfill, Graded material
No odor No Evidence of hydrocarbons
- About ½ foot heave in bottom of hole from flowing sands.

Materials: 10' well Screen Env. Mfg - Sch 40 20 slot 2" } Flush thread
5' Sch 40 2" PVC " "
1 Bottom Cap
5 10-20 Colorado Silica Sand
3 Pure Gold Medium Bentonite
1 Expansion plug 2" Plastic
1 EMCO 2 hole/Bolt Surface manhole
4 Concrete Hydr

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# WELL LOG



PROJECT INFORMATION:

CLIENT: Yale PLP Group PROJECT NAME & NO: 1110

WELL ID: YMW-10 RECORDED BY: AJH after 8', JB 0-8'

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION, BLOW COUNTS | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|
| | | | | | JB Description From Field Book See Also Soil Sample Forms for Twinned Hand Auger Boring | 0-1 Sandy Gravel, LT Gry, Hard Frozen<br>1-3' Silty Clay, Dry, olive Br,<br>3-5' Gravelly sand, olive Br, Dry, 1" Rounded Pebbles<br>5'-8' Sandy Gravel, DRY Olive Brown, minor Sand at 7 ft<br>7.5-8 - Gravel Stuck? |
| | | Sample not Submitted | | YMW-10-SB-D 1410 8-10 FT 50% Recov PID 0 ppm | 7/16/30/22 | 8-10 Gravelly, sand, slightly moist, 4 ft Olive Gray (5Y 5/2), Non-cohesive, ~~moist~~ dense non-stratified, Gravel fragments are Rounded to well rounded Alluvial No odor, Gravel - Pebbles to 1" diameter variable composition, Non-Calcareous<br>* Met Auger refusal at 10 ft, No Penetration with full weight of drill Rig. Go To smaller Augers - ~~Boulders~~ Cobbles at 10'. |
| | | | | YMW-10-SB-B 1530 PID 2.6 ppm | 10-12' 28/34/19/14 @ 1530 100% recovery ▽ 10.3' | 10-12 - Gravel Sandy at top of Sample, Trace Silt - Almost a Sand w/ Gravel Lower half is Gravel less than 15% Sand, wet at 10.3 feet, olive Gray (5Y 4/1) Non-cohesive - Dense - V. Dense, ~~unstratified~~ in Spoon, Non-Calcareous, Alluvium, - Drills like ~~Cobbles~~ Pebbles - Augers bring up pebbles 2"-4". |
| | | | | | Based on Drilling Observations & Sand | 12-13 - Cobbles, pebbles, gravel ? well Acd<br>13- Sand, Silty, wet, moderate yellow color<br>Non-cohesive - Loose, stratified, Alluvium. Sand phase ranges from Fine to Coarse, Subrounded Poorly Sorted, Arkosic Composition, NO odor, No Evidence of hydrocarbons. |
| | | | | YMW-10-SB-C 1600 PID 0 ppm | 13-15' @ 1600 6/2/2/3 25% | |

B - water
C - Bottom

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# WELL LOG



PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 4/11/13

WELL ID: YMW-11 RECORDED BY: Powell

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | YMW-11-SB-A (2-4') 1015 | | headspace 202 ppm | | Submitted for analysis | 2-4' Lt. brown silty clay, θ odor θ stain sl. moist in-hole PID 0 ppm |
| 4 | | | | | | | | |
| 5 | | | YMW-11-SB-A (4-6) 1035 | | headspace = 191 ppm | | | 4-6 Lt. Brown, Clay θ odor θ stain sl. Moist w/white Mottling PID = θ |
| 6 | | | | | | | ↑ | 6-6.5 Lt. brown clay, sl. moist White mottling, common θ odor, θ stain |
| 7 | | | YMW-11-SB-A (6-8) 1050 | | headspace = 204 ppm | | PID = 0 ↓ | 6.5-7.5 Brown V. fine sandy clay, moist θ odor, θ stain |
| 8 | | | | | | | | 7.5-8.0 Brown V. fine sand, clay occasional moist, θ odor, θ stain |

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# WELL LOG



PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____ 4/11/13

WELL ID: YMW-11 RECORDED BY: JPoell

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 8 | | | YMW-11-SB-~~A~~ B KA | 11:10 headspace = 47 ppm | | | | 8-9 water table fine brown sand, dk. orange mottling, v. moist, θ odor, θ stain |
| 9 | | | | | | | | 9-10 Fine brown sand, dk. orange mottling, saturated, θ odor, θ stain PID = θ |
| 10 | | | | | | | | Refusal (rock) at 10' |

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# WELL LOG



RECORDED BY: TES JS TYPE: (Test Pit, Bore Hole, Monitor, Etc.)

DATE STARTED: 4/24/13 9:55 DATE FINISHED: 4/24/13 1307

**PROJECT INFORMATION:**

CLIENT: Yale PROJECT NAME & NO: Yale Oil PLP – Project # 11108

COUNTY: Yellowstone, MT PROPERTY OWNER Yale

**WELL INFORMAITON:** HOLE NAME YMW-11 DEPTH: ELEVATION:

LEGAL DESCRIPTION: DESCRIPTIVE LOCATION

**DRILLING INFORMATION:** TARGET AQUIFER: Alluvium HOLE DIAMETER:

DRILLING CO. S. K. Geotechnical DRILLER NAME: John M

DRILLING METHOD: H.S. Auger DRILLING FLUID: None PURPOSE: Monitor Well
(Soil Sample, Geotech., monitor Well, Collect Water, Etc.)

STATIC WATER LEVEL: STATIC WATER DATE:

MP DESCRIPTION: MP HEIGHT EMP ELEVATION:

**CONSTRUCTION DETAIL:** WELL DESC: (ie: 2-inch, flush threaded, Sch 40, PVC):

WELL SURF DETL (Flush, Stickup, Etc.) stickup WELL INTERVAL

SURF CASING HEIGHT RISER HEIGHT

SURFACE CASING 6" Steel SURFACE CASING INTERVAL

SCREEN DESCRIPTION 4" x 10' Sch 40 .020 Screen Flush Threaded (Envirometal Manufacturing) SCREEN INTERVAL 5'-15

SAND PACK DESCRIPTION Colorado Silica Sand (Premier Silica) SAND PACK INTERVAL 4'-15' (8 bags of sand)

DEVELOPMENT DESCRIPTION ~~DEVELOPMENT INTERVAL~~ BENTONITE Description Pure gold Medium Chips

WATER SAMPLE DESCRIPTION ~~WATER SAMPLE~~ Bentonite INTERVAL ~~1/4"~~ 1'-4.5' (3 bags)

REMARKS Hole vacuumed for utility Clearance 0-8 FT b.g. 1-10-2013
used another 2 bags to fill surf casing

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yak PLP PROJECT NAME & NO: 1108

WELL ID: YMW-11 RECORDED BY: TFS Sbc 8' SB 0-8'

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION, BLOW COUNTS | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|
| | | | | | | 0-0.8 2" minus Gravel fill |
| | | | | | Jim Shaffer from the Hole | 0.8-1 Clayey, Sandy, gravel w/ occasional Cobbles to 12" |
| | | | | | | 1-7' Brown Sandy Clay, minor odor |
| | | | | | | 7'-8' Clay with minor Sand, white inclusions Possibly bentonite, minor odor, wet at 8 ft Clayey Sand. |
| | | | | YMW-11-SB-C | | 8-9' dry silt w/ sand; moist to v. moist, mottled brown, moderately cohesive; sand grains are subrounded to rounded; No odor or stain |
| | | | | | 9-11 2/19/16 15 | 9'-9.5 Sandy silt, medium brown mildly cohesive, wet; subrounded water @ 9.5' |
| | | | | | | 9.5-11.0 gravel, light tan to black, sub-rounded to rounded, wet, 1/4" and greater (to cobble size) upto 4" 20% Recovery |
| | | | | | Screen 4" x 10' sch 40 PVC | 11.0-12 same as above |
| | | | | | .010 Screen flush thread | 12-15 same as below |
| | | | | | 14-16 9/22/19/29 | |
| | | | | YMW-11-SB-C Total Depth Sample | 11:50 PID 0 ppm | ~~14-16~~ 14-15 Sand, wet, medium brown subrounded to rounded Some Small gravels to 1/4" 50% Recovery |
| | | | | | | 15-16 Sandy Gravel, Subrounded to rounded, wet, medium brown, Some silt. No Stain, no odor |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale Oil
PROJECT NAME & NO: 4/11/13
WELL ID: YMW-12
RECORDED BY:

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 2 | | | YMW-12-SB-A | 2-4' 12:00 | | | | 2-4 Silty sand, black, stain odor w/ gray silty clay in hole PID 283 ppm |
| | | | YMW-12-SB-AD | 2-4' 12:05 | | | | |
| | | | | Headspace 3870 | | | | |
| 4 | | | | | | | | 4-5 Sandy silt, black, stain/odor 986 ppm |
| | | | YMW-12-SB-A | 4-6 12:32 | | | Submitted for analysis | 5-6 clay silt grey |
| | | | YMW-12-SB-AD | 4-6 12:35 | | | | |
| | | | | Headspace 4000 ppm | | | | |
| 6 | | | | | | | | 6-7 Sand, grey, odor moist |
| | | | YMW-12-SB-A | 6-8' 12:50 | | | | Refusal @ 7' |
| | | | YMW-12-SB-AD | 6-8' 12:55 | | | | |
| | | | | Headspace 368 ppm | | | | |
| 8 | | | | | | | | 88% LEL 12% CO 15.7 $O_2$ |

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# WELL LOG

Page ___ of ___

RECORDED BY: _____ TYPE: (Test Pit, Bore Hole, Monitor, Etc.) _____

DATE STARTED: 4/30/13 DATE FINISHED: _____

## PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: Yale Oil PLP – Project # 11108

COUNTY: Yellowstone, MT PROPERTY OWNER _____

## WELL INFORMAITON:

HOLE NAME MW-12 DEPTH: 15' ELEVATION: _____

LEGAL DESCRIPTION: _____ DESCRIPTIVE LOCATION _____

## DRILLING INFORMATION:

TARGET AQUIFER: _____ HOLE DIAMETER: _____

DRILLING CO. S. K. Geotechnical DRILLER NAME: _____

DRILLING METHOD: H.S. Auger DRILLING FLUID: None PURPOSE: Monitor Well
(Soil Sample, Geotech., monitor Well, Collect Water, Etc.)

STATIC WATER LEVEL: _____ STATIC WATER DATE: _____

MP DESCRIPTION: _____ MP HEIGHT _____ EMP ELEVATION: _____

## CONSTRUCTION DETAIL:

WELL DESC: (ie: 2-inch, flush threaded, Sch 40, PVC): _____

| | |
|---|---|
| WELL SURF DETL (Flush, Stickup, Etc.) FLUSH | WELL INTERVAL 4.5'-14.5' |
| SURF CASING HEIGHT — | RISER HEIGHT 0 |
| SURFACE CASING — | SURFACE CASING INTERVAL _____ |
| SCREEN DESCRIPTION Sch 40 | SCREEN INTERVAL 4.5-14.5 |
| SAND PACK DESCRIPTION 10/20 | SAND PACK INTERVAL 3' — 10' |
| DEVELOPMENT DESCRIPTION _____ | DEVELOPMENT INTERVAL _____ |
| WATER SAMPLE DESCRIPTION _____ | WATER SAMPLE INTERVAL _____ |

REMARKS Hole heaved to 10' while tripping out augers
Bentonite to 1'-3'

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: YMW-12 RECORDED BY: _____

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION, BLOW COUNTS | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|
| | | | | | | 0'-7' dump sand, backfill |
| | | | | | | 7'-15' coarse grvl, clays to |
| | | | | | | +2'' : PHC sheen ; odor |
| | | | 10/19/21 16/15 | 8'-10' | YMW-12-SB-D @ 12:00 PID 766 ppm | |
| | | 12/19/21/25 | | 11-13' | YMW-12-SB-B @ 12:23 PID 1900 | water @ 10.5' |
| | | 11/25/25/19 | | 13'-15' | YMW-12-SB-C @ 12:34 PID 3270 ppm | TD @ 15' |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: 4/10/13

WELL ID: YMW-13- RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 1 | | | | | | | | See Shallow Surface Soil Sheet |
| 2 | | | | | | | | |
| 3 | | | YMW-B-SB-A 11:15 | (2-4) | Submitted for analysis | | 1700 ppm VOC in Heated Headspace | 2-3.5 Black stain / Odor Silty Clay Gravel, St. Moist 2" Minus Gravel |
| 4 | | | | | | | | 3.5-4 Lt Gray No Stain, Odor Silty Clay Gravel, Slightly Moist 2" Minus Gravel |
| 5 | | | YMW-B-SB-BA 15:15 | | NA | | | 4-5.3' Lt. Grey, No Stain, Sl. Odor Gravel silty Clay, Very Slightly Mois 6" Minus Flat Gravels (Hole Ø increasing) |
| 6 | | | | | | | | 69 ppm VOC in Hole |
| 7 | | | | | | | | 241 ppm VOC in Heated Headspace |
| 8 | | | | | | | | |

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# WELL LOG



RECORDED BY: TFS/ TYPE: (Test Pit, Bore Hole, Monitor, Etc.)

DATE STARTED: 4/26/13 1415 DATE FINISHED: 4/26/13

## PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: Yale Oil PLP – Project # 11108

COUNTY: Yellowstone, MT PROPERTY OWNER

## WELL INFORMAITON:

HOLE NAME YMW-13 DEPTH: Alluvium ELEVATION:

LEGAL DESCRIPTION: DESCRIPTIVE LOCATION

## DRILLING INFORMATION:

TARGET AQUIFER: Alluvium HOLE DIAMETER: 4.25

DRILLING CO. S. K. Geotechnical DRILLER NAME: John M.

DRILLING METHOD: H.S. Auger DRILLING FLUID: None PURPOSE: Monitor Well
(Soil Sample, Geotech., monitor Well, Collect Water, Etc.)

STATIC WATER LEVEL: STATIC WATER DATE:

MP DESCRIPTION: MP HEIGHT EMP ELEVATION:

## CONSTRUCTION DETAIL:

WELL DESC: (ie: 2-inch, flush threaded, Sch 40, PVC):

WELL SURF DETL (Flush, Stickup, Etc.) WELL INTERVAL

SURF CASING HEIGHT +3 RISER HEIGHT 2.5'

SURFACE CASING 4"x5' Steel casing SURFACE CASING INTERVAL -2 to +3

SCREEN DESCRIPTION 2"x10' Sch 40 PVC Screen 0.010 SCREEN INTERVAL 5'-15'

6 bags SAND PACK DESCRIPTION 10-20 Colorado Silica Sand SAND PACK INTERVAL 4'-15'

Bentonite ~~DEVELOPMENT~~ DESCRIPTION Pure Gold Medium Chips Bentonite ~~DEVELOPMENT~~ INTERVAL 1 - 4'

WATER SAMPLE DESCRIPTION WATER SAMPLE INTERVAL

REMARKS

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# WELL LOG



PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: YMW-13 1410 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION, BLOW COUNTS | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|
| | | | | | | First 8' was previously logged |
| | | 8'-10' | | YMW-13-SB-D<br>BC 13/23/25/25<br>ST = 1430<br>PID 4000 ppm<br>took down hole PID @ 9' and LEL was 38%<br>70% Recovery | | 8'-9' silty sand; moist; med brown; subangular<br>9'-9.8' Ash?; lt gray; angular silty sand; slightly moist;<br>9.8'-11 silty sand w/gravel; rounded to subrounded; moist; odor + stain |
| | | 11-13 | | YMW-13-SB-B<br>BC 10/30/24/18<br>ST = 1444<br>PID 954 ppm<br>70% Recovery<br>oil @ 11.4 | | 11'-12' sandy; dark gray; wet; subrounded odor + stain;<br>12'-13' sandy silt; wet; lt gray tan; some gravel; odor + stain; possibly Ash |
| | | 13-15 | | YMW-13-SB-C<br>BC 14/12/14/9<br>ST = 1501<br>PID 1930 ppm<br>50% Recovery | | 13-15' gravelly sand; wet; Dk brown; rounded to subrounded; fining upward; odor + free product. |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: YMW-14-SB AR RECORDED BY: _____

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | |
| | 1 | | | | | | | |
| | 2 | | | | | | | 2-4 Silty clay to clay @ 4' Moist to Damp Stain, Odor PID 1410 ppm |
| | 3 | | YMW-14-SB-A | 2-4' | | | 11:50 | 3" Pipe @ 4' running N/S |
| | 4 | | | | | | | 4-5.5' Silty clay w Some Sand cobbles, both round + flat PID 2110 ppm |
| | 5 | | YMW-14-SB-A | 4-5' | | | 14:10 ~~11:50~~ Submitted for analysis | Refusal @ 5.2' |

**Hydrometrics, Inc.**
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# WELL LOG



RECORDED BY: TFS & LJ TYPE: (Test Pit, Bore Hole, Monitor, Etc.)

DATE STARTED: 4/29/13 1240 DATE FINISHED: 4/29/13 1560

## PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: Yale Oil PLP – Project # 11108

COUNTY: Yellowstone, MT PROPERTY OWNER

## WELL INFORMAITON:

HOLE NAME MW-14- DEPTH: 16 ELEVATION:

LEGAL DESCRIPTION: DESCRIPTIVE LOCATION

## DRILLING INFORMATION:

TARGET AQUIFER: Alluvium HOLE DIAMETER: 4.25

DRILLING CO. S. K. Geotechnical DRILLER NAME: John M.

DRILLING METHOD: H.S. Auger DRILLING FLUID: None PURPOSE: Monitor Well
(Soil Sample, Geotech., monitor Well, Collect Water, Etc.)

STATIC WATER LEVEL: STATIC WATER DATE:

MP DESCRIPTION: MP HEIGHT EMP ELEVATION:

## CONSTRUCTION DETAIL:

WELL DESC: (ie 2-inch, flush threaded, Sch 40, PVC)

WELL SURF DETL (Flush, Stickup, Etc.) WELL INTERVAL

SURF CASING HEIGHT 13 RISER HEIGHT 2.5

SURFACE CASING 4" steel stove pipe SURFACE CASING INTERVAL -2 to 3

SCREEN DESCRIPTION 2 inch Flush threaded, Sch 40, PVC screen 0.010 SCREEN INTERVAL 5'-10'

7 bags SAND PACK DESCRIPTION 10x20 colorado silica sand SAND PACK INTERVAL 3.0 -11'

2 bags ~~DEVELOPMENT~~ Bentonite DESCRIPTION Pure Gold Medium Chips ~~DEVELOPMENT~~ Bentonite INTERVAL 1 - 3.0

WATER SAMPLE DESCRIPTION ~~WATER SAMPLE~~ Cement INTERVAL

REMARKS 3' of Heave before we started placing sand

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# WELL LOG



PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: YMW-14 RECORDED BY: TFS + LJ

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION, BLOW COUNTS | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|
| | | | | | | 0-8' Backfill |
| | | | | | | 8-10' Sand: 8-9' wet gravelly Sand 9-10' lt gry coarse sand w/ pbbl to 1/4": PID 9-10' |
| | | | | WL = 7.10 | | |
| | | | 8'-10' | YMW-14-SB-B<br>ST = 13:00<br>BC = 9/21/21/21<br>PID = 4000<br>~ 50% Recovery | | drilling was easy @ 11' |
| | | | 11-13 | BC = 7/2/2/1<br>Poor Recovery ~ 2% Not enough to sample | | |
| | | | 13'-15' | YMW-14-SB-C<br>BC = WOR/4/15/21<br>ST = 1330<br>PID = 1010<br>~ 40% Recovery | | 13-15 Sandy Gravel; wet; dark gray; odor + stain; subrounded to rounded |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: YMW-15

WELL ID: _____ RECORDED BY: _____

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | on other sheet |
| 2 | | YMW-15-SB-A 4/18/13 | | | * S1-1355 | | LEL = 100% DHSVOC = 6000 ppm HHSVOC = 4000 ppm $O_2$ = 19.8% | Silty clay Dark gray to black Damp; Mild odor; has stain & odor Stopped sampling due to High LEL Reading & waiting Till tomorrow to resume sampling |
| 4 | | 4/19/13 | | YMW-15-SB-A (1045) | | | | Clay, Black, Stain Odor Moist |
| 6 | | | | | | | VOC Downhole 357 ppm HHSVOC >4000 ppm | 5'+ Could not advance likely due to cobble Tried two auger holes in asphalt Hole |
| 8 | | | | | | | | |

* Submitted for analysis

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# WELL LOG

Page ___ of ___

RECORDED BY: _____ TYPE: (Test Pit, Bore Hole, Monitor, Etc.) _____

DATE STARTED: YMW-15 DATE FINISHED: 5/2/13

**PROJECT INFORMATION:**

CLIENT: Yale PROJECT NAME & NO: Yale Oil PLP – Project # 11108

COUNTY: Yellowstone, MT PROPERTY OWNER _____

**WELL INFORMAITON:** HOLE NAME YMW-15 DEPTH: 15' ELEVATION: _____

LEGAL DESCRIPTION: _____ DESCRIPTIVE LOCATION _____

**DRILLING INFORMATION:** TARGET AQUIFER: _____ HOLE DIAMETER: _____

DRILLING CO. S. K. Geotechnical DRILLER NAME: _____

DRILLING METHOD: H.S. Auger DRILLING FLUID: None PURPOSE: Monitor Well
(Soil Sample, Geotech., monitor Well, Collect Water, Etc.)

STATIC WATER LEVEL: 11'2" STATIC WATER DATE: ATD

MP DESCRIPTION: _____ MP HEIGHT _____ EMP ELEVATION: _____

**CONSTRUCTION DETAIL:** WELL DESC: (ie: 2-inch, flush threaded, Sch 40, PVC): _____

WELL SURF DETL (Flush, Stickup, Etc.) FLUSH — WELL INTERVAL _____

SURF CASING HEIGHT _____ — RISER HEIGHT _____

SURFACE CASING _____ — SURFACE CASING INTERVAL _____

SCREEN DESCRIPTION 5214 40 2" Flush thread 20/slot — SCREEN INTERVAL 4'10" to 14'10"

3 Bags SAND PACK DESCRIPTION 10/20 Colorado Sand — SAND PACK INTERVAL ~~13'~~ 3' to 13'

1 bag ~~DEVELOPMENT~~ Bentonite DESCRIPTION _____ — DEVELOPMENT INTERVAL _____

WATER SAMPLE DESCRIPTION _____ — WATER SAMPLE INTERVAL _____

REMARKS _____

Bentonite Benonite chips 1-3'

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: YMW-15 RECORDED BY: CMJ/TS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION, BLOW COUNTS | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|
| | 0 | | | | | 0-8' - well sorted sand, dry to damp near bottom Backfill |
| | 8 | | 4A 11/13/97 | YMW-15-SB-D 13:43 | PID 520 | 8'-9' dk gry, clay w/silt, ppl stain; odor driller says gravel eq' |
| | 10 | | | | | 9'-15' Gravel, coarse, lots sand, clay at 12'; strong odor |
| | 11 | | SP+ 10/24/98 | YMW-15-SB-B 14:00 | PID 845 | |
| | 13 | | 2PT 10/21 15/25 | YMW-15-SB-E 14:10 | PID 39 | Water @ 11.2' Looks less stained @ 13', odor continues |
| | 15 | | | | | 15' — TD |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale Oil PROJECT NAME & NO: 4/11/13

WELL ID: YMW-16 RECORDED BY: MPoell

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | YMW-16-SB-A | | 2-4' | 14:30 | head space = 0ppm | 2-3.5' lt. brown silty clay, dry, few gravels, ~~0~~ odor, ~~0~~ staining<br>3.5-4' lt. brown fine sandy clay and fine sand, dry, few gravels, ~~0~~ odor, ~~0~~ staining |
| 4 | | | | | | | | |
| 5 | | | YMW-16-SB-A | | 4-6 | 14 15:00 ~~13:00~~ | 3330 ppm | 4-5 silty clay, brown w/ rust staining to gray clay silt<br>5-6 Clayey silt gray, odor, st. moist @ bottom, in-hole 199 ppm, slight sulfur odor |
| 6 | | | | | | | | |
| 7 | | | YMW-16-SB-A | | 6-8 | 15:15 | 4000 ppm<br>Submitted for analysis | 6-7½ gray silty sand, sand odor, stain - slight sulfur odor, gravel @ bottom, moist<br>7½ refusal |
| 8 | | | | | | | | |

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# WELL LOG

Page ___ of ___

RECORDED BY: _____ TYPE: (Test Pit, Bore Hole, Monitor, Etc.) _____

DATE STARTED: _____ DATE FINISHED: _____

## PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: Yale Oil PLP – Project # 11108

COUNTY: Yellowstone, MT PROPERTY OWNER _____

## WELL INFORMAITON:

HOLE NAME MW-16 DEPTH: 15' ELEVATION: _____

LEGAL DESCRIPTION: _____ DESCRIPTIVE LOCATION _____

## DRILLING INFORMATION:

TARGET AQUIFER: _____ HOLE DIAMETER: _____

DRILLING CO. S. K. Geotechnical DRILLER NAME: _____

DRILLING METHOD: H.S. Auger DRILLING FLUID: None PURPOSE: Monitor Well
(Soil Sample, Geotech., monitor Well, Collect Water, Etc.)

STATIC WATER LEVEL: _____ STATIC WATER DATE: _____

MP DESCRIPTION: _____ MP HEIGHT _____ EMP ELEVATION: _____

## CONSTRUCTION DETAIL:

WELL DESC: (ie: 2-inch, flush threaded, Sch 40, PVC): _____

| | |
|---|---|
| WELL SURF DETL (Flush, Stickup, Etc.) Stickup | WELL INTERVAL _____ |
| SURF CASING HEIGHT _____ | RISER HEIGHT _____ |
| SURFACE CASING _____ | SURFACE CASING INTERVAL _____ |
| SCREEN DESCRIPTION Sch 40 - 2" | SCREEN INTERVAL 3.5' - 13.5' |
| SAND PACK DESCRIPTION 10/20 | SAND PACK INTERVAL 2.5' - 8' |
| DEVELOPMENT DESCRIPTION _____ | DEVELOPMENT INTERVAL _____ |
| WATER SAMPLE DESCRIPTION _____ | WATER SAMPLE INTERVAL _____ |

REMARKS Sand heave to 8': Begin w/20 sand pack @ 8'
Bent Bentonite to 1'

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: YMW-14 RECORDED BY: _____

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION, BLOW COUNTS | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|
| | | | | | | 0-7.5': brown dry to damp sorted sand. |
| | | | | | water @ 7.5' | 7.5'-8.0': moist clayey silt: w/c PHC odor? |
| | | | 8'-10' 14:40 | YMW-17-SB-B | SPT 13/13/18/19 PID 1560 ppm | 8'-15' sndy, coarse gravel strong PHC odor, Blk color @ 8'-10' sporadic |
| | | | 13'-15' 15:10 | YMW-17-SB C | SPT 12/16/23/25 PID 527 ppm | less PHC odor @ 13'-15' sporadic |

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# WELL LOG

YMW-17

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: _____ RECORDED BY: _____

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | on site | |
| 2 | | | | | | | HH VOC = 345ppm | 2-3 Med-Brown sandy silt w/ some gravel<br>3'-3.2' Med Brown silty clay; dry<br>3.2'-4' dark Brown to black sandy silt ~~some~~ had strong odor; moist |
| 4 | | | | | | | DH VOC = 16.6 ppm<br>LEL = 5%<br>HH VOC = ~~345~~ 3170 ppm | 4-6 Dark Brown to black silty clay w/ some sand<br>had stain + odor; moist; shiny |
| 6 | | | | | | | HH VOC = 3150 ppm<br>DH VOC = 41.6<br>LEL = 100% dropped to 9% after ~10 min | 6-6.5 Dark Gray to black silty clay w/ some sand<br>stain + odor; moist; shiny<br>6.5-8 Dark gray; sandy silt; stain + odor v. moist; shiny |
| 8 | | | | | | | DH VOC = 173 ppm<br>HH VOC = 1690<br>LEL = 100% dropped to 20.1% after 5 min<br>O2 = 16.2% | 8-9 Dark gray; sandy silt; stain + odor wet; some Free Product<br>9-10 Dark gray to Black; sand w/ silt; stain + odor; wet; some Free Product |
| 10 | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| * | YMW-17-SB-A | | 13:20 | |
| * | YMW-17-SB-B | | 14:15 | |

* Submitted for analysis

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# WELL LOG

Page ___ of ___

RECORDED BY: _____ TYPE: (Test Pit, Bore Hole, Monitor, Etc.) _____

DATE STARTED: 4/30/13 DATE FINISHED: _____

## PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: Yale Oil PLP – Project # 11108

COUNTY: Yellowstone, MT PROPERTY OWNER _____

## WELL INFORMAITON:

HOLE NAME YMW-17 DEPTH: 14 ELEVATION: _____

LEGAL DESCRIPTION: _____ DESCRIPTIVE LOCATION _____

## DRILLING INFORMATION:

TARGET AQUIFER: _____ HOLE DIAMETER: 4.25

DRILLING CO. S. K. Geotechnical DRILLER NAME: _____

DRILLING METHOD: H.S. Auger DRILLING FLUID: None PURPOSE: Monitor Well
(Soil Sample, Geotech., monitor Well, Collect Water, Etc.)

STATIC WATER LEVEL: _____ STATIC WATER DATE: _____

MP DESCRIPTION: _____ MP HEIGHT _____ EMP ELEVATION: _____

## CONSTRUCTION DETAIL:

WELL DESC: (ie 2-inch, flush threaded, Sch 40, PVC)

WELL SURF DETL (Flush, Stickup, Etc.) Stickup

WELL INTERVAL 0'-14

SURF CASING HEIGHT _____

RISER HEIGHT _____

SURFACE CASING 4 in steel

SURFACE CASING INTERVAL -2 to +3

SCREEN DESCRIPTION SCH40 PVC

SCREEN INTERVAL 4'-14'

50# SAND PACK DESCRIPTION CO Lonestar 10/20

SAND PACK INTERVAL 2.6-7'

10# ~~DEVELOPMENT~~ Benbentonite DESCRIPTION Pure Gold Med. Chips

~~DEVELOPMENT~~ Benbentonite INTERVAL 1.2'-2.6

WATER SAMPLE DESCRIPTION _____

WATER SAMPLE INTERVAL _____

REMARKS _____

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: YMW-17 RECORDED BY: LMT

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION, BLOW COUNTS | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|
| | | | | | | 0-8' sand w/occ 1/4" pebbles, backfill |
| 5 | | | | | water @ 7'10" | 8'-10', wet, blk, silty clay, strong PHC odor/stain |
| | | | 8'10" | YMW-17-SB-B @ 09:15 | Seam 8'-10' wet/1/1/2 HW PID = 3250 | |
| 10 | | | | | | 10'-15' silty sand, pebbles to 1" PHC strong decreasing down hole |
| | | | 13'-15' | YMW-17-SB-C @ 09:33 | Seam 13'-15' 14/27/25/21 HW PID = 4000 | TD @ 15' |
| | | | 13'-15' | YMW-17-SB-D @ 09:37 Duplicate of ~~YMW-17-SB-C~~ | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: Yale

WELL ID: YMW-1B RECORDED BY: _____

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0-7' light brown dry to damp sand |
| 8 | | | | | | | WATER @ 7 FEET | 7'-9' WELL SORTED SAND, BLK, P/DC ODOR IS STRONG SCREEN CLEANER OF WOOD 1/2" thick |
| 10 | | | | | | | | 9' GRAVEL |
| 13 | | | YMW-13-C | 16:55 | 4/24/19/19 | PID 11.7 LO Battery | | |
| 15 | | | | | | | | TD @ 15' 5 PSI rinse sample @ 17:10 VOH EPH - METALS SCREEN @ 4.2 to 14.2 4" dia to 14" SAND 2.5' to 13' Bentonite 1-2.5' Stickup |

Note: 4 bags of sand
2 bags of bentonite

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: YMW-19 RECORDED BY: JMB

4/23/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 2 | | | YMW-19-SS-A (2-4) | 1405 | | | Downhole VOC 0.0 Heated Headspace VOC 22.5ppm | Silty Sand, Olive Brown w/ ~1" min gravel @ 2' increasing to 3" min gravel @ 4' No Stain, No Odor (2') Slightly Moist to Moist (4') |
| 3 | | | YMW-19-SS-AD (2-4) | 1406 | | | | |
| 4 | | | YMW-19-SS-A (4-4.5) | 1430 | | | Downhole VOC 0.0 Heated Headspace VOC 10.5ppm | Silty Sand, Olive Brown, Moist 4-4.5 w/ 6" Mino Gravel 4.5' + Could Not Advance Due To Cobbles |
| 5 | | | YMW-19-SS-AD (4-4.5) | 1431 | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

# WELL LOG



RECORDED BY: TFS TYPE: (Test Pit, Bore Hole, Monitor Etc.)

DATE STARTED: 4/26/13 0930 DATE FINISHED: 4/26/13 1745

## PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: Yale Oil PLP – Project # 11108

COUNTY: Yellowstone, MT PROPERTY OWNER

## WELL INFORMAITON:

HOLE NAME YMW-19 DEPTH: 15 ELEVATION:

LEGAL DESCRIPTION: DESCRIPTIVE LOCATION

## DRILLING INFORMATION:

TARGET AQUIFER: Alluvium HOLE DIAMETER: 6.25'

DRILLING CO. S. K. Geotechnical DRILLER NAME:

DRILLING METHOD: H.S. Auger DRILLING FLUID: None PURPOSE: Monitor Well
(Soil Sample, Geotech., monitor Well, Collect Water, Etc.)

STATIC WATER LEVEL: STATIC WATER DATE:

MP DESCRIPTION: MP HEIGHT EMP ELEVATION:

## CONSTRUCTION DETAIL:

WELL DESC: (ie: ~~2-inch~~ 4 inch, flush threaded, Sch 40, PVC): –

WELL SURF DETL (Flush, Stickup, Etc.)

WELL INTERVAL

SURF CASING HEIGHT 3'

RISER HEIGHT 2.5'

SURFACE CASING 6" x 5' stove pipe steel casing

SURFACE CASING INTERVAL -2 to +3

SCREEN DESCRIPTION 4" x 10' SCH 40 PVC Screen 0.020

SCREEN INTERVAL 5' - 15'

4 bags SAND PACK DESCRIPTION 10-20 colorado silica Sand

SAND PACK INTERVAL 2.5 - 15'

2 bags ~~DEVELOPMENT~~ Bentonite DESCRIPTION Pure Gold Medium Chips

~~DEVELOPMENT~~ Bentonite INTERVAL 1'-2.5'

WATER SAMPLE DESCRIPTION

~~WATER SAMPLE~~ Concrete INTERVAL 0-1

REMARKS Large Gravels were falling in the hole as augers were being pulled causing the Bentonite seal to be thin and not alot of sand in the Sand Pack

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Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: YMW-19 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION, BLOW COUNTS | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|
| | | | | | | First 8' previously Recorded |
| | | | 8-10 | YMW-19-SB-B ST=9:53<br>BC 6/22/27/17<br>~80% Recovery<br>PID=20.0 | | 8-8.5 silty sand w/gravel; med Brown; wet; sub rounded; No odor; No cohesion<br>8.5-10 Sandy gravel; med Brown to some clasts were light gray; subrounded to rounded; No odor; No cohesion clasts size from sand to +2 inches wet<br>— Note: added Water @ 9' to combat the Heaves; had to pull Auger because the stem was stuck and some delay if in hole drill chatering alot @ 9' |
| | | | 13'-15' | YMW-19-SB-C ST=11:40<br>1/10/21/19<br>~40% Recovery<br>PID=0.0 ppm | | 10-15 Sandy gravel; med Brown to some lt gray clast; Subrounded to rounded; wet; No odor or Cohesion clasts size from sand to +2 inches (Alluvium) |

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: VMW-20 RECORDED BY: JB

4/19/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| | | | 12:5 VMW-20-SB-A (2-4) | | | | | |
| 2 | | Downhole | | (1.6 ppm VOC, 2% $O_2$, 5% LEL) | | | No Stain, No Odor, Moist | 2-2.5 Black Silty Sand w/ glass, some 1" minus gravel |
| 3 | | Heated Headspace | | (39.2 ppm VOC) | | | | 2.5-3.5 Orange Sand Scale Flakes w/ glass; 3.5-4 orange & Black Silty Sand w/ ¼" minus gravel |
| 4 | | | 1230 VMW-20-SB-A * (4-6) | | | | Heated Headspace VOC 943 ppm | 4-4.5 Black, Clay, Stain/Odor, Mo. w/ Brown wood fibers; 4.5-6 Grey Silt odor No Stain, Moist |
| 5 | | Downhole | | (1.1 ppm VOC, 2% $O_2$, 5% LEL) | | | | |
| 6 | | | VMW-20-SB-B * 1300 | | | | Downhole (1.9 ppm VOC, 1.6% $O_2$, 5% LEL) | 6-7 Med Grey Silty Clay No Stain, No Odor, Moist; 7 Sandy Silt Wet No Stain, No Odor |
| 7 | | | | | | | | |
| 8 | | | | | | | Heated Headspace VOC 781 ppm | 7+ Could Not Advance likely due to Cobbles |
| 9 | | | | | | | | |

* Submitted for analysis

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Consulting Scientists and Engineers

# WELL LOG



RECORDED BY: TFS TYPE: (Test Pit, Bore Hole, Monitor, Etc.)

DATE STARTED: 4/25/13 1437 DATE FINISHED: 4/25/13 1645

**PROJECT INFORMATION:**

CLIENT: Yale PROJECT NAME & NO: Yale Oil PLP – Project # 11108

COUNTY: Yellowstone, MT PROPERTY OWNER

**WELL INFORMAITON:** HOLE NAME YMW-20 DEPTH: ELEVATION:

LEGAL DESCRIPTION: DESCRIPTIVE LOCATION

**DRILLING INFORMATION:** TARGET AQUIFER: Alluvium HOLE DIAMETER: 4.25

DRILLING CO. S. K. Geotechnical DRILLER NAME: John M

DRILLING METHOD: H.S. Auger DRILLING FLUID: None PURPOSE: Monitor Well
(Soil Sample, Geotech., monitor Well, Collect Water, Etc.)

STATIC WATER LEVEL: STATIC WATER DATE:

MP DESCRIPTION: MP HEIGHT EMP ELEVATION:

**CONSTRUCTION DETAIL:** WELL DESC: (ie: 2-inch, flush threaded, Sch 40, PVC): 2-inch, flush threaded, Sch 40, PVC

WELL SURF DETL (Flush, Stickup, Etc.) Flush WELL INTERVAL

SURF CASING HEIGHT N/A RISER HEIGHT N/A

SURFACE CASING Flush m SURFACE CASING INTERVAL

SCREEN DESCRIPTION SCREEN INTERVAL 4.4' - 14.4'

SAND PACK DESCRIPTION SAND PACK INTERVAL 3.5' - 14.4'

DEVELOPMENT DESCRIPTION ~~DEVELOPMENT INTERVAL~~ Bentonite 1 - 3.5

WATER SAMPLE DESCRIPTION ~~WATER SAMPLE~~ Bentonite Concrete INTERVAL

REMARKS 0.6" below

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

# WELL LOG



PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: Vale O.1

WELL ID: YMW - 20 RECORDED BY: ~~[illegible]~~ TES

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION, BLOW COUNTS | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|
| | | | | | | 0'-8' previously Recorded |
| | | | | YMW-20-SB-B 15:00 ~~15:30~~ 8'-10' ~40% Rec<br>BC WOH/1/1/1<br>HH VOC = 38.4 ppm | KDx | 8'-11 sand; wet; dark gray; subangular rounded; not cohesive; some silt color poorly graded<br>water table @ 9.9' |
| | | | | | | 11-13 Cobbles (Gravel) [illegible] returns<br>driller [illegible] Rig was chattering |
| | | | | 13-15 ~90%<br>YMW-20-SB-C 15:15<br>YMW-20-SB-CD 15:20<br>BC 1/2/6/14/<br>HH VOC = 49.8 ppm | | 13'-15' gravelly sand; wet; dark gray; subangular rounded to rounded; well graded; finning upward |

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: YMW-21 RECORDED BY: JB

4/19/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 2 | | | YMW-21-SB-A (2-4) 1430 Downhole (14.6 ppm VOC 0% LEL) | | | | 2-3.5 No Stain, No odor 3.5-4 stain/odor Heated Headspace VOC 1010 ppm | Sandy Silt, Lt Brown, DRY; Clay Black, moist |
| 3 | | | | | | | | |
| 4 | | | * YMW-21-SB-A (4-6) 1500 Downhole VOC 343 ppm LEL peak 57% | | | | 4-6 Stain/Odor Heated Headspace ~~VOC 1010 ppm~~ VOC 2720 ppm | Clay Black Moist |
| 5 | | Submitted for analysis | | | | | | |
| 6 | | | YMW-21-SB-A (6-7.5 1530 Downhole VOC 242 ppm LEL 49% Peak | | | | 6-7.5 Stain/Odor Heated Headspace ~~VOC 2720 ppm~~ VOC 2040 ppm | Black Clay Moist |
| 7 | | | | | | | | |
| 8 | | | | | | | | 7.5 + Could not advance auger (likely cobbles) |
| 9 | | | | | | | | |

2040

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# WELL LOG

Page ___ of ___

RECORDED BY: L MJ

TYPE: (Test Pit, Bore Hole, Monitor, Etc.)

DATE STARTED: 4/29/13

DATE FINISHED: 4/29/13

## PROJECT INFORMATION:

CLIENT: Yale

PROJECT NAME & NO: Yale Oil PLP – Project # 11108

COUNTY: Yellowstone, MT

PROPERTY OWNER

## WELL INFORMAITON:

HOLE NAME: YMW-21

DEPTH: 15'

ELEVATION:

LEGAL DESCRIPTION:

DESCRIPTIVE LOCATION

## DRILLING INFORMATION:

TARGET AQUIFER: Alluvium

HOLE DIAMETER: 4.25

DRILLING CO. S. K. Geotechnical

DRILLER NAME:

DRILLING METHOD: H.S. Auger

DRILLING FLUID: None

PURPOSE: Monitor Well
(Soil Sample, Geotech., monitor Well, Collect Water, Etc.)

STATIC WATER LEVEL:

STATIC WATER DATE:

MP DESCRIPTION:

MP HEIGHT

EMP ELEVATION:

## CONSTRUCTION DETAIL:

WELL DESC: (ie. 2-inch, flush threaded, Sch 40, PVC);

WELL SURF DETL (Flush, Stickup, Etc.)

WELL INTERVAL

SURF CASING HEIGHT

RISER HEIGHT

SURFACE CASING

SURFACE CASING INTERVAL

SCREEN DESCRIPTION

SCREEN INTERVAL 4.75 - 14.75

4 bags SAND PACK DESCRIPTION

SAND PACK INTERVAL ~~2'-9'~~ 3'-9'

2 bags ~~DEVELOPMENT~~ Bentonite DESCRIPTION Co Silica Sand 10/20

~~DEVELOPMENT~~ Bentonite INTERVAL ~~1'-2'~~ 1'-3'

WATER SAMPLE DESCRIPTION Pure Gold Med. Chips

WATER SAMPLE INTERVAL

REMARKS Had 6' of Water in the Hole

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: MW-21 RECORDED BY: LB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION, BLOW COUNTS | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|
| | | | | | | 0-8' dup snd w/ pbls to 1/8", backfill |
| | | | | | 8-10' SPT 2-12-14-13 | |
| | | | | | | 7.9': hit water |
| | | | | | | 8-8.5' most red brn snd w/ cbls |
| | | | | | | 8.5' strong PHC odor, some product? |
| | | | | 8'10' | ~~10'-12'~~ 8-10 MW-21-SB-B PID 376 ppm | |
| | | | | | 10-12' SPT 8-13-21-21 | 10 - snd w/ pbls to 1/8" decrease in PHC |
| | | | | 10'-12' | MW-21-SB-C PID 2490 ppm | 15 = TD hole at 15' 10-15' snd w/ pbls to 1/8" w/ occ cbls |

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Consulting Scientists and Engineers

# WELL LOG



RECORDED BY: TFS TYPE: (Test Pit, Bore Hole, Monitor, Etc.)

DATE STARTED: 4/25/13 1145 DATE FINISHED: 4/25/13 1340

## PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: Yale Oil PLP – Project # 11108

COUNTY: Yellowstone, MT PROPERTY OWNER Yale

## WELL INFORMAITON:

HOLE NAME YMW-22 DEPTH: 15 ELEVATION:

LEGAL DESCRIPTION: DESCRIPTIVE LOCATION

## DRILLING INFORMATION:

TARGET AQUIFER: Alluvium HOLE DIAMETER: ~~8"~~ 4.25

DRILLING CO. S. K. Geotechnical DRILLER NAME: John M

DRILLING METHOD: H.S. Auger DRILLING FLUID: None PURPOSE: Monitor Well
(Soil Sample, Geotech., monitor Well, Collect Water, Etc.)

STATIC WATER LEVEL: STATIC WATER DATE:

MP DESCRIPTION: MP HEIGHT EMP ELEVATION:

## CONSTRUCTION DETAIL:

WELL DESC: (ie: 2-inch, flush threaded, Sch 40, PVC):

WELL SURF DETL (Flush, Stickup, Etc.) WELL INTERVAL

SURF CASING HEIGHT RISER HEIGHT 2.5'

SURFACE CASING SURFACE CASING INTERVAL -2' to +3'

SCREEN DESCRIPTION SCREEN INTERVAL 4'-14

SAND PACK DESCRIPTION 10-20 Colorado SS. SAND PACK INTERVAL 3'-10.5'

DEVELOPMENT DESCRIPTION ~~DEVELOPMENT~~ Bentonite INTERVAL 1'-3'

WATER SAMPLE DESCRIPTION ~~WATER SAMPLE~~ Concrete INTERVAL 0-1

REMARKS Never came up the auger 4.5' From T.D.

6 SS

2 Bentonite

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# WELL LOG



PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: YMW-22 RECORDED BY: _____

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION, BLOW COUNTS | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|
| | | | | | | 0'-8' logged previously |
| | | | | | & 1% LEL taken @ 9' | 8'-12' sandy gravel; wet; dark gray; subrounded to Rounded; Alluvium; |
| | | | | YMW:22-SB-B = 1200 | | |
| | | | BC | 9'-11' 10/9/13/15 20% Recovery | | 12'-14.2' sand; wet; gray to black; rounded; No cohesion; subrounded to rounded |
| | | | | water @ 8.8' BGS | | |
| | | | | HH VOC = 0.0 ppm | | 14.2'-15' sandy Gravel; wet; med Brown to dark gray; Subrounded to rounded; Filtering upward |
| | | | | YMW-22-SB-C = 1220 | | |
| | | | BC | for 13'-16' 11/22/19/18 95% Recovery | | |
| | | | | HH VOC = 0.0 ppm | | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: YMW-22 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 1 | | | | | | | | |
| 2 | | | YMW-22-SB-A (2-4) | 11:15 | | | DRY | Sand Silt w/ some gravel & Glass — No Stain, No Odor (8.9 VOC Heated Headspace) |
| 3 | | | | | | | | |
| 4 | | | YMW-22-SB-A (4-6) | 1130 | | DRY | 4-4.5 Same As Above; 4.5-5 Silty Sand Orangish Brown; 5-5.5 Medium Brown Sandy Silt Gravel; 5.5-6.0 Dark Bronish Gray Clay | No Stain, Some Odor (1% LEL, 0 PPM VOC Down Hole) (VOC 114 ppm Heated Headspace) |
| 5 | | | | | | | | |
| 6 | | | YMW-22-SB-A * (6-8) | 1150 | | | Silty Clay w/ Sand, Dark Grey Moist, Stain & Odor, Water @ 8' | (VOC 4.29 PPM, 7% LEL) Down Ho; (VOC 875 ppm Heated Headspace) |
| 7 | | | | | | | | |
| 8 | | | | | | | | |

Could not Advance past 8' (Likely Cobbles)

H:\OFFICE\Forms\TEST HOLE LOG.doc

* submitted for analysis

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: _____ PROJECT NAME & NO: _____

WELL ID: V/MW-23 RECORDED BY: JB

4/17/13

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 2 | | V/MW-23-B-A * (2-4) 1405 (0ppm VOC, 0% LEL, Downhole) (710ppm VOC Heated Headspace) | | | | | 2-2.5 Sandy Silty Sand w/Gravel Dark Brown<br>2.5-3.5 Tar Black Compact Sandy Silt DRY<br>3.5-4 Silty Clay Olive Brown | |
| 4 | | V/MW-23-B-A (4-6) 1500 (0ppm VOC, 0% LEL, Downhole) (0ppm VOC Heated Headspace) | | | | | 4.0-4.5<br>4.5-5.0<br>5.0-6.0 | Silty Clay, Olive Brown Brown<br>Black Silty Gravel<br>Yellow Sandy Gravel DRY ~2"<br>No Stain<br>No Odor |
| 5 | | | | | | | | |
| 6 | | | | | | | | Could not Advance Below 6' Due to increasing gravel size (Refusal) |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |

* Submitted for analysis

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

# WELL LOG



RECORDED BY: TS TYPE: (Test Pit, Bore Hole, Monitor, Etc.)

DATE STARTED: 4/25/13 0925 DATE FINISHED: 4/25/13 1110

**PROJECT INFORMATION:**

CLIENT: Yale PROJECT NAME & NO: Yale Oil PLP – Project # 11108

COUNTY: Yellowstone, MT PROPERTY OWNER Yale oil

**WELL INFORMAITON:** HOLE NAME YMW-23 DEPTH: 15' ELEVATION:

LEGAL DESCRIPTION: DESCRIPTIVE LOCATION

**DRILLING INFORMATION:** TARGET AQUIFER: Alluvium HOLE DIAMETER: 6" 4.25

DRILLING CO. S. K. Geotechnical DRILLER NAME: John M.

DRILLING METHOD: H.S. Auger DRILLING FLUID: None PURPOSE: Monitor Well
(Soil Sample, Geotech., monitor Well, Collect Water, Etc.)

STATIC WATER LEVEL: STATIC WATER DATE:

MP DESCRIPTION: MP HEIGHT EMP ELEVATION:

**CONSTRUCTION DETAIL:** WELL DESC: (ie: 2-inch, flush threaded, Sch 40, PVC)

WELL SURF DETL (Flush, Stickup, Etc.) stickup WELL INTERVAL

SURF CASING HEIGHT RISER HEIGHT 2.5'

SURFACE CASING 4" steel SURFACE CASING INTERVAL

SCREEN DESCRIPTION 2"x10' sch 40 PVC .010 screen SCREEN INTERVAL 5'-15'

SAND PACK DESCRIPTION SAND PACK INTERVAL 4'-5.5'

DEVELOPMENT DESCRIPTION ~~DEVELOPMENT~~ Bentonite INTERVAL 1'-4'

WATER SAMPLE DESCRIPTION ~~WATER SAMPLE~~ Concrete INTERVAL

REMARKS lots of stuff + Heave. Heaved up to ~~6.5'~~ ~~BGS~~ 5.5' BGS
6" of heave on the Pipe

Materials: 10' well screen Env. Manufacture sch 40 } flush thread
7.5' sch 40' 2" PVC
1 Bottom Cap
2 10-20 Colorado SS
2 Pure Gold Medium Bentonite chips
1 2" expansion plug
1 4" steel pipe surface casing

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# WELL LOG



PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO:

WELL ID: 23 RECORDED BY: TFS

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION, BLOW COUNTS | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|
| | | | | | | First 8' Previously Recorded |
| | | | | HH VOP = 0.0 ppm | 9'-11' = 12/18/19/21 ~50% Recovery YMW-23-SB-B = 942 | HT gravel @ 8' water @ 8.11 |
| | | | | | | 8'-12 Sandy gravel; wet; olive Brown; subrounded to rounded; clast sizes from sand to +2"; no cohesion |
| | | | | HH VOP = 0.0 ppm | 13'-15' - 18/17/16/19 ~8% Recovery YMW-23-SB-C = 1010 | 12-14 Sand; wet; med Brown; subrounded; no cohesion |
| | | | | ~~VOP~~ | | 14-15 sandy gravel; wet; olive brown; subrounded to rounded; clast size sand to 2"; fining upward |
| | | | | | | Note: had 9" of ~~[illegible]~~ here from 13'-15' split spoon |

# MONITORING WELL FIELD NOTES

11/13/12 J. Bergin Focus Area Stak-Out

- Former Paint Area (FPA)
- Points along Loading Dock 701, 708, 709 were offset 18' West.
- Point 700 was offset 20' West
- Points 698, 699, 702, 703, 706, 707, 711, 710, 714, 715 were offset 18' West
- Points 697, 704, 705, 712, 713 were offset 12.5' (edge of grid)
- Point 692 offset 6' West due to Building
- Corner Grid Points 747, 749, 748 were not staked due to Building
- All other points staked in proposed location including TEL Area

12/10/12

YMW-22 Clearance Hole

0-2 Med. Difficulty Gravel

2-5 Easy Silt

@ 5'-6' ~~Wet Sand~~ Moist Clay

6'-8' Hydraulic Lock ~~Wet Clay~~ Moist Clay

8+ Encountered Cobbles (Could not penetrate w/ Hand Auger

January 7 2013, Monday

1000 Met Brian Lawrence EXXONMOBIL to inspect YMW-19 location approved to/for AirVac Excavation Location is >25' N of buried pipeline and OK to excavate w/o representative onsite

1030 Met Bob Ranford, 360 office Solution - showed him location of AirVac Excavation of YMW-14, YMW-13 YMW-12 and YMW-11. All location acceptable w/o condition

1100 Returned to office to finish loading equipment

1300 Met PSC onsite at YMW-19 Set up to AirVac
- Andy Contreras
- Travis Buerkley
- Eugene Isaacson

RTI Mark Johnson

1315 Conduct Health & Safety Briefing Tailgate Safety Meeting

1417 Begin AirVac

January 7 2013 Monday

| | | | | |
|---|---|---|---|---|
| 1417 | Air Mon. | O | 21.1 | Before AirVac Begun |
| | | LEL % | 0.00 | |
| | | $H_2S$ | 0.00 | |
| | | CO | 0.00 | |

YMW-19 Frozen Ground, Gravelly Clay
Need spud bar - air knife
Not working to <6"
Begin knife @ 6" w/ vacuum

1417 1417-1430 0-3 feet (1-3' Not frozen)
sample 1 $H_2S$ 0.00 CO 0.0
O 21.1 %LEL 0.00

1430 1430 - 1452 3'-5' Sample 2
$H_2S$ 0.0 CO 0.0 LEL 0.0 $O_2$ 21.1
Silty gravel/cobbles - loose, caving from 4'

1452 1452 - 1502 5'-7'
$H_2O$ 0.0 CO 0.0 LEL 0.0 $O_2$ 21.1
Wet sandy gravel @ 7'

Finish YMW-19. Demob
MOVE equip to YMW-18

Hrs January 7, 2013 Monday

1526 @ YMW-18

Setting up AirVac

Surface cover: 5" concrete

1533 Background Air

$H_2S$ 0.0 LEL 0.0 CO 0.0 $O_2$ 21.1

1540- 0'-3' Sample 1 @ 3'

$H_2S$ 0.02 LEL 0.01 CO 0.00 $O_2$ 20.7

Wet sticky black clay ~~[illegible]~~ w/ hydrocarbon odor @ 2'

1604 1607 3'-5 Sample 2 @ 5'

Wet, black hydrocarbon soaked sand

$H_2S$ 0.02 LEL 0.06 CO 0.00 $O_2$ 20.6

1609 5'-7 Sample 3 @ 7'

Water @ 7'

Wet Sand, saturated, black strong hydrocarbon

1614 $H_2S$ 0.0 LEL 0.0 CO 0.0 $O_2$ 21.0 @ 1' below surface

1615 Tear down equipment move to Hair 360 Solution

1659 Depart YMW-15 - end of shift



January 8, 2013 Tuesday

0800 Meet PSC @ Midland Pack Bldg

Move PSC to YMW-15 and set up

(A) Decide to move location about 15' to south to be out from under overhead power line. Location OK and cleared/approved by Jim Costello - P66

0916 Health and Safety Briefing

RTI - Mark Johnson and Rob Roll/MDEQ both onsite for oversight

0844 ExxonMobil EMGR Permit signed

0919 Start Air Vac YMW-15

4" asphalt w/ pea gravel sandy clayey gravel to 1'

Landscape fabric @ 1'. Very hard to Vac

Clayey/Sandy Gravel very compacted > 1'

@ 2½' encountered hydrocarbon odor

0955 Sample 1 @ 3'

$H_2S$ 0.00 LEL% 0.00 CO 0.00 $O_2$ 21.1

@ 1' LEL 0.1

1004 Resume Vac 3-5'

Same materials as 0-3' Red brick at 4'

Blue black clay plastic, damp at 5'

strong hydrocarbons odor

1022 ~~1022~~ Sample #2

1022 Vac 5'-7' [illegible]

1052 Sample 3 bluish grey clay, hydrocarbon odor

1055 End [illegible] @ 8'

Rite in the Rain

1053 Collect last of 3 samples for WC-YMW-15.

1056 Move to YMW-12

1147 Finish setup onsite / Lunch Break
Start Air Vac

1238 From Lunch - crew already working
Air Vac 0-3'
@ 2' damp blue gray silty sand w/ minor hydrocarbon odor - matl is slow to vac

1300 Sample 1 @ 3'
blu-gray silt, fine sand, loose
minor odor,

1306 Sample #2 @ 5'
same as sample 1 (@3') - also minor odor

1309 Start Vac @ 5' to 7'

1312 Sample #3 @ 7' - as above, wet
$H_2S$ 0.00 LEL 0.00 CO 0.00 $O_2$ 21.2
air mon. @ 1' below surface
Widen hole to 12" dia

1312 Sample WC-YMW-12



1313 Setting up Air Vac @ YMW-14
Asphalt cover 3"

1404 Start Air Vac 0-3'
(a) Sample #1 @ 3'
Wet silty, clayey sandy gravel to 6"
Lots of broken brick @ 6" to 12"
Gravel continues to about 2', then blue-black/gray black silty sand w/ hydrocarbon odor

1439 Sample #1 @ 3'
blue-black sand, silty strong hydrocarbon odor - strong odor of gasoline more fresh than degraded

1441 Sample #2 @ 5'
same material as above

1448 ~~Sample #3 @ 7'~~ ~~Concrete~~ Pipe slab at about 5' below asphalt bisects hole - pipe run E-W

1454 Decide to Air Vac in soil sample
(b) located 10' to SE @ SS-14-Center - concrete @ 12"

1500 Decide to drill asphalt / drill about 10' to NE of original
(c) Location given WC-YMW-14NE

Rite in the Rain

1/8/2013 (cont)

1502 Start core asphalt
1515 (c) Start Air Vac @ WC-YMW-14NE
Asphalt 3", broken brick 3"
Concrete slab @ 12"
Abandon location
1530 Core asphalt at location about 15' to SW of YMW-14
(d) New location WC-YMW-14SW
- location is about 5' to south of the E-W trend of pipe in YMW14 (a)
1540 Asphalt 3" thick
1546 Start AirVac in clayey gravel, black
Brick ~~and~~ and wood frag @ 2.5'
1611 Concrete slab and broken brick at 2.5'-3' - abandon location
(e) Move to ~~SS~~ Select another location at SS-14-NW (green water)
1630 Reposition all equip. for 0800 ~~start~~ 1/8/2013. Clean work areas of debris
1658 Depart Yale



1/9/2013 Wednesday

0800 Arrive onsite @ YMW-14
0810 Health and Safety Briefing
0845 Start AirVac WC-YMW-14NW (e)
Need to core asphalt
Asphalt 4"
0851 Background Air
$H_2S$ 000 LEL 000 CO 000 $O_2$ 21.1
0857 Concrete 'chunk' blocking 2/3 of hole
- will try coring-out — concrete extends throughout hole bottom
- abandon hole @ 18" depth - photo
0917 Relocate to a site
(f) 22 x 2.5' = 55' and 6' E of Grid Corner #14
0925 ID Loc WC-YMW-14C #55N (f)
AirVac & spud bar
brick frags @ 12" in black stained clay
- brick 3' 3 cm and fragments in w/ depth to 18"
- at 18' strong hydrocarbon odor
- 4" steel pipe running NNE-SSW @ 2'
0951 - abandon hole
- Call Kris Bolles - decide to try SS-14SW, then SS-25NW
1017 - Inform PBC Office staff at 550 #660 Bldg
1020 - Reposition DSC

Rite in the Rain

1024 Moving PSC to SS-14-SW (g)

(g) Begin Air Vac. Tries to previously hand augered on 6". Asphalt ~7"

Black clayey gravel w/ hydrocarbon stain & odor to 12". Some brick @ 2' and wood @ 2½'. Wood plank laying flat (spongy - difficult to break) across ½ hole diameter

1113 Sample 1 @ 3'

1117 Sheet metal @ 4' and fiberglass insulation

PSC "felt like a cavity @ 7' (auger kick)"

Lots of confounded/disorientated bricks @ 5'

So much so the hole is jagged w/ mixed debris

Can't get below 5' w/ 12" hole

1145 Abandon hole (g) LEL 0.00 CO 0.00 $H_2S$ 0.00 $O_2$ 21.2

1150 Called Kris Adler - agreed to move to SS-25 NW (h)

1215 Move equipment and finish mud up - Lunch Break

1300 (h) Start Air Vac (Asphalt 3")

0 - 3' Clayey Grv black stiff strong odor

1314 Sample #1 @ 3' WC-25-NW (h)

1316 Airknife pushing to 4' No problem

1327 Pipe encountered @ 4' on edge hole

Air Mon LEL 0.00 CO 0.00 $H_2S$ 0.00 $O_2$ 21.0

1328 Hole TD 5'



1345 ~~1400~~ Kris Adler reviewed all holes (Air Vac)

Decision - try SS-25 - (i) where previously augered to 2'

1400 Start Air Vac (i) LEL 0.0 CO 0.0

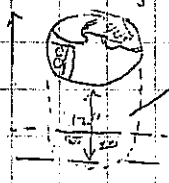
1409 Background/surface Air $H_2S$ 0.0 $O_2$ 21.0

Air Mon - asphalt chunks, brick, and clayey sandy Gvl

odor 1' below surface

Below 1' Clay (sandy) strong odor, black

Metal object (flattened, pipe?) at 1'



Decision to widen hole to south by 12' or more

If no other obstruction then can drill hole > 12" from metal object

1428 Corroded 4" pipe @ 2' on south edge of enlarged area

1429 Abandon Site (i)

Move equipment to YMW-13

Move YMW-13 to be 25' N of OH Elec powerline

1445 LEL 0.00 CO 0.00 $H_2S$ 0.00 $O_2$ 21.0

next page

1501 Set to ~~start~~ AirVac YMW-13
Surface is sandy clay gravel & weeds
1505 Start AirVac 0-3'
WC-YMW-13 is in line w/
RR spur dead-ending about 30' to W
Tar or Asphalt layer @ about 9"
This was center of former Tank 58
(1937 Fire site + was Tank 59)
1336 Sample #1 @ 3' - River Cobbles, stained
could Not collect matrix - cobble
stopped auger penetration
1337 Air Monitoring LEL 000 CO 000
$H_2S$ 000 $O_2$ 20.9
1341 River cobbles frequently ≥6"-8" down
to 4'
1406 Depth @ 5' - Cobble ~~[illegible]~~ density and size
prevent augering and recovery of matrix
- No sample possible - all rock
oil stained and odor (moderate)
1414 @5.5' and progressing slowly
1500 @ 7' feet - finish 1/10/13
1506 Attempt ~~Sample~~ Sample @ 7'
loose gravel @ 2"-1" dia - loose
matrix will Not stay in auger
- gravel tends to clog Auger
preventing recovery
1507 No Sample for WC-YMW-13
@ 7' LEL 000 CO 000 $H_2S$ 00 $O_2$ 21.9



0805 Conduct Health and Safety Briefing
0810 Collect samples from sidewall
at 3' and 5'
0823 Resume Air Vac from 7'-8' at
WC-YMW-13
0828 Air Mon. LEL 000 CO 000
$H_2S$ 000 $O_2$ 21.0
Material ~~dem~~ AirVac: Stained cobbles
and gravel >1"-9" w/ med gr
sand matrix, moderate odor
(*) Large cobbles flat to egg shaped
often play airvac pipe (6" dia)
- will be very difficult to hand-auger
and/or auger/split tube core
0840 Reach 8' - stop hole
Hole clear of any piping, obstructions
foundation, wires, etc
0846 Collect final sample 3 @ 7.5' from
sidewall.
Demob equipment
Move to YMW-11

next page 28

Rite in the Rain

January 10, 2013 (cont) Thursday

0902 Set up equip @ YMW-11
Note: These samples WC-YMW-11
0936 Background Air: LEL 000% CO 000 ppm
$H_2S$ 000 ppm $O_2$ 20.9%
Surface material gravel (<2"), occ. cobbles to 6" and fine-coarse sand and washed gt3 sand
0937 Start Air Vac - frost at surface start @ 2" to ~10"
Clayey sandy gravel & cobbles to ~12"
Brown sandy clay > 12" to
1000 Sample #1 @ 3' - brown sandy clay w/ minor odor
1011 Sample #2 @ 5' - same as above No odor
1017 Sample #3 @ 7' - more clay w/ minor sandy (incl. minor white clay (bentonite?) - minor odor
Finish hole to 8' - saturated clayey sand & clay.
Hole clear of any util, ppls, cement foundations, etc.
1026 Demob equip - move to YMW-22
1027 Air Mon in hole LEL 000 CO 000
$H_2S$ 00 $O_2$ 20.9

January 10, 2013 Thursday

~~Setup @ YMW-22~~

1048 ACCIDENT - hit low pipe with front tire - bounced front of truck - auger tied down on pickup bed bounced up and hit, through rear window - also sprung front passenger door
No injuries
Photos of accident site taken
1118 Begin setup @ YMW-22
1145 Finish setup - decide lunch break
1220 Resume Air Vac
- Asphalt cinders @ surface, frost to 6", compacted 6-10"
- Brown. Dk brown silty sand, no odor damp - f-vf grained, loose, occ 1/4" gvl.
1228 Sample #1 @ 3'
1233 @ 4' depth
Air Mon (at hole) & breathing
LEL 000 CO 000 ppm
$H_2S$ ppm 000 $O_2$ 20.9 %
1240 Sample #2 @ 5' Wet ~~clay & sand~~ silt clay
strong odor, brown-blk - gray black rusty brown mottling throughout 5'-5.5'

January 10 2013 Thursday

1246 Sample #3 @ 7' Saturated, standing water @ ~ 6.5'. Sandy sludge strong odor and sheen, oil black

1259 Air Mon @ 8' TD take 1' below surface LEL 000% CO 000 ppm $H_2S$ 000 ppm $O_2$ 20.9%

Demob move to YMW-23

1315 Confirm YMW-23 has until marking - for PPL — PG6 QWest —

1322 Begin setup. Begin Air VAC YMW-23 @ - Surface matl: Compacted cobbles, sandy — adjacent to RR embankment and piles of small silty/clayey/sandy gvl fill material. (b)

1332 — Well (Air VAC) location moved ~ 6' to SW to be out of dirt roadway

1345 Asphalt @ 2' — photo. hole bottom

1346 Move location to West 20' (c)

1354 2" Pipe @ 1' - Move location 4' W (d) Photo

1356 Lutest location (d) material is silty clay w/ minor gravel to 2" dk brown, stiff to 2', no odor, damp



January 10, 2013 Thursday

1421 Hard, very hard white 'crusty' layer at about 2.5'. Same hard layer encountered during ~~soil~~ shallow soil augering — source is the Magnesium salt binder used by MDOT for road sanding
- Widen hole for better access to spud/air knife through

1419 Sample #1 @ 5' — asphalt millings, sand, black, ~~set~~ pea-size gravel weak hydrocarbon odor, compacted (hard to air knife)

1422 Air Mon LEL 000% CO 000 ppm $H_2S$ 000 ppm $O_2$ 21.0%

1445 Gravel & Sand, gray black @ ~ 4', silty GVL 1'-3' loose — clean, no odor, damp, Sd Mel gr

1450 Sample #2 @ 5' - matl as above

1458 Sample #3 @ 7' - matl as above

~~1501 Depth 8'~~

1508 Hole to 8'. No obstructions, ppls, foundation, elec. etc. Photos

Demob for day

Move VAC Box to job trailer for storage — bad winter storm moving in overnight — probably no work 1/11/2013

Rite in the Rain

January 10, 2013 Thursday

1504 Air Mon in hole 1' below surface
LEL 000 % CO 000 ppm
$H_2S$ 000 ppm $O_2$ 21.0 %

~~Dispatch~~

①

| | | | |
|---|---|---|---|
| 1/7 | YMW 19 | 1300 - 1452 | ✓ |
| | 18 | 1526 - 1639 | ✓ |
| 1/8 | YMW 15 | 0919 - 1055 | ✓ |
| | YMW 12 | 1238 - 1312 | ✓ |
| ⓐ | YMW 14ⓐ | 1404 - 1454 | |
| ⓑ | SS-14-Cⓑ | 1454 - 1500 | |
| ⓒ | (WC-YMW-14NE) YMW 14a +10'N | 1502 - 1530 | |
| ⓓ | WC-14MW-14SW | 1630 - 1611 | |
| e | SS-14-NW | | |



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③

| | | | |
|---|---|---|---|
| 1/10 | YMW-22 | ~~1118~~ 1220 - 1259 | |
| ⓐ | YMW-23 | 1322 - 1332 | |
| ⓑ | YMW-23 | 1332 - 1345 | |
| ⓒ | YMW-23 | 1346 - 1354 | |
| ⓓ | YMW-23 | 1356 - 1508 | |

Rite in the Rain

January 16, 2013 (Wednesday)

| Time | Comment |
|---|---|
| 0830 | Arrive onsite at job trailer |
| 0830 | PSC onsite |
| 0854 | Conduct Health & Safety Briefing |
| N/A | ~~Relocate equipment from job trailer to TEL area to Arvac Excavator YMW-21 and YMW-17~~ |
| GDS 1/16 | ~~Note: After review on list of utility and pipelines with Kris Adler decision made to relocate YMW-17 approx. 100' to East of original loc. in Work Plan~~ |
| GDS 1/16 | ~~Air Monitoring (background) at YMW-~~ ~~LEL~~ ~~$H_2S$~~ ~~CO~~ ~~$O_2$~~ |
| 0935 | Kris Adler arrive onsite to provide additional safety and procedures before start work |
| 0907 | Personnel: Jim Shaffer Hydrometrics; Aaron Korell, Andy Contreaz, Eugene Isakson } PSC |

January 16, 2013 (cont.)



| Time | Comments |
|---|---|
| 0935 | All work curtailed pending review of all safety procedures and protocols by Exxon, LPS requirement |
| 1000 | Depart YMW Site - after discuss work stop with Mark Johnson/RTL |
| 1030 ~~1100~~ | To office - unload rental truck |
| 1100 | Finish task |

Rain in the Rain

January 23, 2013 J. Berryman

| Time | Comments |
|---|---|
| 0900 | Arrive @ Job Site Trailer |
| | PSC on Site |
| | Safety Meeting |
| 1000 | Start on Grid CNTR 14 |
| | (Alternate location for YMW-14) |
| | Frost 0-1' |
| | Piece of wood protruding from |
| | Pad @ 1', Backfilled w/ Sand & Pot |
| | Hole cover back |
| 1035 | Relocate SE 5' from CNTR Grid 14 |
| | Cored Asphalt (12" Ø), 4" Thick |
| | 4-12" Frozen Gravel |
| | 12" 4x4" Wooden Board |
| 1125 | Backfilled Hole w/ Sand & Pot cored |
| | Replacement Cover back on |
| 1250 | Moved to YMW-21 |
| 1250 | Began Air Knife & Spade for thing |
| | Frozen Soil, Air Testing OK |
| 1300 | 0-2.5' Silty Clay Olive Brown |
| | 2.5-3' Clay Silty/Clay Sludge Black |
| | Sampled @ 3' |



1/23/13 J. Berryman

| Time | Comments |
|---|---|
| | 3'-5' Clayey, Silt Black Stain Sludge |
| | Air Monitor 0's & 21.9% $O_2$ |
| | 5-7' Sampled @ 5' |
| | 5-7 Clayey, Silt Sludge Black Stain |
| | 7-8 Same As Above |
| | Sampled @ 7' |
| | Composited Samples in |
| 1320 | WC-YMW-21' 1/23/13 1320 |
| | Black liquid 7-8' BGS |
| | water (Product ?) |
| | 8' Encountered Hard Layer (Gabbro?) |
| | Air Monitoring |
| | AT 3' Ø LEL, VOC Breathing Zone (BZ) |
| | Ø LEL 5PPM VOC Hole |
| | AT 5' Ø LEL, VOC BZ |
| | Ø LEL, VOC 14ppm |
| | AT 7' Ø LEL, VOC BZ |
| | Ø LEL, VOC 45 ppm |
| | AT 8' Ø LEL, VOC BZ |
| | Ø LEL, VOC 48PPM, in the Rain |

1/23/13 J. Bergin

| Time | Comments |
|---|---|
| 1445 | Start Cleaning YMW-17 |
| | Frozen Silty Clay Olive Brown 0'-1' |
| | Dry Silty Clay w/ 1/2 Gravels 1'-2' Olive Brown |
| | 2'-2.5' Tan Silty Clay Black Hard Digging |
| | 2.5-3 Dry Silty Clay Olive Brown |
| 1530 | Sampled @ 3' start of → |
| | Clay, Moist Black & Olive Brown Odor |
| 1540 | Sample 5' Silty/Clay Slightly Moist → |
| | Black Odor/Stain |
| 1545 | Sampled 7' Clayey/Silt Slightly Moist |
| | Black Odor/Stone (Gasoline Odor?) |
| | Composited WC-YMW-17 |
| | 7-8' Same as above, |
| | Water @ Bottom of Hole |
| | AT 3' Ø, LEL/VOC BZ & in Hole |
| | AT 5' Ø LEL/VOC in BZ |
| | Ø LEL, 66 ppm VOC in Hole |
| | AT 7' Ø LEL/VOC in BZ |
| | Ø LEL, 89 PPM VOC in Hole |



1/23/13 J. Bergin

| Time | Comments |
|---|---|
| | AT 8' Ø LEL, VOC in BZ |
| | 2% LEL, 237 ppm in Hole |
| | Wet Bottom |

Rite in the Rain

1/24/13 John Begin

| Time | Comments |
|---|---|
| 0800 | Safety Meeting Hydro, RSC, & RTI in attendance |
| | Set-up |
| 0900 | ~~Start~~ Pon YMW-16 Clearance Hole |
| 0920 | Ø LEL, Ø CO, Ø $H_2S$, 21.2% $O_2$ |
| | Frozen Silty clay olive Brown D-1' |
| | 1'-3 Dry Silty Clay olive Brown hard Pack |
| | 3' Ø LEL, Ø CO, Ø $H_2S$, 20.9 $O_2$ |
| | Sample @ BZ |
| | AT 4' Odor detected |
| | Ø LEL/VOC in BZ |
| | Ø LEL & 25 ppm VOC in Hole |
| 1010 | 5' Saturated clay Silt Moist Greyish Black Stain & Odor |
| 1020 | 7' Sandy Rock ½"-1" Gravels wet Black Sand Odor/Stain |
| | Gravels Begin @ 7' Water in Hole |

1/24/13 J. Bergin

1120 Moved to YMW-10 (Auto Mugin)
Moved Hole 25' South for Overhead
Powerline Clearance, Owner
Verbally agreed to location change
1125 Began Clearing Hole
0-1 Frozen Sandy Gravel, Lt Gray Hard
1-3' Silty Clay Dry Olive Brown
No Stain or Odor
1150 Sampled @ 3' ~~Sandy~~ Gravely Sand
Olive Brown, DRY, No Stain or odor
3' Began 1"+ Cobbles Rounded
1200 Sampled 5' Sandy Gravel, Olive Brown
No Stain or Odor
1210 Sampled 7' Cobble (Minor Sand
Olive Brown No Stain or Odor
1215 Composite Sample WC-YMW-10
1220 Finish Clearing YMW-10 No Water (DRY)



1300 Moved To YMW-20 (MDOT)
0 $H_2S$, LEL, VOC, & 20.9% $O_2$
1320 Start Clearing Hole
0-1 Snow Cover Frozen Silty Clay Olive Brown
1-3 Silt Clay, Dry Olive Brown
Sampled @ 3' Slightly Moist Clay Silt
Olive Brown
1350 4" Encounter 2" Pipe, Moved Still
5' to try again
1347 Composited Surface Samples
WC-SS
1455 Cored Through Asphalt
w/ 1' of Aggregate
1520 Placed Composited Surface Samples
into Ice Box
1540 Sampled 3' Sandy Gravel DRY
Olive Brown w/ Orange, Hard digging Clay

Rite in the Rain

J. Bergin 1/24/13

| Time | Comments |
|---|---|
| 1600 | Sampled 5' Moist Black Clay Gravel Odor/Stain Ø LEL, $H_2S$, CO & 20.8% $O_2$ Change occured @ 5' |
| 1620 | Sampled 7' Moist Black Odor/Stain Glass piece was Aged |
| 1625 | Composited MW-YMW-20 |
| | Water @ 8' seeping in |
| | Ø LEL, $H_2S$, CO & 20.9% $O_2$ in Air |
| 1640 | Filled in Both Clearance Holes @ YMW-20 w/ Knife River Sand (Left one where monitoring well to be completed) |
| 1650 | Lock Job site Trailer & Left site |



J. Bergin 1/25/13

| | |
|---|---|
| 0810 | Safety Meeting |
| 0900 | Start Core Drilling @ next stop for YMW-14 clearance hole Ø LEL $H_2S$, & CO, 21.2% $O_2$ |
| 1115 | Finally cleared Asphalt ~6" Ø LEL, Ø $H_2S$, Ø CO, & 21.0% $O_2$ BZ |
| | 6" - 1' Frozen Gravel Sand, Tan w/ Orange Rock & Clay lining ? |
| 1140 | 1' - 2' Tar Black Hard Odor Ø LEL, Ø $H_2S$, Ø CO, 21.2% $O_2$ BZ Ø LEL, Ø $H_2S$, Ø CO, 21 ND |
| | 2' - 3 Black, Clay Stained Moist 5% LEL, Ø $H_2S$, Ø CO, 21.0% $O_2$ ND |
| 1200 | Sampled @ 3' Clayey Silt, Black Moist, Stain-Odor |
| | 4.5' - 9% LEL, Ø $H_2S$, Ø CO, 20.7% $O_2$ ND |

Rite in the Rain

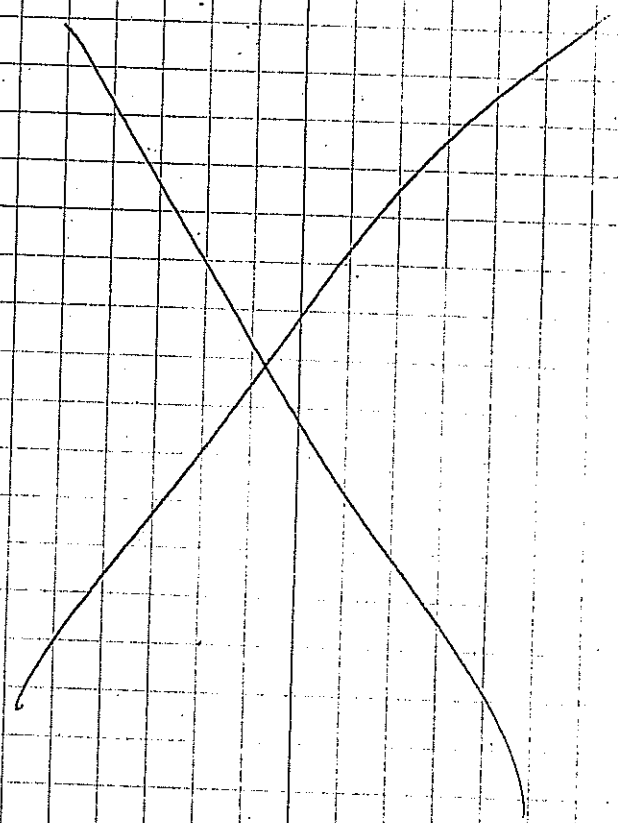
J. Berg 1/25/13

| Time | Comments |
|---|---|
| 1215 | Sampled @ 5' Silty Clay Faded Black Stain Odor Slightly Moist (Gasoline?) |
| | Sheen on Water (snow melt) near Clearance Hole |
| 1230 | Sampled @ 7' Silty Gravel, Black Stain/Odor Slightly Moist |
| | 7' start of Gravels |
| | Ø LEL, Ø $H_2S$, Ø CO, ≈19% $O_2$ DH |
| | 5' Silty Gravel, Black |
| | 19% LEL, Ø $H_2S$, Ø CO, 19.7% $O_2$ DH 5' |
| | 0 LEL, Ø $H_2S$, Ø CO, 20.4% $O_2$ BZ |
| | DRY Hole |
| 1240 | 0% LEL, Ø $H_2S$, Ø CO, 20.4% $O_2$ DH 5' |
| 1250 | Backfill Clearance Hole w/ Sand & Placed Cone on Top |



J. Bergin 1/25/13

| | |
|---|---|
| 1300 | Decon Equipment (Augers, Bailer, etc.) |
| 1315 | Backfilled MW-16 w/ ~1' of water on bottom of hole |



Rite in the Rain

John Bergin

1-4-13 1500 YOSD-1301-100
(Soil Sample to test Backfill Material
3/8 minus natural fines from Knife River

1-10-13 0925 Backfilled YMW-18 Clearance Hole
~3" Water @ bottom of hole
0930 Backfilled YMW-19 Clearance Hole
~3" Water @ bottom of hole

0940 Backfilled YMW-14 Clearance Hole
No water visible

0945 Backfilled YMW-15 Clearance Hole
No Water Visible

1000 Backfilled YMW-13 Clearance Hole
Hole took ~2X Backfill

1600-1700 Backfilled YMW-11, YMW-22, ~~&~~
YMW-23, ~~YMW-~~ JB
No visible water in above clearance
holes

J. Bergin

4/23/13

| Sample | Time | VOC |
|---|---|---|
| YMW-18-SS-A | 0950 | |
| YMW-18-SS-B | 1005 | |
| YMW-18-SS-C | 1030 | |
| YMW-18-SB-A (2-4) | 1035 | 448 |
| YMW-18-SB-A (4-6) | 1050 | 185 |
| YMW-18-SB-B (6-8) | 1105 | 277 |
| YOSD-1304-103 | 1245 | |

* Submitted to Lab

J. Bergin

4/23/13

| Sample | Time | VOC |
|---|---|---|
| YMW-19-SS-A | 1300 | |
| YMW-19-SS-B | 1305 | |
| YMW-19-SS-C | 1315 | |
| YMW-19-SB-A (2-4) | 1405 | 22.5 |
| Dup YMW-19-SB-AD (2-4) | 1406 | |
| YMW-19-SB-A (4-4.5) | 1430 | 10.5 |

4/9/13 T. Swant

Soil sampling from holes adjacent to monitoring well boring

Conducted Safety Meeting
J. Bergin Mark Johnson
T. Swant Kris Adler

YMW-14 offset 2' South

| | | | |
|---|---|---|---|
| YMW-14-SS-A | 0-6" | 10:50 | |
| YMW-14-SS-B | 6-12" | 10:59 | |
| YMW-14-SS-C | 12-24" | 11:05 | |
| | | | PID (ppm) |
| YMW-14 ~~SS~~ SB-A | 2-4' | 11:50 | 1410 |

~3" pipe running N/S ~4'

| | | | |
|---|---|---|---|
| | | | PID |
| ✱ YMW-14-SB-A | 4-5' | 14:10 | 2110 |

met refusal @ 5.5' LEL 47%
mark johnson LEL 100% in hole
VOCs ~300 ppm

✱ Denotes submitted sample



4/10/13 J. Bergin

Safety Meeting: K. Adler, M. Johnson, K. Johnson & J. Bergin

YMW-13 offset SW 5'

| | | | |
|---|---|---|---|
| YMW-13-SS-A | 0-6" | 0930 | |
| YMW-13-SS-B | 6"-12" | 0945 | |
| YMW-13-SS-C | 1'-2' | 1010 | |
| | | | PID PPM |
| ✱ YM-13-SB-A (2-4) | | 11:15 | 1700? |
| YM-13-SB-~~A~~ (4-5.3) | | 15:15 | 241 |

✱ Denotes submitted sample

Rite in the Rain

4/11/13 J Begin

YMW-11-offset 4' North

| | | | |
|---|---|---|---|
| ✱ YMW-11-SS-A | 0-0.5' | 0935 | |
| ✱ YMW-11-SS-B | 0.5'-1' | 0945 | |
| ✱ YMW-11-SS-C | 1'-2' | 0950 | |
| | | | PID (PPM) |
| ✱ YMW-11-SB-A(2-4) | 1015 | | 212 |
| YMW-11-SB-A(4-6) | 1035 | | 191 |
| YMW-11-SB-A(6-8) | 1050 | | 204 |
| ✱ YMW-11-SB-A(8-10) | 1110 | | 47 |

YMW-12- offset 4' North

✱ YMW-12-SS-A
✱ YMW-12-SS-B
✱ YMW-12-SS C

| | | PID ~~PID (PPM)~~ |
|---|---|---|
| YMW-12-SB-A(2-4) | 1220 | ~~285~~ ~~3378~~ |
| ✱ YMW-12-SB-A(4-8) | 1232 | ~~486~~ ~~4000~~ |
| YMW-12-SB-A(6-8) | 1250 | ~~368~~ |
| YMW-12-SB-AD(2-4) | 1225 | |

✱ Denotes submitted samples



4/11/13 J. Begin

| | | |
|---|---|---|
| ✱ YMW-12-SB-AD(4-8) | 1235 | |
| YMW-12-SB-AD (6-8) | 1255 | |

YMW-16 offset 4' west

| | | PID |
|---|---|---|
| ✱ YMW-16-SS-A | 1400 | |
| ✱ YMW-16-SS-B | 1410 | |
| ✱ YMW-16-SS-C | 1420 | |
| YMW-16-SB-A(2-4) | 1430 | 0 ppm |
| YMW-16-SB-A(4-6) | 1500 | 3330 ppm |
| ✱ YMW-16-SB-A(6-8) | 1515 | 4000 ppm |

✱ Denotes Submitted samples

Rite in the Rain

4/15/13

YMW-17 Sampling



Rite in the Rain

4/17/13

YMW-22 sampling



4/17/13

YMW-23 Sampling

Rite in the Rain

4/18/13

YMW-10 Sampling Offset 4' West

YMW-10-SS-A ~~0913~~ 0930

YMW-10-SS-B 0935

YMW-10-SS-C 0950

YMW-10-SB-A PID 126 ppm VOC
(2-4)

Refusal @ 4'



4/18/13

YMW-15

Rite in the Rain

~~YMW~~ 4/18/13

YMW-20



~~YMW~~ - 4/19/13

| Time | Sample ID | Depth | VOC (ppm) |
|---|---|---|---|
| 1045 | YMW-15-SB-A | (4-5) | +4000 ppm |
| | ★ YMW-15-SB-A | (2-4) | +4000 ppm |
| 1105 | ★ YOSD-1304-102 | Rinsate Blank | |
| 1215 | YMW-20-SB-A | (2-4) | 39.2 |
| 1230 | ★ YMW-20-SB-A | (4-6) | 943 |
| 1300 | ★ YMW-20-SB-B | (6-7) | 781 |
| | Refusal @ 7' | | |
| 1410 | ★ YMW-21-SS-A | | |
| 1415 | ★ YMW-21-SS-B | | |
| 1420 | YMW-21-SS-C | | |
| 1430 | YMW-21-SB-A | (2-4) | 1010 |
| 1500 | ★ YMW-21-SB-A | (4-6) | 2720 |
| 1530 | YMW-21-SB-A | (6-7.5) | 2040 |

Rite in the Rain

CONTENTS

| PAGE | REFERENCE | DATE |
|---|---|---|
| | | |



9-23-2013

| | | | |
|---|---|---|---|
| On-Site at 12:10 | | | On-Site |
| Rig Crew on Site | John 1230 & 1245 - SAM | | SK - John SAM |
| Kris Conducted Safety Mtg | 1245-1300 | | Hank Johnson Kris Anderson Tyler Smith Matt Kelly |
| Move, Rig up, etc | 1300 - 1330 | | |
| Spud 4MW-10 | 1330 | | |
| Drill 4MW-10 | 1330 - 1500 | | weather |
| Twist off Center Pin & drop to Smaller hole 1500 | | 1530 | Breezy ~15MPH |
| Drill Smaller Ages to 15' | 1530-1615 | | 43° F |
| Construct well | 1615 - 1800 | | Sunny - Pickly |

| | LEL | CO | $H_2S$ | $O_2$ | |
|---|---|---|---|---|---|
| Gas Test | 0 | 0 | 0 | 20.9 | - Ambient Air |

| | | |
|---|---|---|
| Re-Move Cuttings | 1800 - 1830 | |
| Drive to office | 1830 - 1900 | |

Rite in the Rain

4-23-13

| ~~Date~~ Location | Date | Time | ID | ~~#~~ Depth |
|---|---|---|---|---|
| YMW-10 | 4-23-2013 | 1410 | YMW-10-SB-D (not submitted) | 8-10 ft @ ppm PID |
| — 50% Recovery | | | | |
| YMW-10 | 4-23-2013 | 1530 | YMW-10-SB-B | 10-12 ft 2.6 PPM PID |
| 60% Recovery | | — At Water Table (10.3') | | |
| YMW-10 | 4-23-2013 | 1600 | YMW-10-SB-C | 13-15' 0.0 PPM PID |
| | | Bottom of hole | | |
| YMW-11 | 4/24/13 | 11:50 | YMW-11-SB-C | 14-16' |
| 50% Recovery | | Bottom of Hole | | 0.0 PPM PID |
| YMW-23 | 4/25/13 | 9:42 | YMW-23-SB-B | 8-10' |
| 50% Recovery | | water table @ 8.11' | | PID 0.0 ppm |
| YMW-23 | 4/25/13 | 10:10 | YMW-23-SB-C | 13-15' |
| 8% Recovery | | | | PID 0.0 ppm |
| YMW-22 | 4/25/13 | 12:00 | YMW-22-SB-B | 8-10' |
| 20% Recovery | | water table @ 8.8' | | 0.0 PID ppm |
| YMW-22 | 4/25/13 | 12:20 | YMW-22-SB-C | 13-15' |
| 95% Recovery | | | PID: | 0.0 ppm |



| Location | Date | Time | Sample ID | Depth |
|---|---|---|---|---|
| YMW-~~22~~ 20RA | 4/25/13 | 15:00 | YMW-20-SB-B | 8-10' |
| 40% Recovery | | water table @ 4.9' | | |
| (not submitted - "B" interval previously submitted on 4/19/13) | | | PID | 38.4 ppm |
| YMW-~~22~~ 20RA | 4/25/13 | 15:15 | YMW-20-SB-C | 13-15' |
| | 4/25/13 | 15:20 | YMW-20-SB-CD Duplicate | 13-15' |
| 80% Recovery | | | PID | 49.8 ppm |
| 4/24/13 | | 14:14 | YOSD-1304-POT | See next page |
| Potable water used by drillers | | | | |
| | | | CO / $H_2S$ / LEL / O | |
| 4/26/13 | | Gas test | 0 / 0 / 1 / 20.9 | |
| YMW-19 | 4/26/13 | 09:53 | YMW-19-SB-B | 8-10' |
| 30% Recovery | | water table @ | | PID 20.0 ppm |
| YMW-19 | 4/26/13 | 11:40 | YMW-19-SB-C | 13-15' |
| 40% Recovery | | | | PID 0.0 ppm |
| YMW-13 | 4/26/13 | 14:30 | YMW-13-SB-D | 8-10 |
| 70% Recovery | | | | PID 4000 ppm |
| YMW-13 | 4/26/13 | 14:44 | YMW-13-SB-B | 11-13 |
| 70% Recovery | | 011 @ 11.4 | | PID 954 ppm |
| YMW-13 | 4/26/13 | 15:01 | YMW-13-SB-C | 13-15 |
| 50% Recovery | | | | PID 1930 ppm |
| | | 0.2 / 11 / LEL / O2 | | Note in the Rain |
| | | 11+25 / CO / 0 / 20.7 | | |

| Location | Date | Time | Sample ID | PID | Depth | Comments |
|---|---|---|---|---|---|---|
| YMW-14 | 4/29/13 | 13:00 | YMW-14-SB-B | 4000ppm | 8-10' | Water/oil 7.1' |
| YMW-14 | 4/29/13 | 13:30 | YMW-14-SB-C | 1010 ppm | 13-15' | |
| Potable Water | 4/24/13 | 14:14 | YOSD-1304-POT | | | Water sample collected from Driller's potable water supply that was used to combat heaving sands |

Rite in the Rain

# GROUNDWATER SAMPLING FORMS

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): CJL
Laboratory Used: Energy Labs

Site Designation: YMW-11
Sample Code Number: YOSA-1306-300
Sample Date: 6/3/13
Sample Time: 12:30 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

| | | Comments |
|---|---|---|
| TD (ft): | 11.78 | |
| SWL (ft): | 10.41 | no access/pumping |
| Casing Diameter (I.D.") | 4.0 | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

***Site Conditions***

New Site: (Yes) No
Photo taken: Yes (No)
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other: Monitoring Well
Weather Conditions: calm breeze (windy) (no precip.) rain snow clear p. cloudy (overcast)
Air Temperature: °C (°F)

Pumping Rate (GPM): 4.3L/min

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) ±10 | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 1105 | 183.5 | 25.9 | 6.65 | 731 | 1.10 | 11.77 | 10.51 |
| 1112 | 185.9 | 23.3 | 6.70 | 722 | 0.53 | 12.36 | 10.47 |
| 1119 | 182.7 | 21.4 2.18 | 6.84 | 717 | 0.46 | 12.26 | 10.46 |
| 1126 | 184.8 | 2.03 | 6.87 | 699 | 0.19 | 12.45 | 10.44 |
| 1133 | 182.6 | 1.86 | 6.82 | 686 | N/A | 12.52 | 10.50 |
| 1140 | 182.3 | 1.76 | 6.86 | 676 | 1.19 | 12.60 | 10.49 |
| 1147 | 186.4 | 1.61 | 6.86 | 667 | 0.96 | 12.62 | 10.50 |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite (pump) bailer other
Low Flow Bladder

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Intake of pump 13.5 BTOPVC

Sample Team Member Signature: [signature]

Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): CJL
Laboratory Used: Energy Labs

Site Designation: YMW-10
Sample Code Number: YESD-1306-301
Sample Date: 6/3/13
Sample Time: 1510 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft):
SWL (ft): 8.85 — no access/pumping
Casing Diameter (I.D.") 2.0
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

***Site Conditions***

New Site: (Yes) No — Photo taken: Yes (No)
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other: Monitoring Well
Weather Conditions: calm breeze (windy) no precip. (rain) snow clear p. cloudy (overcast)
Air Temperature: °C 54 °F

5-15
After pump in well v 8.85'

Pumping Rate (GPM):

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 14:10 | ~~221.2~~ | ~~1.10~~ | 6.94 | 667 | 9.23 | 12.45 | 8.92 |
| 14:17 | ~~223.0~~ | ~~1.04~~ | 6.96 | 664 | 10.90 | 12.60 | 8.90 |
| 14:24 | ~~223.3~~ | ~~1.44~~ | 6.97 | 664 | 12.17 | 12.51 | 8.90 |
| 14:31 | ~~224.5~~ | ~~1.97~~ | 6.95 | 664 | 10.70 | 12.41 | 8.90 |
| 14:38 | ~~225.0~~ | ~~2.46~~ | 6.95 | 665 | 10.40 | 12.34 | 8.89 |
| 14:45 | ~~225.5~~ | ~~2.87~~ | 6.95 | 664 | 8.02 | 12.42 | 8.90 |
| 14:52 | ~~226.1~~ | ~~3.29~~ | 7.01 | 661 | 4.70 | 12.51 | 8.90 |

**Turbidity:** (circle) clear slight moderate very

**Sample Method:** (describe) grab composite (pump) bailer other
Low Flow Bladder

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Pump On ~ 14:03

Sample Team Member Signature:

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5/31/2013/11:42 AM

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): CJL
Laboratory Used: Energy Labs

Site Designation: YMW-19
Sample Code Number: YOSA-1306-302
Sample Date: 6/3/13
Sample Time: 17:45 (military)

## If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

## For Groundwater Samples

| | | Comments |
|---|---|---|
| well volume formula: | V = (TD-SWL)x(Dia.$^2$) / 25 | |
| TD (ft): | | |
| SWL (ft): | ~~9.32~~ 6.32 | no access/pumping |
| Casing Diameter (I.D.") | | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

## Site Conditions

New Site: (Yes) No  Photo taken: Yes (No)
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other: Monitoring Well
Weather Conditions: calm breeze (windy) (no precip.) rain snow clear p. cloudy (overcast)
Air Temperature: °C 54 °F

5-15

Pumping Rate (GPM): ~.3 L/min

Pump set @ 12.5 ft
Pump On @ 16:43

## Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 16:48 | ~~265.7~~ | ~~1.22~~ | 6.07 | 1396 | N/A | 11.34 | 6.36 |
| 16:54 | ~~243.2~~ | ~~1.46~~ | 6.09 | 1438 | | 11.09 | 6.39 |
| 17:00 | ~~244.5~~ | ~~0.74~~ | 6.10 | 1447 | | 10.97 | 6.39 |
| 17:06 | ~~183.8~~ | ~~0.51~~ | 6.11 | 1444 | | 10.96 | 6.39 |
| 17:12 | ~~158.7~~ | ~~0.51~~ | 6.13 | 1440 | | 10.95 | 6.40 |
| 17:18 | ~~142.7~~ | ~~0.46~~ | 6.14 | 1438 | | 10.96 | 6.40 |
| 17:24 | ~~127.7~~ | ~~0.42~~ | 6.15 | 1434 | | 10.93 | 6.41 |

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite (pump) bailer other
Low Flow bladder

## Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | Petroleum Smell | |
| Other: | | |

## Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments:

Sample Team Member Signature:

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5/31/2013/11:42 AM

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): CJL
Laboratory Used: Energy Labs

Site Designation: MW-01
Sample Code Number: 4050-1306-303
Sample Date: 6/4/13
Sample Time: 09:43 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

| | | |
|---|---|---|
| well volume formula: | V = (TD-SWL)x(Dia.$^2$) / 25 | Comments |
| TD (ft): | 15.50 | |
| SWL (ft): | 8.36 | no access/pumping |
| Casing Diameter (I.D.") | 2.0 | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

Discharge Timer 7sec
Fill Timer 25sec

Pumping Rate (GPM):
After pump installed to 12.0' SWL = 8.36

***Site Conditions***

New Site: (Yes) No Photo taken: Yes (No)
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other: Monitoring Well
Weather Conditions: (calm) breeze windy
~~no precip.~~ (rain) snow
clear p. cloudy (overcast)
Air Temperature: °C 41 °F

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 09:25 | 139.9 | 6.60 | 7.59 | 3075 | N/A | 10.95 | 8.36 |
| 09:31 | 144.8 | 6.52 | 7.58 | 3064 | | 10.85 | 8.36 |
| 09:37 | 153.6 | 6.47 | 7.58 | 3066 | | 10.81 | 8.35 |
| 09:43 | 158.1 | 6.40 | 7.60 | 3072 | | 10.83 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite (pump) bailer other
Low Flow Bladder

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | Brown | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Pump On - 09:19
- Pulled old tubing from inside of PVC casing.

Sample Team Member Signature:

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5/31/2013/11:42 AM

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): CJL
Laboratory Used: Energy Labs

Site Designation: MW-02
Sample Code Number: YA05-1306-304
Sample Date: 6/4/13
Sample Time: 12:30 (military)

## If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

## For Groundwater Samples

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$

| | | Comments |
|---|---|---|
| TD (ft): | 19.3 | |
| SWL (ft): | 4.23 | no access/pumping |
| Casing Diameter (I.D.") | | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

3.00 Discharge Timer
Fill Timer

Pumping Rate (GPM):

Pump set @ 11.0', SWL 4.17

## Site Conditions

New Site: (Yes) No
Photo taken: Yes (No)
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other: Monitoring Well
Weather Conditions: calm (breeze) windy (no precip.) rain snow clear p. cloudy (overcast)
Air Temperature: °C (°F)

## Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 11:50 | ~~-96.14~~ | ~~1.26~~ | 7.00 | 488 | N/A | 13.91 | 4.32 |
| 11:56 | ~~-106.0~~ | ~~0.84~~ | 7.10 | 469 | MOD | 13.80 | -Stopped water recal ORP |
| 12:20 | ~~-109.9~~ | ~~0.77~~ | 7.12 | 477 | MOD | 13.4 | 4.27 |
| 12:30 | ~~-113.5~~ | ~~0.71~~ | 7.12 | 481 | MOD | 13.50 | -Sample 4.23 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Turbidity: (circle) clear slight (moderate) very

Sample Method: (describe) grab composite (pump) bailer other
2in Bladder Low Flow

## Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

## Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Pump On @ 11:44, ORP not working right water MODERATELY Turbid
-Pulled dedicated tubing out of well prior to installing Hydros

Sample Team Member Signature:

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5/31/2013/11:42 AM

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): CJL
Laboratory Used: Energy Labs

Site Designation: MW-4
Sample Code Number: YOSA-1306-305
Sample Date: 6/4/18
Sample Time: 14:30 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #: YOSA-1306-306
Duplicate Sample Time: 15:10

***For Groundwater Samples***

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

| | | Comments |
|---|---|---|
| TD (ft): | 24.2 | |
| SWL (ft): | 8.58 | no access/pumping |
| Casing Diameter (I.D.") | 1.0 | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

24.2
8.6
15.6

Fill Time ~ 30sec
Discharge Time ~ 10

Pump Set to 17', SWL ~ 8.61

***Site Conditions***

New Site: (Yes) No  Photo taken: Yes (No)
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other: Monitoring Well
Weather Conditions: calm breeze (windy) (no precip.) rain snow clear p. cloudy (overcast)
Air Temperature: °C 53 °F

Pumping Rate (GPM):

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 14:11 | -75.2 | 0.78 | 6.22 | 1251 | N/A | 12.11 | 8.61 |
| 14:17 | -89.3 | 0.52 | 6.23 | 1253 | | 11.91 | 8.61 |
| 14:23 | -104.1 | 0.35 | 6.27 | 1253 | | 11.86 | 8.61 |
| 14:29 | -112.3 | 0.29 | 6.28 | 1252 | | 11.90 | 8.63 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite (pump) bailer other
Low Flow Bladder

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Pump On ~ 14:05 Petroleum Odor, Duplicate taken YOSA-1306-306 @ 15:10
- Pulled Dedicated tubing out of well, Well needs locking lid & lock. → Prior to installing Hydros tubing

Sample Team Member Signature: [signature]  Page  of

Water Sampling Form ~~ HF-430

1 - steel collar for 8 in well lid.

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** Yale Oil
**Project Code:** 11108.00
**Sample Team Member(s):** CJL
**Laboratory Used:** Energy Labs

**Site Designation:** MW-4
**Sample Code Number:** YOSD-1306-307
**Sample Date:** 6/4/13
**Sample Time:** 16:52 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft): 19.87
SWL (ft): 11.73 — no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Fill Rate - 35
Discharge Rate - 10

Pumping Rate (GPM):

Pump set @ 15', SWL after pump - 11.71

***Site Conditions***

New Site: (Yes) No — Photo taken: Yes (No)
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other: Monitoring Well
Weather Conditions: calm (breeze) windy (no precip.) rain snow clear p. cloudy (overcast)
Air Temperature: °C 55 °F

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 16:28 | ~~37.3~~ | ~~5.00~~ | 6.72 | 1175 | N/A | 12.59 | 11.70 |
| 16:34 | ~~38.1~~ | ~~3.91~~ | 6.72 | 1223 | | 12.46 | 11.69 |
| 16:40 | ~~40.1~~ | ~~3.61~~ | 6.77 | 1241 | | 12.44 | 11.69 |
| 16:46 | ~~42.1~~ | ~~3.38~~ | 6.79 | 1248 | | 12.45 | 11.70 |
| 16:52 | ~~45.4~~ | ~~3.23~~ | 6.80 | 1254 | | 12.46 | 11.70 |
| | | | | | | | |
| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite (pump) bailer other
2in. Low flow bladder

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Pump On 16:22

Sample Team Member Signature: [signature]

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Water Sampling Form ~~ HF-430

Could not achieve zero headspace

Hydrometrics, Inc.
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): CJL
Laboratory Used: Energy Labs

Site Designation: MW-03
Sample Code Number: 4500-1306-308
Sample Date: 6/5/13
Sample Time: 09:40 (military)

**If Duplicate Sample Collected, Please Record Below**

Duplicate Sample Code #:
Duplicate Sample Time:

**For Groundwater Samples**

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft): 16.5
SWL (ft): 6.63 — no access/pumping
Casing Diameter (I.D.") 2.0
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Fill Time: 40 sec.
Discharge Time: 5.0 sec

**Site Conditions**

New Site: (Yes) No — Photo taken: Yes (No)
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other: Monitoring Well
Weather Conditions: (calm) breeze windy (no precip.) rain snow (clear) p. cloudy overcast
Air Temperature: °C 60 °F

Pumping Rate (GPM):

Set pump @ 12.0' ft. BTOPVC., SWL after pump installed: 6.60

**Field Parameter Stabilization**

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 09:16 | ~~-164.5~~ | ~~2.43~~ | 6.87 | 5990 | N/A | 13.12 | 6.71 |
| 09:22 | ~~-170.5~~ | ~~0.55~~ | 6.83 | 5979 | | 13.01 | 6.84 |
| 09:28 | ~~-172.3~~ | ~~0.34~~ | 6.86 | 5912 | | 13.49 | 6.88 |
| 09:34 | ~~-169.3~~ | ~~0.21~~ | 6.88 | 5958 | | 13.94 | 6.77 |
| 09:40 | ~~-164.4~~ | ~~0.19~~ | 6.87 | 6029 | | 14.13 | 6.80 |
| | | | | | | | |
| | | | | | | | |

**Turbidity:** (circle) clear (slight) moderate very

**Sample Method:** (describe) grab composite pump bailer other
2in Low Flow bladder

**Field Parameters**

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntú) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

**Bottles Collected**

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Pump On: 09:12
Pulled old dedicated tubing from well prior to sampling
- Strong Petroleum Odor. Sheen on discharge.

Sample Team Member Signature: [signature] Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** Yale Oil
**Project Code:** 11108.00
**Sample Team Member(s):** CJL
**Laboratory Used:** Energy Labs

**Site Designation:** 4MW-15
**Sample Code Number:** 4OSD-1306-309
**Sample Date:** 6/5/13
**Sample Time:** (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

| | | |
|---|---|---|
| well volume formula: | V = (TD-SWL)x(Dia.$^2$) / 25 | Comments |
| TD (ft): | 15 | |
| SWL (ft): | ~~8.86~~ 7.86 | no access/pumping |
| Casing Diameter (I.D.") | | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

***Site Conditions***

New Site: (Yes) No  Photo taken: Yes (No)
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other: Monitoring Well
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

5-15

Fill Time - 60
Discharge Time - 6
Pumping Rate (GPM): ≈ 175ml/min

Set pump to 12' BTOPVC, swl prior to pump placement - 7.83

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 11:22 | ~~-42.1~~ | ~~0.94~~ | 6.30 | 2663 | | 15.44 | 8.00 |
| 11:28 | ~~-27.3~~ | ~~0.41~~ | 6.24 | 2614 | | 14.56 | 8.05 |
| 11:34 | ~~-24.9~~ | ~~0.31~~ | 6.33 | 2606 | | 14.60 | 8.10 |
| 11:40 | ~~-17.9~~ | ~~0.24~~ | 6.39 | 2604 | | 14.88 | 8.03 |
| 11:46 | ~~-15.5~~ | ~~0.19~~ | 6.53 | 2621 | | 15.73 | 7.99 |
| 11:52 | ~~-19.4~~ | ~~0.20~~ | 6.58 | 2626 | | 16.14 | 7.99 |
| 11:58 | ~~-31.2~~ | ~~0.19~~ | 6.59 | 2643 | | 16.26 | 7.97 |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite (pump) bailer other
2in Low Flow Bladder

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Pump On - 11:16, New Well, Strong gasoline smell from discharge water.

Sample Team Member Signature: [signature]  Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): CJL
Laboratory Used: Energy Labs

Site Designation: YMW-16
Sample Code Number: YOSD-1306-310
Sample Date: 6/5/13
Sample Time: 1624 (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *For Groundwater Samples*

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft): 15.21
SWL (ft): 7.79 Sheen Odor Brown no access/pumping
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Fill time - 40
Discharge time - 10
Pumping Rate (GPM):

### *Site Conditions*

New Site: (Yes) No Photo taken: Yes (No)
Site Type: DRY surface water process water
(monitoring well) domestic well adit seep
spring other: Monitoring Well
Weather Conditions: (calm) breeze windy
(no precip.) rain snow
(clear) p. cloudy overcast
Air Temperature: °C (8°C) °F

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 1512 | ~~-8.3~~ | ~~81.1~~ | 6.79 | 3256 | Very | 17.71 | Black Odor Shen |
| 1518 | ~~-2.9~~ | ~~23.1~~ | 6.48 | 3220 | | 15.54 | 7.71 |
| 1524 | ~~-23.7~~ | ~~18.6~~ | 6.49 | 3177 | Clear | 14.35 | 7.62 |
| 1530 | ~~-41.1~~ | ~~11.2~~ | 6.61 | 3090 | clear | 14.09 | 7.71 |
| 1536 | ~~-52.5~~ | ~~1.04~~ | 6.67 | 3024 | Clear | 13.93 | 7.72 |
| 1542 | ~~-59.8~~ | ~~0.95~~ | 6.72 | 2948 | Clear | 13.80 | 7.72 |
| 1548 | ~~-63.6~~ | ~~0.89~~ | 6.76 | 2885 | | 13.95 | 7.72 |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite (pump) bailer other
2" Low Flow Bladder

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | ~~0.648~~ | |
| DO (mg/l) | ~~-0.14~~ | |
| pH | 6.81 | |
| SC (µmhos/cm) | 2600 | |
| Turbidity (ntu) | 8.1 | |
| $H_2O$ Tmp. (°C) | 13.80 | |
| Color | | |
| Other: | SWL 7.71 | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Pump on 15:06, New Well, Brown product

Sample Team Member Signature: [signature]

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Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** Yale Oil
**Project Code:** 11108.00
**Sample Team Member(s):** CJL
**Laboratory Used:** Energy Labs

**Site Designation:** DI Blank
**Sample Code Number:** YOSD-1306-311
**Sample Date:** 6/5/13
**Sample Time:** 17:30 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$

| | | Comments |
|---|---|---|
| TD (ft): | | |
| SWL (ft): | | no access/pumping |
| Casing Diameter (I.D.") | | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

***Site Conditions***

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other: Monitoring Well
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

Pumping Rate (GPM):

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments:

Sample Team Member Signature: [signature]

Page 1 of 1

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): CJL, DB
Laboratory Used: EnergyLabs

Site Designation: YMW-2I
Sample Code Number: YOSD-1306-03P2
Sample Date: 6/6/13
Sample Time: 1042 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft): 16.45
SWL (ft): 7.82 — no access/pumping
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Fill Time - 40
Discharge Time - 70
Pumping Rate (GPM):
Set pump @ 12"

### Site Conditions

New Site: (Yes) No — Photo taken: Yes (No)
Site Type: DRY surface water process water (monitoring well) domestic well adit seep spring other: Monitoring Well
Weather Conditions: (calm) breeze windy (no precip.) rain snow (clear) p. cloudy overcast
Air Temperature: °C 65 °F

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| 1000 | -134.4 | ~~2.00~~ 1.80 | 6.14 | 2123 | Very | 14.22 | SWL 7.87 |
| 1006 | -136.4 | 1.18 | 6.15 | 2114 | " | 13.82 | 7.87 |
| 1012 | -136.6 | 1.04 | 6.40 | 2113 | " | 13.17 | 7.81 |
| 1018 | -144.6 | 0.52 | 6.61 | 2108 | moderate | 13.40 | 7.85 |
| 1024 | -154.9 | 0.40 | 6.66 | 2103 | " | 13.61 | 7.85 |
| 1030 | -162.0 | 0.31 | 6.73 | 2108 | Slight | 13.62 | 7.85 |
| 1036 | -165.3 | 0.17 | 6.74 | 2103 | Clear | 13.54 | 7.87 |

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite (pump) bailer other
1" Low Flow Bladder

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | -167.6 | |
| DO (mg/l) | 0.11 | |
| pH | 6.79 | |
| SC (µmhos/cm) | 2098 | |
| Turbidity (ntu) | Clear | |
| $H_2O$ Tmp. (°C) | 13.64 | |
| Color | | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Start @ 0954

Sample Team Member Signature: Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): CJL
Laboratory Used: Energy Labs

Site Designation: MW-17
Sample Code Number: YOSI-1306-313
Sample Date: 6/6/13
Sample Time: 1420 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft): 16.42
SWL (ft): 8.10 sheen & odor access/pumping
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Fill Time - 40 s
Discharge Time - 10 s
Pumping Rate (GPM):

Set Pump @ 12'

### Site Conditions

New Site: Yes No
Photo taken: Yes No
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other: Monitoring Well
Weather Conditions: calm breeze windy no precip. rain snow clear p. cloudy overcast
Air Temperature: °C 75 °F

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 1326 | -142.2 | 2.82 | 6.12 | 2539 | Very | 14.90 | 8.11 |
| 1332 | -143.3 | 0.31 | 5.83 | 2535 | [illegible] | 15.76 | 8.17 |
| 1338 | -164.8 | 0.32 | 6.08 | 2511 | slight | 14.52 | 8.17 |
| 1344 | -169.0 | 0.33 | 6.15 | 2506 | slight | 14.39 | 8.17 |
| 1350 | -180.9 | 0.32 | 6.34 | 2487 | slight | 14.49 | 8.17 |
| 1356 | -192.5 | 0.31 | 6.53 | 2462 | Clear | 14.38 | 8.17 |
| 1402 | -199.2 | 0.32 | 6.61 | 2460 | clear | 14.51 | 8.18 |

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Start Pump @ 1320

Sample Team Member Signature:

Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): CJL
Laboratory Used: Energy Labs

Site Designation: YMW-9R
Sample Code Number: YOSD-1306-319
Sample Date: 6/6/13
Sample Time: 1617 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft): 16.35
SWL (ft): 9.67 — no access/pumping
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

Fill Time 40s
Discharge Time 10s
Pumping Rate (GPM):

Set Pump @ 13'

***Site Conditions***

New Site: (Yes) No — Photo taken: Yes No
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other: Monitoring Well
Weather Conditions: calm (breeze) windy (no precip.) rain snow clear (p. cloudy) overcast
Air Temperature: °C 25 °F

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 1541 | 95.4 | 1.33 | 6.34 | 22,802 | slight | 16.47 | 9.74 |
| 1547 | 89.9 | 1.18 | 6.29 | 22889 | Slight | 15.62 | 9.75 |
| 1553 | 89.0 | 0.97 | 6.25 | 22803 | Clear | 15.29 | 9.76 |
| 1559 | 60.7 | 0.53 | 6.25 | 22753 | Clear | 14.87 | 9.77 |
| 1605 | 57.6 | 0.48 | 6.26 | 22726 | Clear | 14.84 | 9.77 |
| 1611 | 57.1 | 0.42 | 6.26 | 22675 | clear | 14.79 | 9.76 |
| 1617 | 44.3 | 0.36 | 6.27 | 22649 | Clear | 14.85 | 9.77 |

**Turbidity:** (circle) clear slight moderate very

**Sample Method:** (describe) grab composite (pump) bailer other
2" Bladder Low flow

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | 6.27 | |
| SC (µmhos/cm) | 22649 | |
| Turbidity (ntu) | Clear | |
| $H_2O$ Tmp. (°C) | 14.85 | |
| Color | N/A | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Start Pump @ 1537

Sample Team Member Signature: [signature]

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Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): CJL
Laboratory Used: Energy Labs

Site Designation: Rinsate Blank
Sample Code Number: VOSD.-1306-315
Sample Date: 6/6/13
Sample Time: 1715 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$

| | | Comments |
|---|---|---|
| TD (ft): | | |
| SWL (ft): | | no access/pumping |
| Casing Diameter (I.D.") | | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

***Site Conditions***

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other: Monitoring Well
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

Pumping Rate (GPM):

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments:

Sample Team Member Signature: Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): CJL GB
Laboratory Used: Energy Labs

Site Designation: YMW-20
Sample Code Number: Y050-1306-316
Sample Date: 6/7/13
Sample Time: 1012 (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *For Groundwater Samples*

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft): 13.31
SWL (ft): 5.55 odor — no access/pumping
Casing Diameter (I.D.") 12"
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

10
40

Pumping Rate (GPM):

### *Site Conditions*

New Site: (Yes) No — Photo taken: Yes No
Site Type: DRY surface water process water (monitoring well) domestic well adit seep spring other: Monitoring Well
Weather Conditions: (calm) breeze windy (no precip.) rain snow (clear) p. cloudy overcast
Air Temperature: °C 65 °F

Set Pump @ 9'

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 0930 | ~~-61.5~~ | ~~1.60~~ | 6.28 | 2532 | Slight | 16.34 | 5.57 |
| 0936 | ~~-51.1~~ | ~~1.54~~ | 6.02 | 2516 | Clear | 15.11 | 5.57 |
| 0942 | ~~-44.1~~ | ~~1.67~~ | 6.00 | 2477 | Clear | 14.78 | 5.58 |
| 0948 | ~~-34.8~~ | ~~0.89~~ | 6.21 | 2479 | Clear | 14.60 | 5.58 |
| 0954 | ~~-38.4~~ | ~~0.77~~ | 6.26 | 2477 | Clear | 14.28 | 5.58 |
| 1000 | ~~-33.5~~ | ~~0.57~~ | 6.31 | 2478 | Clear | 14.20 | 5.57 |
| 1006 | ~~-36.7~~ | ~~0.47~~ | 6.38 | 2479 | Clear | 14.37 | 5.58 |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite (pump) bailer other
2" Bladder Pump Low Flow

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Start Pump @ 0929

Sample Team Member Signature:

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Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.00
Sample Team Member(s): ~~CJL~~ DB
Laboratory Used: Energy Labs

Site Designation: YMW-23
Sample Code Number: YOSD-1306-317
Sample Date: 6/7/13
Sample Time: 0310 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

| | | |
|---|---|---|
| well volume formula: | V = (TD-SWL)x(Dia.$^2$) / 25 | Comments |
| TD (ft): | 16.35 | |
| SWL (ft): | 9.19 | no access/pumping |
| Casing Diameter (I.D.") | 2 | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

40
40

Pumping Rate (GPM):

***Site Conditions***

New Site: (Yes) No  Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other: Monitoring Well
Weather Conditions: (calm) breeze windy
(no precip.) rain snow
clear (p. cloudy) overcast
Air Temperature: °C 75 °F

Set Pump @ 12.5'

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 1234 | ~~-6.2~~ | ~~1.21~~ | 6.51 | 2621 | moderate | 18.06 | 9.19 |
| 1240 | ~~-22~~ | ~~0.49~~ | 6.25 | 2709 | " | 15.90 | 9.20 |
| 1246 | ~~-22.7~~ | ~~0.58~~ | 6.48 | 2807 | slight | 15.45 | 9.22 |
| 1252 | ~~-33.7~~ | ~~0.39~~ | 6.64 | 2913 | slight | 15.25 | 9.22 |
| 1258 | ~~-35.8~~ | ~~0.34~~ | 6.66 | 2887 | slight | 15.29 | 9.20 |
| 1304 | ~~-40.4~~ | ~~0.31~~ | 6.72 | 2923 | slight | 15.31 | 9.20 |
| 1310 | ~~-44.8~~ | ~~0.29~~ | 6.68 | 2901 | slight | 15.12 | 9.21 |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite (pump) bailer other
2" Bladder Pump

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | ~~-44.8~~ | |
| DO (mg/l) | ~~0.29~~ | |
| pH | 6.68 | |
| SC (µmhos/cm) | 2901 | |
| Turbidity (ntu) | slight | |
| $H_2O$ Tmp. (°C) | 15.12 | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |
| | | F or UF | | | |

Comments: Start Pump @ 1228

Sample Team Member Signature: Page of

Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): TS CS
Laboratory Used: Energy

Site Designation: YMW-10
Sample Code Number: YOSD-1309-110
Sample Date: 9/11/13
Sample Time: 945 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### For Groundwater Samples

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$

Comments

TD (ft):
SWL (ft): 8.97
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### Site Conditions

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY surface water process water
(monitoring well) domestic well adit seep
spring other:
Weather Conditions: (calm) breeze windy
(no precip) rain snow
(clear) p. cloudy overcast
Air Temperature: °C 65 °F

### For Low Flow

Pumping Rate (GPM):

Discharge Time: 45 sec
Fill Time: 5 sec

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 909 | 138.9 | 2.62 | 6.96 | 1701 | NA | 18.4 | 9.02 |
| 915 | 125.9 | 3.44 | 7.01 | 1703 | | 18.5 | 9.03 |
| 921 | 119.8 | 4.44 | 6.99 | 1705 | | 18.7 | 9.00 |
| 927 | 119.0 | 4.60 | 6.99 | 1705 | | 18.8 | 9.01 |
| 933 | 118.4 | 5.11 | 6.98 | 1706 | | 18.8 | 9.00 |
| 939 | 118.0 | 5.32 | 6.98 | 1707 | | 18.8 | 9.00 |
| 945 | 117.5 | 5.06 | 6.98 | 1708 | | 18.9 | 9.00 |

Turbidity: (circle) clear moderate very slight

Sample Method: (describe) grab composite pump bailer other

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | 117.5 | |
| DO (mg/l) | 5.06 | |
| pH | 6.96 | |
| SC (µmhos/cm) | 1708 | |
| Turbidity (ntu) | — | |
| $H_2O$ Tmp. (°C) | 18.9 | |
| Color | — | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Post Pump → 8.96. Pump on @ 903
Pump Plug @ 12 ft

Sample Team Member Signature: Tyler E. Sweet Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): TES · CJ
Laboratory Used: Energy

Site Designation: YMW-11
Sample Code Number: YOSD-1309-111
Sample Date: 9/9/13
Sample Time: 1020 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### For Groundwater Samples

| | | Comments |
|---|---|---|
| well volume formula: | V = (TD-SWL)x(Dia.$^2$) / 25 | |
| TD (ft): | ~~10.78~~ 15.78 | |
| SWL (ft): | 10.66 | |
| Casing Diameter (I.D.") | 4 | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

### Site Conditions

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY surface water process water (monitoring well) domestic well adit seep spring other:
Weather Conditions: (calm) breeze windy (no precip) rain snow (clear) p. cloudy overcast
Air Temperature: °C 75 °F

### For Low Flow

Pumping Rate (GPM):
5/60 @ 1010 36/60
@ 1025 35/45

### Field Parameter Stabilization

| | Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (~~mg/l~~ %) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|---|
| 0.73 | 1010 | 120.0 | 10.9 | 7.20 | 2468 | | 17.7 | |
| | 1015 | 120.0 | 30.6 | 7.24 | 2396 | | 17.9 | |
| 0.71 | 1020 | 123.9 | 31.7 | 7.24 | 2370 | | 17.9 | |
| 0.73 | 1025 | 125.8 | 34.3 | 7.23 | 2358 | | 17.8 | |
| 0.73 | 1030 | 129.8 | 24.3 | 7.24 | 2339 | | 17.8 | |
| 0.73 | 1035 | 130.9 | 26.8 | 7.24 | 2302 | | 17.7 | |
| | | 131.1 | 25.8 | 7.24 | 2264 | | 17.7 | |

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite (pump) bailer other
Low flow bladder

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | 131.1 | |
| DO (mg/l) | 25.8 | |
| pH | 7.24 | |
| SC (µmhos/cm) | 2264 | |
| Turbidity (ntu) | — | |
| $H_2O$ Tmp. (°C) | 17.7 | |
| Color | — | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Intake of pump is @ 13.5' Below PVC
minus 1 40 ml VOA. Broken in transit

Sample Team Member Signature: Tyler E. Swoll

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9/6/2013/3:26 PM

Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): CJ, TS
Laboratory Used: Energy

Site Designation: YMW-12
Sample Code Number: YOSD-1309-112
Sample Date: 9/11/13
Sample Time: 1600 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

### For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft): 14
SWL (ft): 7.50
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### For Low Flow

Pumping Rate (GPM):
5.3 → Fill
5 → DSC.

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| 1520 | -213.6 | .68 | 6.66 | 1506 | NA | 21.3 | 7.55 |
| 1526 | -213.5 | 0.50 | 6.65 | 1503 | | 20.4 | 7.58 |
| 1532 | -212.9 | .41 | 6.64 | 1500 | | 20.7 | 7.60 |
| 1538 | -212.4 | .23 | 6.64 | 1503 | | 20.9 | 7.58 |
| 1544 | -211.4 | .19 | 6.64 | 1497 | | 20.7 | 7.58 |
| 1550 | -211.5 | .19 | 6.64 | 1497 | | 20.7 | 7.58 |
| | | | | | | | |

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | -211.5 | |
| DO (mg/l) | .19 | |
| pH | 6.64 | |
| SC (µmhos/cm) | 1497 | |
| Turbidity (ntu) | — | |
| $H_2O$ Tmp. (°C) | 20.7 | |
| Color | — | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: pump hung @ 10.5' pump on @ 1512
product odor, sheen on discharge water

Sample Team Member Signature: [signature]

Page of

Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s):
Laboratory Used: Energy

Site Designation: YMW-13
Sample Code Number: YOSD-1309-113
Sample Date:
Sample Time: (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *Site Conditions*

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

### *For Groundwater Samples*

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$ Comments

TD (ft):
SWL (ft):
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### *For Low Flow*

Pumping Rate (GPM):

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
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**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): CJ, JS
Laboratory Used: Energy

Site Designation: YMW-14
Sample Code Number: YOSD-1309-114
Sample Date: 9/12/13
Sample Time: 945 (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *Site Conditions*

New Site: Yes (No) Photo taken: Yes No
Site Type: DRY surface water process water (monitoring well) domestic well adit seep spring other:
Weather Conditions: (calm) breeze windy (no precip.) rain snow (clear) p. cloudy overcast
Air Temperature: °C 60 °F

### *For Groundwater Samples*

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft): 17.0'
SWL (ft): 9.81
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### *For Low Flow*

Pumping Rate (GPM):
45 → Fill
5 → Disc

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 906 | -176.4 | 2.83 | 6.61 | 1080 | NA | 16.8 | 9.85 |
| 912 | -182.8 | 1.65 | 6.62 | 1078 | | 16.5 | 9.85 |
| 918 | -185.3 | 1.30 | 6.63 | 1077 | | 16.5 | 9.85 |
| 924 | -187.9 | .50 | 6.63 | 1075 | | 16.5 | 9.85 |
| 930 | -189.5 | .39 | 6.63 | 1076 | | 16.4 | 9.85 |
| 936 | -190.9 | 0.27 | 6.62 | 1078 | | 16.4 | 9.85 |
| 942 | -191.8 | .60 | 6.62 | 1077 | | 16.4 | 9.85 |

Turbidity: (circle) clear (moderate) (slight) very

Sample Method: (describe) grab composite (pump) bailer other
Low Flow / Bladder

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | -191.8 | |
| DO (mg/l) | .60 | |
| pH | 6.62 | |
| SC (µmhos/cm) | 1077 | |
| Turbidity (ntu) | — | |
| $H_2O$ Tmp. (°C) | 16.4 | |
| Color | — | |
| Other: | | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Pump hung @ 13', On @ 900.
Product sheen on disc. Water, petro odor

Sample Team Member Signature: [signature] Page of

Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s):
Laboratory Used: Energy

Site Designation: YMW-15
Sample Code Number: YOSD-1309-115
Sample Date:
Sample Time: (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *Site Conditions*

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

### *For Groundwater Samples*

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$

Comments

TD (ft): 15
SWL (ft):
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### *For Low Flow*

Pumping Rate (GPM):

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
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| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** grab composite pump bailer other
(describe)

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: Page . of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s):
Laboratory Used: Energy

Site Designation: YMW-16
Sample Code Number: YOSD-1309-116
Sample Date:
Sample Time: (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *Site Conditions*

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

### *For Groundwater Samples*

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$ Comments

TD (ft): 15.21
SWL (ft):
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### *For Low Flow*

Pumping Rate (GPM):

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
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| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: Page of

Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s):
Laboratory Used: Energy

Site Designation: YMW-17
Sample Code Number: YOSD-1309-117
Sample Date:
Sample Time: (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *Site Conditions*

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

### *For Groundwater Samples*

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$ Comments

TD (ft): 16.42
SWL (ft):
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### *For Low Flow*

Pumping Rate (GPM):

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
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| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: Page of

Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): CS, TS
Laboratory Used: Energy

Site Designation: YMW-18
Sample Code Number: YOSD-1309-118
Sample Date: 9/12/13
Sample Time: 1145 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft): 16.00
SWL (ft): 6.46
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other:
Weather Conditions: calm breeze windy no precip. rain snow clear p. cloudy overcast
Air Temperature: °C 67 °F

### For Low Flow

Pumping Rate (GPM):
Fill 50
Disc 5

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| 1113 | -247.5 | 2.58 | 7.08 | 2581 | NA | 19.8 | 6.55 |
| 1119 | -249.7 | 1.89 | 7.07 | 2585 | | 19.2 | 6.52 |
| 1125 | -260.4 | 1.29 | 7.11 | 2589 | | 18.9 | 6.51 |
| 1131 | -264.1 | 1.37 | 7.12 | 2597 | | 18.9 | 6.50 |
| 1137 | -260.2 | 1.15 | 7.13 | 2603 | | 18.9 | 6.51 |
| 1143 | -261.1 | 1.09 | 7.12 | 2603 | | 18.9 | 6.51 |
| | | | | | | | |

Turbidity: (circle) clear slight moderate very

Sample Method: (describe) grab composite pump bailer other

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | -261.1 | |
| DO (mg/l) | 1.09 | |
| pH | 7.12 | |
| SC (µmhos/cm) | 2603 | |
| Turbidity (ntu) | — | |
| $H_2O$ Tmp. (°C) | 18.9 | |
| Color | Brown | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Pump hung @ 9.5
Pump on @ 11:07
No odor

Sample Team Member Signature:

Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): TRS ; CS
Laboratory Used: Energy

Site Designation: YMW-19
Sample Code Number: YOSD-1309-119
Sample Date: 9/9/2013
Sample Time: 1245 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### Site Conditions

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY surface water process water (monitoring well) domestic well adit seep spring other:
Weather Conditions: calm (breeze) windy (no precip.) rain snow (clear) p. cloudy overcast
Air Temperature: °C 80 °F

### For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft):
SWL (ft): 7.27
Casing Diameter (I.D.") 4
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### For Low Flow

Pumping Rate (GPM): ~0.2 L/min
Discharge Time: 7 sec
Fill Time: 43 sec

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 1210 | 186.3 | 3.73 | 6.31 | 4676 | NA | 16.9° | 7.35 |
| 1215 | 180.5 | 4.40 | 6.26 | 4687 | | 16.6° | 7.30 |
| 1220 | 172.6 | 5.15 | 6.27 | 4682 | | 16.5 | 7.31 |
| 1225 | 170.6 | 4.44 | 6.27 | 4688 | | 16.4 | 7.33 |
| 1230 | 166.0 | 4.24 | 6.28 | 4682 | | 16.3 | 7.33 |
| 1235 | 159.7 | 4.17 | 6.29 | 4685 | | 16.7 | 7.31 |
| 1240 | 153.0 | 4.06 | 6.30 | 4682 | | 16.4 | 7.31 |

Turbidity: (circle) clear (slight) moderate very

Sample Method: (describe) grab composite (pump) bailer other
Low Flow bladder

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | 146.1 | |
| DO (mg/l) | 3.69 | |
| pH | 6.31 | |
| SC (µmhos/cm) | 4685 | |
| Turbidity (ntu) | slight | |
| $H_2O$ Tmp. (°C) | 16.3 | |
| Color | lt Yellow | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Pump Hung @ 17.5' Below Top of PVC; water after pump lowered 7.23' start Time 12:03; slight odor and v. slight sheen

Sample Team Member Signature: Tyler R. Swart

Page of

Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): CS CJ
Laboratory Used: Energy

Site Designation: YMW-20
Sample Code Number: YOSD-1309-120
Sample Date: 9/10/13
Sample Time: 1500 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### For Groundwater Samples

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$

Comments

TD (ft): 13.31
SWL (ft): 5.83
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### Site Conditions

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY surface water process water (monitoring well) domestic well adit seep spring other:
Weather Conditions: (calm) breeze windy (no precip.) rain snow (clear) p. cloudy overcast
Air Temperature: °C 85 °F

### For Low Flow

Pumping Rate (GPM):
Fill → 45
Disc → 8

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| 1431 | -171.7 | 1.86 | 6.84 | 2721 | NA | 19.9 | 5.86 |
| 1437 | -183.0 | .38 | 6.93 | 2898 | | 19.0 | 5.86 |
| 1443 | -193.4 | .21 | 6.99 | 3002 | | 18.7 | 5.89 |
| 1449 | -196.5 | 0.19 | 7.02 | 3036 | | 18.5 | 5.86 |
| 1455 | -198.9 | .20 | 7.04 | 3058 | | 18.5 | 5.87 |
| 1501 | -199.1 | .33 | 7.05 | 3070 | | 18.4 | 5.90 |
| 1507 | -196.3 | .26 | 7.05 | 3068 | | 18.0 | 5.87 |

Turbidity: (circle) clear (slight) (moderate) very

Sample Method: (describe) grab composite pump bailer other

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | -200.7 | |
| DO (mg/l) | .32 | |
| pH | 7.35 | |
| SC (µmhos/cm) | 35.3 | |
| Turbidity (ntu) | — | |
| $H_2O$ Tmp. (°C) | 18.7 | |
| Color | | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Pump on @ 14:25
pump: Hung @ 9.6
Petro odor

Sample Team Member Signature: Tyler F. Smith

Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): CJ, TS
Laboratory Used: Energy

Site Designation: YMW-21
Sample Code Number: YOSD-1309-121
Sample Date: 9/11/13
Sample Time: 13:40 (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *Site Conditions*

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY surface water process water (monitoring well) domestic well adit seep spring other:
Weather Conditions: calm (breeze) windy (no precip) rain snow (clear) p. cloudy overcast
Air Temperature: °C 75 °F

### *For Groundwater Samples*

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft): 16.45
SWL (ft): 8.15
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### *For Low Flow*

Pumping Rate (GPM):
45 → Fill
5 → Dise

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 13:08 | -231.2 | 0.43 | 7.32 | 1973 | NA | 17.4 | 8.21 |
| 13:13 | -236.3 | 0.26 | 7.32 | 1965 | | 16.9 | 8.19 |
| 13:18 | -238.4 | 0.20 | 7.32 | 1965 | | 16.7 | 8.21 |
| 13:23 | -238.8 | 0.23 | 7.32 | 1965 | | 16.5 | 8.21 |
| 13:28 | -239.4 | 0.17 | 7.33 | 1961 | | 16.6 | 8.21 |
| 13:33 | -239.3 | 0.20 | 7.35 | 1966 | | 16.4 | 8.19 |
| 13:38 | -238.9 | 0.19 | 7.33 | 1962 | | 16.4 | 8.21 |

**Turbidity:** (circle) clear moderate (slight) very

**Sample Method:** (describe) grab composite (pump) bailer other
Low Flow Bladder

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | -239.9 | |
| DO (mg/l) | 0.19 | |
| pH | 7.33 | |
| SC (µmhos/cm) | 1962 | |
| Turbidity (ntu) | — | |
| $H_2O$ Tmp. (°C) | 16.3 | |
| Color | — | |
| Other: | | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Pump on @ 13:00
Pump Hung @ 12'
product sheen on discharge water, product odor

Sample Team Member Signature: [signature] Page of

Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): CS, VS
Laboratory Used: Energy

Site Designation: YMW-22
Sample Code Number: YOSD-1309-122
Sample Date: 9/11/13
Sample Time: 1145 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### For Groundwater Samples

| | | Comments |
|---|---|---|
| well volume formula: | $V = \frac{(TD-SWL)x(Dia.^2)}{25}$ | |
| TD (ft): | 16.35 | |
| SWL (ft): | 10.17 | |
| Casing Diameter (I.D.") | 2 | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

### Site Conditions

New Site: Yes (No) Photo taken: Yes No
Site Type: DRY surface water process water (monitoring well) domestic well adit seep spring other:
Weather Conditions: (calm) breeze windy (no precip) rain snow (clear) p. cloudy overcast
Air Temperature: °C 67 °F

### For Low Flow

Pumping Rate (GPM):
Fill → 50
Disc → 8

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| 1057 | -192.5 | 1.64 | 7.14 | 4850 | NA | 18.5 | 10.24 |
| 1103 | -194.6 | 2.27 | 7.14 | 4624 | | 17.4 | 10.26 |
| 1109 | -196.7 | 2.21 | 7.17 | 4284 | | 17.1 | 10.26 |
| 1115 | -195.1 | 2.12 | 7.18 | 4182 | | 17.1 | 10.29 |
| 1121 | -193.3 | 3.58 | 7.23 | 3939 | | 17.1 | 10.28 |
| 1127 | -191.0 | 3.43 | 7.23 | 3844 | | 17.5 | 10.27 |
| 1133 | -196.6 | 3.14 | 7.27 | 3580 | | 17.2 | 10.28 |

Turbidity: (circle) clear (slight) moderate very

Sample Method: (describe) grab composite (pump) bailer other
Low Flow / Bladder

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | -196.6 | |
| DO (mg/l) | 3.14 | |
| pH | 7.27 | |
| SC (µmhos/cm) | 3580 | |
| Turbidity (ntu) | — | |
| $H_2O$ Tmp. (°C) | 17.2 | |
| Color | — | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: SWL post pump → 10.17
Pump on 1051 - pump depth 13'
Product odor

Sample Team Member Signature: [signature] Page of

Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): CS, JS
Laboratory Used: Energy

Site Designation: YMW-23
Sample Code Number: YOSD-1309-123
Sample Date: 9/10/13
Sample Time: 1250 (military)

**If Duplicate Sample Collected, Please Record Below**

Duplicate Sample Code #: YOSD-1309-123D
Duplicate Sample Time: 1300 | 139

**For Groundwater Samples**

| | | Comments |
|---|---|---|
| well volume formula: | V = (TD-SWL)x(Dia.²) / 25 | |
| TD (ft): | 16.35 | |
| SWL (ft): | 10.66 | |
| Casing Diameter (I.D.") | 2 | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

**Site Conditions**

New Site: Yes (No) Photo taken: Yes No
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other:
Weather Conditions: (calm) breeze windy no precip. rain snow clear p. cloudy overcast
Air Temperature: °C 65 °F

**For Low Flow**

Pumping Rate (GPM):

**Field Parameter Stabilization**

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 1216 | -164.4 | 0.60 | 7.04 | 3630 | | 20.3 | 10.68 |
| 1222 | -167.0 | 0.34 | 7.04 | 3672 | | 19.8 | 10.67 |
| 1228 | -168.4 | 0.24 | 7.04 | 3692 | | 19.6 | 10.67 |
| 1237 | -170.5 | 0.21 | 7.06 | 3600 | | 19.6 | 10.66 |
| 1242 | -171.3 | 0.22 | 7.06 | 3565 | | 19.6 | 10.69 |
| 1248 | -172.2 | 0.22 | 7.08 | 3507 | | 19.4 | 10.67 |
| | | | | | | | |

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite Low Flow Bladder (pump) bailer other

**Field Parameters**

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | -172.2 | |
| DO (mg/l) | .22 | |
| pH | 7.08 | |
| SC (µmhos/cm) | 3507 | |
| Turbidity (ntu) | — | |
| $H_2O$ Tmp. (°C) | 19.4 | |
| Color | — | |
| Other: | | |

**Bottles Collected**

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Pump on @ 1210, mild petro odor
Dupe!

Sample Team Member Signature: [signature] Page of

Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): TES / CS
Laboratory Used: Energy

Site Designation: MW-01
Sample Code Number: YOSD-1309-131
Sample Date: 9/9/2013
Sample Time: 16:05 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### For Groundwater Samples

| | | Comments |
|---|---|---|
| well volume formula: | V = (TD-SWL)x(Dia.$^2$) / 25 | |
| TD (ft): | 15.5 | |
| SWL (ft): | 8.61 | |
| Casing Diameter (I.D.") | 2 | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

### Site Conditions

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY surface water process water (monitoring well) domestic well adit seep spring other:
Weather Conditions: calm (breeze) windy (no precip) rain snow clear p. cloudy (overcast)
Air Temperature: °C 75 °F

### For Low Flow

Pumping Rate (GPM):

Discharge Time: 7 sec
Fill Time: 25 sec

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | SWL |
| 1530 | 139.1 | 3.70 | 7.65 | 3124 | NA | 16.3 | 8.62 |
| 1535 | 140.1 | 3.43 | 7.64 | 3116 | | 16.4 | 8.62 |
| 1540 | 142.8 | 3.28 | 7.65 | 3064 | | 16.2 | 8.62 |
| 1545 | 144.4 | 3.66 | 7.67 | 2997 | | 16.3 | 8.62 |
| 1550 | 145.2 | 3.60 | 7.68 | 2907 | | 16.4 | 8.62 |
| 1555 | 147.1 | 3.49 | 7.70 | 2851 | | 16.3 | 8.62 |
| 1600 | 148.4 | 3.88 | 7.71 | 2765 | | 16.4 | 8.62 |

Turbidity: (circle) (clear) moderate slight very

Sample Method: (describe) grab composite (pump) bailer other
Low Flow Bladder

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | 149.3 | |
| DO (mg/l) | 3.69 | |
| pH | 7.72 | |
| SC (µmhos/cm) | 2709 | |
| Turbidity (ntu) | Clear | |
| $H_2O$ Tmp. (°C) | 16.2 | |
| Color | clear | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Pump on @ 15:30
Pump Hung @ 12.5'

Sample Team Member Signature: Tyler E. Sweet

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Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): CS, TS
Laboratory Used: Energy

Site Designation: MW-~~02~~ 03
Sample Code Number: YOSD-1309-132~~2~~3 0 (DUP)
Sample Date: 9/12/13
Sample Time: 1330 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other:
Weather Conditions: calm breeze windy no precip. rain snow clear p. cloudy overcast
Air Temperature: °C 70 °F

### For Groundwater Samples

| | | Comments |
|---|---|---|
| well volume formula: | V = (TD-SWL)x(Dia.²) / 25 | |
| TD (ft): | 19.3 | |
| SWL (ft): | 6.63 | |
| Casing Diameter (I.D.") | 2 | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

### For Low Flow

Pumping Rate (GPM):
Fill → 50
Disc → 5

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| 1256 | -148.8 | 3.38 | 6.97 | 4124 | | 20.6 | 6.85 |
| 1302 | -149.1 | 2.79 | 6.96 | 4124 | | 20.7 | ~~[illegible]~~ 6.91 |
| 1308 | -154.4 | 2.84 | 6.96 | 4171 | | 20.8 | 7.05 (Reduced Fill) |
| 1314 | -160.6 | 3.23 | 6.96 | 4261 | | 20.7 | 7.07 |
| 1320 | -168.6 | .93 | 6.95 | 4321 | | 20.8 | 7.09 |
| 1326 | -172.6 | 1.01 | 6.95 | 4312 | | 20.8 | 7.10 |
| | | | | | | | |

Turbidity: (circle) clear slight moderate very

Sample Method: (describe) grab composite pump bailer other
2" Low Flow / Bladder

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | -172.6 | |
| DO (mg/l) | 1.01 | |
| pH | 6.95 | |
| SC (µmhos/cm) | 4312 | |
| Turbidity (ntu) | — | |
| $H_2O$ Tmp. (°C) | 20.8 | |
| Color | ~~Dark Brown~~ Yellow | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Pump hung @ 10.5', Pump on @ 1250
product odor

Sample Team Member Signature: [signature]

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Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): CJ, TS
Laboratory Used: Energy

Site Designation: MW-04
Sample Code Number: YOSD-1309-134
Sample Date: 9/10/13
Sample Time: 900 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### For Groundwater Samples

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$

Comments

TD (ft): 19.87
SWL (ft): 14.68
Casing Diameter (I.D.") 2
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### Site Conditions

New Site: Yes (No) Photo taken: Yes No
Site Type: DRY surface water process water (monitoring well) domestic well adit seep spring other:
Weather Conditions: calm (breeze) windy no precip. rain snow (clear) p. cloudy overcast
Air Temperature: °C 55 °F

### For Low Flow

Pumping Rate (GPM):
Fill → 45 sec
Disc. 10 sec

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes SWL |
|---|---|---|---|---|---|---|---|
| 834 | 172.6 | 58.0 | 7.30 | 1027 | | 16.5 | 14.68 |
| 840 | 190.0 | 54.6 | 7.24 | 1028 | | 16.8 | 14.68 |
| 846 | 195.3 | 47.4 | 7.20 | 1025 | | 16.8 | 14.68 |
| 852 | 198.2 | 56.2 | 7.22 | 1028 | | 16.6 | 14.68 |
| 858 | 201.9 | 57.1 | 7.23 | 1030 | | 16.6 | 14.68 |
| | | | | | | | |
| | | | | | | | |

Turbidity: (circle) (clear) slight moderate very

Sample Method: (describe) grab composite (pump) bailer other
Low Flow / Bladder

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | 201.9 | |
| DO (mg/l) | 57.1 | |
| pH | 7.23 | |
| SC (µmhos/cm) | 1030 | |
| Turbidity (ntu) | — | |
| $H_2O$ Tmp. (°C) | 16.6 | |
| Color | Clear | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: SWL post pump → 14.68
Pump on @ 8:28

Sample Team Member Signature: [signature]

Page of

Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): CS, TS
Laboratory Used: Energy

Site Designation: MW-06
Sample Code Number: YOSD-1309-136
Sample Date: 9/10/13
Sample Time: 1100 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other:
Weather Conditions: calm breeze windy no precip. rain snow clear p. cloudy overcast
Air Temperature: °C 60 °F

### For Groundwater Samples

| | | Comments |
|---|---|---|
| well volume formula: | V = (TD-SWL)x(Dia.²) / 25 | |
| TD (ft): | 24.2 | |
| SWL (ft): | 11.56 | |
| Casing Diameter (I.D.") | 2 | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

### For Low Flow

Pumping Rate (GPM):
Fill → 30 sec
Disc. → 10 sec

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | SWL |
| 1016 | -166.5 | 2.53 | 6.94 | 1309 | NA | 16.8 | 11.57 |
| 1022 | -166.5 | 06.6 | 6.98 | 1311 | | 16.9 | 11.58 |
| 1028 | -168.8 | 32.4 | 6.96 | 1311 | | 17.1 | 11.58 |
| 1034 | -168.2 | 35.5 | 6.96 | 1309 | | 17.2 | 11.58 |
| 1040 | -166.8 | 33.4 | 6.96 | 1311 | | 17.4 | 11.57 |
| 1046 | -162.2 | 32.6 | 6.95 | 1310 | | 17.5 | 11.58 |
| 1052 | -164.3 | 33.0 | 6.94 | 1310 | | 17.6 | 11.58 |

Turbidity: (circle) clear slight moderate very

Sample Method: (describe) grab composite pump bailer other
Bladder / Low flow

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | -164.3 | |
| DO (mg/l) | 33.0 | |
| pH | 6.94 | |
| SC (µmhos/cm) | 1310 | |
| Turbidity (ntu) | — | |
| $H_2O$ Tmp. (°C) | 17.6 | |
| Color | Pale Yellow | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Petro odor and stain on tubing
Pump on @ 1010

Sample Team Member Signature: [signature]

Page of

Water Sampling Form — HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): CS, TB
Laboratory Used: Energy

Site Designation: DI Blank
Sample Code Number: YOSD-1309-137
Sample Date: 9/9/2013
Sample Time: 1330 (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *Site Conditions*

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

### *For Groundwater Samples*

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$ Comments

TD (ft):
SWL (ft):
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### *For Surface Water Samples*

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Sample Taken by well YMW-19

Sample Team Member Signature: Tyler R. Swart

Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): CS, TS
Laboratory Used: Energy

Site Designation: Rinsate
Sample Code Number: YOSD-1309-138
Sample Date: 9/11/13
Sample Time: 1420 (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *Site Conditions*

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other:
Weather Conditions: calm breeze windy no precip rain snow clear p. cloudy overcast
Air Temperature: °C 75 °F

### *For Groundwater Samples*

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25 — Comments

TD (ft):
SWL (ft):
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### *For Surface Water Samples*

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Rinsate

Sample Team Member Signature: [signature] Page of

# WATER LEVEL FIELD NOTES

Yale Oil

| Site | Date | Time | DTW (ft) | DTP (ft) | TD (ft) | COMMENT |
|---|---|---|---|---|---|---|
| YMW-11 | 5/~~15~~ 16/13 | 11:54 | 11.75 | — | 12.75 | TD ~15' sanded in 5/21/13 15.98' top of PVC after developing |
| YMW-10 | 5/16/13 | 12:09 | 10.81 | — | 14.10 | Black |
| YMW-12 | 5/16/13 | 12:44 | 8.44 | 8.43 | ~~8~~ | Black |
| YMW-14 | 5/16/13 | 12:47 | 10.81 | 10.78 | | Black |
| YMW-13 | 5/16/13 | 12:54 | 12.36 | 11.55 | | Sheen / Brown |
| YMW-16 | 5/16/13 | 13:07 | 8.48 | — | | Odor |
| YMW-17 | 5/16/13 | 13:13 | 9.25 | — | | Sheen / odor |
| YMW-15 | 5/16/13 | 13:24 | 8.94 | — | | |
| YMW-20 | 5/16/13 | 13:28 | 6.74 | | | |
| YMW-21 | 5/16/13 | 13:44 | 9.04 | | | Odor |
| YMW-22 | 5/16/13 | 13:53 | 10.82 | | | Odor |
| YMW-23 | 5/16/13 | 14:00 | 11.02 | | | Odor |
| YMW-19 | 5/16/13 | 14:12 | 4.68 | | | Odor |
| YMW-18 | 5/16/13 | 14:18 | 7.80 | 7.72 | | Light Brown |



Rite in the Rain

5/2/13

| Time | Sample | Depth | Hydrocarbon Headspace |
|---|---|---|---|
| 0915 | 47-SB-A | 2-4 | 0.1 |
| 0930 | 47-SB-A | 4-6 | 23.5 |
| ☆ 0945 | 47-SB-A | 6-7.7 | 24.8 |
| 1115 | 31-SB-A | 2-4 | 13.9 |
| 1145 | 31-SB-A | 4-6 | 65.9 |
| ☆ 1150 | 31-SB-A | 6-7.5 | 69.5 |
| ☆ 1455 | 31-SB-A | 2-3.5 | 98.4 |

7/16/13 Product depth Interface measuring
Joe Schmeder

| Well ID | Starting depth | Ending Depth | TOH product depth |
|---|---|---|---|
| YMW-13 | 10.46' | 10.68' | .22' |
| YMW-14 | product did not exceed product threshold | | |
| YMW-16 | 7.15' | 8.54' | 1.39' |
| YMW-17 | 7.84 | 8.46 | .62' |
| YMW-18 | product does not exceed product threshold | | |

7/17/13

| | |
|---|---|
| YMW-12 | product does not exceed threshold (starts at 7.56') |
| YMW-15 | " (starts at 8.15') |

Site + Date + Time + SWL/PL + Gal purged

YMW-14 / 7-18 / 1010 / 9.76 / 25 gal
Product-water interface meter not working/un-able to read interface. Purge water had product sheen (<.01'). Water color med/Dark grey heavy turbidity. Purged fine sands as well

YMW 18 / 7-16 / 1300 / 9.43 / 15 gal
Interface meter not reading PL/WL. Product slim on surface. Water was muddy grey & retrieved sed. w/ Bailers

CJ

| Site | Date | Time | SWL/PL | Gal purged |
|---|---|---|---|---|
| YMW-13: | 7/18-7/19 | 1230 | — | 25 gal |

Well contained a large amount of black oil. Completely coated meter and unable to read depth. Product in buckets was prox .05'. Bailer streaked and coated inside of well during purge, un-able to contain or collect all of product. Squeeged off bailer after each retrieval. (Note: Peristaltic pump w/ Disposable tubing may be better method of bailing/purging)

| | | | | |
|---|---|---|---|---|
| YMW 12: | 7-19 | 1230 | 7.5 | 10 gal |

Interface meter not reading. Product on purge water aprox .01'. Well dry @ 5 gal. Waited 45 min for recovery, bailed 5 more gal till dry

CJ

| | | | | |
|---|---|---|---|---|
| YMW 13: | 8/16/13 | (1230) | 10.90/12.0 | 1.1' |

Purged 20 gal. Thick product coating

CJ

| Site | Date | Time | PL/WL | Total Product/ OTHER |
|---|---|---|---|---|
| YMW 18: | 8/14/13 | (1420) | [7.06/7.08] | .02 |

Installed sock (Cntr @ 7') and lock

| | | | | |
|---|---|---|---|---|
| YMW 12: | 8/15/13 | (1330) | [7.80/9.40] | 1.6' |

After 2 gal purged, only able to recover 6"-10" per bailer. 5 gal purged

| | | | | |
|---|---|---|---|---|
| YMW 15: | 8/15/13 | (1450) | [8.30/8.50] | .20' |

Installed sock, Cntr @ 8.5'

| | | | | |
|---|---|---|---|---|
| YMW 20: | 8/15/13 | (1510) | [See comments] | |

Solinist P/W interface meter recorded water on product as follows: Water → 6.2', PR → 7.8' TD → 13.5'. Bailed 5 gal w/ no noticable odor/sheen. Meter continued to measure water on product post bailing/purge

| | | | | |
|---|---|---|---|---|
| YMW 14: | 8/16/13 | (0910) | [10.0'/10.90'] | .90' |

Purged 20 gal / one hour.

| | | | | |
|---|---|---|---|---|
| YMW 16: | 8/16/13 | (1015) | [7.80/8.55] | .75' |

Purged 15 gal. NO measurable product post purge. Oil coated inside of well

| | | | | |
|---|---|---|---|---|
| YMW 17: | 8/16/13 | (1115) | [8.45/10.60] | 2.15' |

Purged 15 gal / one hour

CJ

| Site | Date | Time | PL/ SWL | Comments |
|---|---|---|---|---|
| YMW 10 | 6/21 | 1100 | 9.51 | |
| YMW 11 | 6/20/13 | 1136 | 11.14 | |
| YMW 12 | 6/15/13 | 1330 | 7.80/9.40 | (1.6' prod) purged |
| YMW 13 | 6/16/13 | 1230 | 10.90/12.00 | (1.1' prod) purged |
| YMW 14 | 6/16/13 | 910 | 10.0/10.90 | (.90' prod) purged |
| YMW 15 | 6/15/13 | 1450 | 6.30/6.50 | (.20 prod) Sock |
| YMW 16 | 6/16/13 | 1015 | 7.80/6.55 | (.75' prod) purged |
| YMW 17 | 6/16/13 | 1115 | 8.45/10.60 | (2.15' prod) purged |
| YMW 18 | 6/14/13 | 1420 | 7.06/7.08 | (.02' prod) Sock |
| YMW 19 | 6/20/13 | 1115 | 8.70 | |
| YMW 20 | 6/15/13 | 1510 | 6.20 | |
| YMW 21 | 6/20/13 | 1150 | 6.56/6.60 | (.04' prod) SOCK |
| YMW 22 | 6/20/13 | 1143 | 10.42 | |
| YMW 23 | 6/20/13 | 1158 | 11.01 | |
| | | | | |
| MW 1 | 6/20/13 | 1111 | 9.04 | |
| MW 2 | 6/21/13 | 1111 | 7.91 | |
| MW 3 | 6/21/13 | 1115 | 7.97 | odor |
| MW 4 | 6/20/13 | 1045 | 15.03 | Added lock |
| MW 6 | 6/20/13 | 1048 | 12.07 | Added lock |

1.35

8-29-13 S. Bergin

Surveyed:

| ~~Site~~ Data Logge | | Name |
|---|---|---|
| MW-04 | GND, PVC, TS | "MW-4" |
| MW-05 | " | "MW-5" |
| MW-06 | " | "MW-6" |
| MW-07 | GND, TS | ? |
| MW-08 | " | |
| MW-09 | " | |
| MW-10 | " | |

~~YD-1~~ 4000 - 4060 YD-1

2 Profiles & WL's

Establish CP-05 NE corner of Berm

Established staff gauge YD-1 w/ 1.35' Waterlevel

4061 - 4064 Culvert Elevations (Top Slab)

4065 - 4108 YD-3 Profile & WL's

Established Staff gauge YD-3 w/ 0.60 Waterlevel

4109 - 4163 YD-4 Profile, WL's, & Bridge

Establish Staff Gauge YD-4 w/ 1.38' Water Level

YD-5 Established Staff Gauge w/ Depth of 0.90'

Could not get GPS to Fix due to trees; however, established bridge 4164 -

| Site | Date | Time | PL/SWL | Comments | SC/PH/Temp | Sample ID/Date/Time |
|---|---|---|---|---|---|---|
| YMW10 | 9/9/13 | 1545 | 8.96 | | 1706/6.98/15.9 | YOSD-1309-110 (9/11/13-945) |
| YMW11 | 9/9/13 | 1040 | 10.66 | | 2264/7.24/17.7 | YOSD-1309-111 (9/9/13-1040) |
| YMW12 | 9/9/13 | 1550 | 7.55 | | 1497/6.64/20.7 | YOSD-1309-114 (9/11/13-1600) |
| YMW13 | 9/9/13 | 1250 | 10.2/13.0 | | | |
| YMW14 | 9/9/13 | 1552 | 9.90 | | 1072/6.62/16.4 | YOSD-1309-114 (9/12/13-945) |
| YMW15 | 9/9/13 | 1555 | 8.24/9.28 | [on 9/12] 8.17/8.24 | Replaced SOC | |
| YMW16 | 9/9/13 | 1300 | 7.42/8.13 | | | |
| YMW17 | 9/9/13 | 1255 | 8.08/8.10 | | | |
| YMW18 | 9/9/13 | 1225 | 6.69 | SOC in well; saturated NO meas. product | 2603/7.12/18.9 | YOSD-1309-118 (9/12/13-1145) |
| YMW19 | 9/9/13 | 1245 | 7.27 | | 4685/6.31/16.3 | YOSD-1309-119 (9/9/13-1245) |
| YMW20 | 9/9/13 | 1615 | 5.79 | | 3530/7.35/18.7 | YOSD-1309-120 (9/10/13-1500) |
| YMW21 | | 1315 | 8.09 | | 1962/7.33/16.3 | YOSD-1309-121 (9/11/13-1340) |
| YMW22 | | 1335 | 10.73 | | 3580/7.27/17.2 | YOSD-1309-122 (9/11/13-1145) |
| YMW23 | | 1330 | 10.03 | Dupe! | 3507/7.08/19.4 | YOSD-1309-123 (9/10/13-1250) |
| MW01 | | 1230 | 8.65 | | 2709/7.72/16.2 | YOSD-1309-131 (9/9/13-1605) |
| MW02 | 9/9/13 | 1530 | 3.26 | up to 15" standing H2O around site | 5300/7.26/16.7 | YOSD-1309-133 (9/13/13-1000) |
| MW03 | 9/9/13 | 1215 | 5.86 | | 4312/6.95/20.8 | YOSD-1309-132 (9/12/13-1330) |
| MW04 | 9/10/13 | 900 | 14.68 | | 1030/7.23/16.6 | YOSD-1309-134 (9/10/13-900) |
| MW05 | | | | | | |
| MW06 | 9/10/13 | 1100 | 11.56 | | 1310/6.94/17.6 | YOSD-1309-136 (9/10/13-1100) |
| Dupe | 9/10/13 | 1250 | — | YOSD-1309-139 | | |
| Blank | 9/9/13 | 1330 | — | YOSD-1309-137 | | |
| Rinsate | 9/11/13 | 1420 | — | YOSD-1309-138 | | |

October 2, 2013

| SITE | DATE/TIME | Product level (ft) | SWL (ft) Heron | Product Thickness | Solinst SWL | Solinst PL | Thickness | Keck SWL | Keck PL | Thickness | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| YMW-10 | 9:31 | — | 8.76 | | 8.78 | NR sheen | | 7.25 | NR sheen | | no odor/no stain |
| YMW-~~11~~12 | 9:40 | 7.22 | 7.23 | ~~NR~~ 0.01 ~~prem. skimmed~~ | 7.24 | | | | | | odor/stain/dark brown installed sock |
| YMW-~~12~~11 | 9:15 | — | 10.39 | | 10.41 | | | 10.40 | | | no odor/no stain |
| YMW-13 | 10:12 | 10.19 | ~~9.53~~ 11.33 | 1.14 | 11.34 | 10.21 | 1.13 | 11.35 | 10.21 | 1.14 | odor/stain-black |
| YMW-14 | 9:52 | | 9.53 | | 9.54 | | | 9.52 | | | odor/stain brown |
| YMW-15 | 11:20 | — | 7.88 | | 7.87 | | | 7.94 | | | gas odor removed sock replaced sock |
| YMW-16 | 10:34 | 6.58 | 12.07 | 5.49 ~~6.61~~ | 12.07 | 6.61 | 5.46 | 11.90 | 6.64 | 5.26 | odor/stain-brown |
| YMW-17 | 11:02 | 7.77 | 8.72 | | 8.72 | 7.98 | 0.74 | 8.76 | 8.0 | 0.76 | odor/stain-brown |
| YMW-18 | 14:00 | | 6.34 | | 6.31 | | | 6.35 | | | odor |
| YMW-19 | 14:19 | | 7.29 | | 7.30 | | | 7.29 | | | odor/stain-brown installed sock |
| YMW-20 | 11:51 | — | 5.74 | | 5.73 | | | 5.76 | | | |
| YMW-21 | 12:06 | — | 7.95 | | 7.96 | | | 7.99 | | | odor/no stain |
| YMW-22 | 13:34 | — | 9.96 | | 9.98 | | | 10.00 | | | no odor/no stain |
| YMW-23 | 13:39 | — | 10.18 | | 10.18 | | | 10.20 | | | no odor/no stain |
| MW-01 | 13:50 | | 8.23 | | 8.22 | | | 8.23 | | | no odor/no stain |
| MW-02 | 14:30 | | ~~5.69~~ 6.69 | | ~~5.64~~ 6.64 | | | 6.63 | | | odor/no stain |
| MW-03 | 14:10 | | 6.96 | | 6.98 | | | 7.06 | | | odor/no stain |
| MW-4 | 12:30 | | 13.98 | | 13.99 | | | 13.99 | | | no odor/no stain |
| MW-6 | 12:44 | | 11.04 ~~11.24~~ | | 11.04 | | | 11.05 | | | no odor/no stain |

| | | Product Thickness | |
|---|---|---|---|
| YMW-12 | 10/2/13 | 0.01 | Installed sock |
| YMW-14 | 10/2/13 | Sheen | Installed sock |
| YMW-16 | 10/8/13 | | Bailed 25gal water/product |
| YMW-17 | 10/8/13 | | Bailed 25gal water/product |
| YMW-15 | 10/2/13 | NA | Removed & Replaced sock ~½ sock saturated w/ oil.. |
| YMW-19 | 10/2/3 | Sheen | Installed sock |
| YMW-13 | 10/8/13 | | Bailed 25gals water/product |

10/8/13 T Swant

Purging of oil in wells YMW - 13
YMW - 16
YMW - 17

13:18 Arrived on site

| | SWL | Product Level |
|---|---|---|
| YMW - 13 | 10.44 | 9.62 |

13:25 started purging product in well YMW - 13

Bailed 25 gallons
Water was black lots of product

1450 started purging product in well YMW - 16

Bailed 25 gallons water was black lots of product

15 45 started pursing product in well YMW - 17

Bailed 25 gallons
water was black lots of product



Rite in the Rain

# SURFACE WATER SAMPLING FORMS

Water Sampling Form ~~ HF-430

Yeager Drainage Ditch

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** Yale
**Project Code:** 11108.002
**Sample Team Member(s):** JB
**Laboratory Used:** Energy Labs

**Site Designation:** YD-1
**Sample Code Number:** YOSD-1307-601
**Sample Date:** 7-16-13
**Sample Time:** 1930 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

| | | Comments |
|---|---|---|
| well volume formula: | V = (TD-SWL)x(Dia.$^2$) / 25 | |
| TD (ft): | | |
| SWL (ft): | | no access/pumping |
| Casing Diameter (I.D.") | | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

***Site Conditions***

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C 72 °F

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 7.6 cfs Staff Gage:

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| 1530 | | — | 8.30 | 770 | Clear | 20.5 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | 8.30 | |
| SC (µmhos/cm) | 770 | |
| Turbidity (ntu) | Clear | |
| $H_2O$ Tmp. (°C) | 20.5 | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 1000 ml | F or UF | Raw | Cmn Ions | |
| 1 | 250 ml | F or UF | Nitric Acid | Total Rec | |
| ~~1~~ | ~~250 ml~~ | ~~F or UF~~ | ~~Nitric Acid~~ | ~~Dis. Metal~~ | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Sample Taken under Cross Fence
Black

Sample Team Member Signature: J. Beyer

Page of

h:\files\105\9801\admin\hsop\sec6.0\hf-430.xls\HLN\07/17/97\034 7/8/2013/2:21 PM

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** Yale
**Project Code:** 11108.002
**Sample Team Member(s):** JB
**Laboratory Used:** Energy Labs

**Site Designation:** YD-2
**Sample Code Number:** YOSD-1307-602
**Sample Date:** 7-16-13
**Sample Time:** _____ (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *Site Conditions*

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

### *For Groundwater Samples*

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$ Comments

TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### *For Surface Water Samples*

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 1000 ml | F or UF | Raw | Cmn Ions | |
| 1 | 250 ml | F or UF | Nitric Acid | Total Rec | |
| ~~1~~ | ~~250 ml~~ | ~~F or UF~~ | ~~Nitric Acid~~ | ~~Dis. Metal~~ | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Pipeline - Unable to Sample.

Sample Team Member Signature: J. Berg Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** Yale
**Project Code:** 11108.002
**Sample Team Member(s):** JB
**Laboratory Used:** Energy Labs

**Site Designation:** YD-3
**Sample Code Number:** YOSD-1307-603
**Sample Date:** 7-16-13
**Sample Time:** 1430 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

***Site Conditions***

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip rain snow
clear p. cloudy overcast
Air Temperature: °C 75 °F

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 7.29 cfs Staff Gage:

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| 1430 | | — | 8.21 | 815 | clear | 21.5 | |
| | | | | | | | |
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| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump baller other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 1000 ml | F or UF | Raw | Cmn Ions | |
| 1 | 250 ml | F or UF | Nitric Acid | Total Rec | |
| 1 | 250 ml | F or UF | Nitric Acid | Dis. Metal | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Dark, swimming up stream, moderate to heavy moss
Located in between Wetbrook plants, downstream 30yds from pipelines
Lots of minnows in stream

Sample Team Member Signature: Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** Yale
**Project Code:** 11108.002
**Sample Team Member(s):** JB
**Laboratory Used:** Energy Labs

**Site Designation:** YD-4
**Sample Code Number:** YOSD-1307-604
**Sample Date:** 7-16-13
**Sample Time:** 1255 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

| | | |
|---|---|---|
| well volume formula: | V = (TD-SWL)x(Dia.$^2$) / 25 | Comments |
| TD (ft): | | |
| SWL (ft): | | no access/pumping |
| Casing Diameter (I.D.") | | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

***Site Conditions***

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C 75 °F

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 6.84 cfs Staff Gage:

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| 1310 | | | 8.29 | 747 | Clear | 21.2 | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | — | |
| DO (mg/l) | — | |
| pH | 8.29 | |
| SC (µmhos/cm) | 747 | |
| Turbidity (ntu) | Clear | |
| $H_2O$ Tmp. (°C) | 21.2 | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 1000 ml | F or UF | Raw | Cmn Ions | |
| 1 | 250 ml | F or UF | Nitric Acid | Total Rec | |
| ~~1~~ | ~~250 ml~~ | ~~F or UF~~ | ~~Nitric Acid~~ | ~~Dis. Metal~~ | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: South of monitoring well, Well Head Pump manifold, upstream of Transient Waste, Slight Moss 2-4" Cobbles; Frogs, Minnows in stream. RTI split

Sample Team Member Signature: [signature] Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** Yale
**Project Code:** 11108.002
**Sample Team Member(s):** JB
**Laboratory Used:** Energy Labs

**Site Designation:** YD-5
**Sample Code Number:** YOSD-1307-605
**Sample Date:** 07-16-13
**Sample Time:** 0930 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #: YOSD-1307-607
Duplicate Sample Time: 0935

***For Groundwater Samples***

| | | |
|---|---|---|
| well volume formula: | V = (TD-SWL)x(Dia.$^2$) / 25 | Comments |
| TD (ft): | | |
| SWL (ft): | | no access/pumping |
| Casing Diameter (I.D.") | | |
| Water Volume (V) (gal): | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Water Level Recovery: | slow moderate rapid | |

***Site Conditions***

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C 65 °F

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 6.91 cfs Staff Gage:

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| 0930 | — | — | 8.32 | 817 | Clear | 20.4 | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | — | |
| DO (mg/l) | — | |
| pH | 8.32 | |
| SC (µmhos/cm) | 817 | |
| Turbidity (ntu) | Clear | |
| $H_2O$ Tmp. (°C) | 20.4 | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 1000 ml | F or UF | Raw | Cmn Ions | |
| 1 | 250 ml | F or UF | Nitric Acid | Total Rec | |
| ~~1~~ | ~~250 ml~~ | ~~F or UF~~ | ~~Nitric Acid~~ | ~~Dis. Metal~~ | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Cobbles & Gravel 1-6" w/ some moss
downstream of pedestrian Bridge ~30'

Sample Team Member Signature: [signature]

Page 1 of 1

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** Yale
**Project Code:** 11108.002
**Sample Team Member(s):** JB
**Laboratory Used:** Energy Labs

**Site Designation:** DI BLANK
**Sample Code Number:** YOSD-1307-606
**Sample Date:** 7-16-13
**Sample Time:** 1440 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$

Comments

TD (ft):
SWL (ft): no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

***Site Conditions***

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 1000 ml | F or UF | Raw | Cmn Ions | |
| 1 | 250 ml | F or UF | Nitric Acid | Total Rec | |
| ~~1~~ | ~~250 ml~~ | ~~F or UF~~ | ~~Nitric Acid~~ | ~~Dis. Metal~~ | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: Page of

HYDROMETRICS, INC. Consulting Scientists, Engineers, & Contractors

# STREAM GAGING - MARSH MCBIRNEY METER

PROJECT NAME: Yale Oil # 11108.002

SAMPLE # SITE: YD-1 DATE 7/16/2013

| DIST FROM INITIAL POINT (ft) | WIDTH (FT) | DEPTH (FT) | OBSER-VATION DEPTH | | | AREA (W x D) | POINT VELOCITY (FT/SEC) | DISCHARGE (CFS) |
|---|---|---|---|---|---|---|---|---|
| 1.0 | | 0.2 | | | | 0.00 | -0.10 | 0.00 |
| 2.1 | 1.10 | 0.43 | | | | 0.47 | -0.07 | -0.03 |
| 3.2 | 1.10 | 0.60 | | | | 0.66 | 0.05 | 0.03 |
| 4.3 | 1.10 | 0.65 | | | | 0.72 | -0.01 | -0.01 |
| 5.4 | 1.10 | 0.90 | | | | 0.99 | 0.05 | 0.05 |
| 6.5 | 1.10 | 1.25 | | | | 1.38 | 0.07 | 0.10 |
| 7.6 | 1.10 | 1.50 | | | | 1.65 | 0.13 | 0.21 |
| 8.7 | 1.10 | 1.20 | | | | 1.32 | 0.13 | 0.17 |
| 9.8 | 1.10 | 1.25 | | | | 1.38 | 0.17 | 0.23 |
| 10.9 | 1.10 | 1.40 | | | | 1.54 | 0.27 | 0.42 |
| 11.8 | 0.90 | 1.90 | | | | 1.71 | 0.39 | 0.67 |
| 12.9 | 1.10 | 1.85 | | | | 2.04 | 0.44 | 0.90 |
| 14.0 | 1.10 | 1.50 | | | | 1.65 | 0.47 | 0.78 |
| 15.1 | 1.10 | 1.65 | | | | 1.82 | 0.48 | 0.87 |
| 16.2 | 1.10 | 1.60 | | | | 1.76 | 0.41 | 0.72 |
| 17.3 | 1.10 | 1.60 | | | | 1.76 | 0.47 | 0.83 |
| 18.4 | 1.10 | 1.65 | | | | 1.82 | 0.40 | 0.73 |
| 19.5 | 1.10 | 1.60 | | | | 1.76 | 0.30 | 0.53 |
| 20.6 | 1.10 | 1.55 | | | | 1.71 | 0.20 | 0.34 |
| 21.7 | 1.10 | 1.50 | | | | 1.65 | 0.03 | 0.05 |
| 22.7 | 1.00 | 0.90 | | | | 0.90 | 0.01 | 0.01 |
| 23.3 | 0.60 | 0.75 | | | | 0.45 | 0.03 | 0.01 |
| | | | | | | | TOTAL CFS____ | 7.60 |

MEAS CONDITIONS

___ GOOD (5%)
___ FAIR (8%)
___ POOR (12%)
___ V. POOR (20%)

STREAM BOTTOM prioritize 1-3

___BOULDERS
__COBBLES
__GRAVEL
__SAND
__1_SILT

WEATHER

CALM BREEZE WIND
NO PRECIP RAIN SNOW
CLEAR P. CLOUDY O. CAST

Angle X-Sec W/Stream 90°__X___ Other____

GAGE HT_____ AIR TEMP___20_____°F H2O TEMP___0.1_____°C

COMP BY_____ PERSONNEL: TFS, CJL_____

HYDROMETRICS, INC. Consulting Scientists, Engineers, & Contractors

# STREAM GAGING - MARSH MCBIRNEY METER

PROJECT NAME: Yale Oil # 11108.002

SAMPLE # SITE: YD-3 DATE 7/16/2013

| DIST FROM INITIAL POINT (ft) | WIDTH (FT) | DEPTH (FT) | OBSER-VATION DEPTH | | | AREA (W x D) | POINT VELOCITY (FT/SEC) | DISCHARGE (CFS) |
|---|---|---|---|---|---|---|---|---|
| 1.0 | | 0.7 | | | | 0.00 | 0.26 | 0.00 |
| 1.8 | 0.80 | 0.75 | | | | 0.60 | 0.39 | 0.23 |
| 2.6 | 0.80 | 0.73 | | | | 0.58 | 0.60 | 0.35 |
| 3.4 | 0.80 | 0.80 | | | | 0.64 | 0.71 | 0.45 |
| 4.2 | 0.80 | 0.90 | | | | 0.72 | 0.77 | 0.55 |
| 5.0 | 0.80 | 0.93 | | | | 0.74 | 0.70 | 0.52 |
| 5.8 | 0.80 | 1.00 | | | | 0.80 | 0.55 | 0.44 |
| 6.6 | 0.80 | 1.00 | | | | 0.80 | 0.45 | 0.36 |
| 7.4 | 0.80 | 1.00 | | | | 0.80 | 0.51 | 0.41 |
| 8.2 | 0.80 | 1.10 | | | | 0.88 | 0.45 | 0.40 |
| 9.0 | 0.80 | 1.15 | | | | 0.92 | 0.48 | 0.44 |
| 9.8 | 0.80 | 1.35 | | | | 1.08 | 0.50 | 0.54 |
| 10.6 | 0.80 | 1.45 | | | | 1.16 | 0.65 | 0.75 |
| 11.4 | 0.80 | 1.50 | | | | 1.20 | 0.65 | 0.78 |
| 12.2 | 0.80 | 1.40 | | | | 1.12 | 0.56 | 0.63 |
| 13.0 | 0.80 | 1.15 | | | | 0.92 | 0.30 | 0.28 |
| 13.8 | 0.80 | 1.10 | | | | 0.88 | 0.11 | 0.10 |
| 14.6 | 0.80 | 0.75 | | | | 0.60 | 0.10 | 0.06 |
| | | | | | | | TOTAL CFS | 7.29 |

MEAS CONDITIONS

___ GOOD (5%)
___ FAIR (8%)
___ POOR (12%)
___ V. POOR (20%)

STREAM BOTTOM prioritize 1-3

___BOULDERS
_1_COBBLES
_2_GRAVEL
_3_SAND
___SILT

WEATHER

| | | |
|---|---|---|
| CALM | BREEZE | WIND |
| NO PRECIP | RAIN | SNOW |
| CLEAR | P. CLOUDY | O. CAST |

Angle X-Sec W/Stream 90°__X___ Other_____

GAGE HT_____ AIR TEMP___20_____°F H2O TEMP___0.1_____°C

COMP BY_____ PERSONNEL: TFS, CJL_____

HYDROMETRICS, INC. Consulting Scientists, Engineers, & Contractors

# STREAM GAGING - MARSH MCBIRNEY METER

PROJECT NAME: Yale Oil # 11108.002

SAMPLE # SITE: YD-4 DATE 7/16/2013

| DIST FROM INITIAL POINT (ft) | WIDTH (FT) | DEPTH (FT) | OBSER-VATION DEPTH | | | AREA (W x D) | POINT VELOCITY (FT/SEC) | DISCHARGE (CFS) |
|---|---|---|---|---|---|---|---|---|
| 1.0 | | 0.4 | | | | 0.00 | 0.14 | 0.00 |
| 2.0 | 1.00 | 1.10 | | | | 1.10 | 0.28 | 0.31 |
| 3.0 | 1.00 | 1.00 | | | | 1.00 | 0.36 | 0.36 |
| 4.0 | 1.00 | 1.05 | | | | 1.05 | 0.44 | 0.46 |
| 5.0 | 1.00 | 1.10 | | | | 1.10 | 0.45 | 0.50 |
| 6.0 | 1.00 | 1.10 | | | | 1.10 | 0.50 | 0.55 |
| 7.0 | 1.00 | 1.10 | | | | 1.10 | 0.54 | 0.59 |
| 8.0 | 1.00 | 1.05 | | | | 1.05 | 0.72 | 0.76 |
| 9.0 | 1.00 | 0.95 | | | | 0.95 | 0.65 | 0.62 |
| 10.0 | 1.00 | 0.90 | | | | 0.90 | 0.59 | 0.53 |
| 11.0 | 1.00 | 1.00 | | | | 1.00 | 0.65 | 0.65 |
| 12.0 | 1.00 | 1.00 | | | | 1.00 | 0.65 | 0.65 |
| 13.0 | 1.00 | 0.95 | | | | 0.95 | 0.62 | 0.59 |
| 14.0 | 1.00 | 0.80 | | | | 0.80 | 0.37 | 0.30 |
| 15.0 | 1.00 | 0.50 | | | | 0.50 | -0.04 | -0.02 |
| | | | | | | | TOTAL CFS____ | 6.84 |

MEAS CONDITIONS

___ GOOD (5%)
___ FAIR (8%)
___ POOR (12%)
___ V. POOR (20%)

STREAM BOTTOM prioritize 1-3

___BOULDERS
_1_COBBLES
_2_GRAVEL
_3_SAND
___SILT

WEATHER

CALM BREEZE WIND
NO PRECIP RAIN SNOW
CLEAR P. CLOUDY O. CAST

Angle X-Sec W/Stream 90°__X___ Other_____

GAGE HT_____ AIR TEMP___20_____°F H2O TEMP___0.1_____°C

COMP BY_____ PERSONNEL: TFS, CJL_____

HYDROMETRICS, INC. Consulting Scientists, Engineers, & Contractors

# STREAM GAGING - MARSH MCBIRNEY METER

PROJECT NAME: Yale Oil # 11108.002

SAMPLE # SITE: YD-5 DATE 7/16/2013

| DIST FROM INITIAL POINT (ft) | WIDTH (FT) | DEPTH (FT) | OBSER-VATION DEPTH | | | AREA (W x D) | POINT VELOCITY (FT/SEC) | DISCHARGE (CFS) |
|---|---|---|---|---|---|---|---|---|
| 1.5 | | 0.2 | | | | 0.00 | -0.20 | 0.00 |
| 2.3 | 0.80 | 0.20 | | | | 0.16 | 0.30 | 0.05 |
| 3.1 | 0.80 | 0.30 | | | | 0.24 | 1.01 | 0.24 |
| 3.9 | 0.80 | 0.40 | | | | 0.32 | 0.85 | 0.27 |
| 4.7 | 0.80 | 0.30 | | | | 0.24 | 1.03 | 0.25 |
| 5.5 | 0.80 | 0.25 | | | | 0.20 | 1.77 | 0.35 |
| 6.3 | 0.80 | 0.55 | | | | 0.44 | 1.03 | 0.45 |
| 7.1 | 0.80 | 0.30 | | | | 0.24 | 0.75 | 0.18 |
| 7.9 | 0.80 | 0.45 | | | | 0.36 | 1.50 | 0.54 |
| 8.7 | 0.80 | 0.20 | | | | 0.16 | 2.52 | 0.40 |
| 9.5 | 0.80 | 0.40 | | | | 0.32 | 2.18 | 0.70 |
| 10.3 | 0.80 | 0.50 | | | | 0.40 | 2.50 | 1.00 |
| 11.1 | 0.80 | 0.50 | | | | 0.40 | 2.25 | 0.90 |
| 11.9 | 0.80 | 0.55 | | | | 0.44 | 2.08 | 0.92 |
| 12.7 | 0.80 | 0.50 | | | | 0.40 | 1.61 | 0.64 |
| 13.5 | 0.80 | 0.40 | | | | 0.32 | 0.04 | 0.01 |
| | | | | | | | TOTAL CFS____ | 6.91 |

MEAS CONDITIONS

___ GOOD (5%)
___ FAIR (8%)
___ POOR (12%)
___ V. POOR (20%)

STREAM BOTTOM prioritize 1-3

___BOULDERS
__COBBLES
__GRAVEL
__SAND
__1_SILT

WEATHER

CALM BREEZE WIND
NO PRECIP RAIN SNOW
CLEAR P. CLOUDY O. CAST

Angle X-Sec W/Stream 90°__X___ Other_____

GAGE HT_____ AIR TEMP___20_____°F H2O TEMP___0.1_____°C

COMP BY_____ PERSONNEL: TFS, CJL_____

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): JB TS
Laboratory Used: Energy

Site Designation: YD-1
Sample Code Number: YOSD-1309-101
Sample Date: 9-4-13
Sample Time: 17:30 (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *Site Conditions*

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

### *For Groundwater Samples*

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft):
SWL (ft):
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### *For Surface Water Samples*

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 4.43 cfs Staff Gage: 1.84

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
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**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | — | |
| DO (mg/l) | 0.63 | |
| pH | 9.23 | |
| SC (µmhos/cm) | 143 | |
| Turbidity (ntu) | [illegible] | |
| $H_2O$ Tmp. (°C) | 23.5 | |
| Color | | |
| Other: | | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: [signature] Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): TB, SB
Laboratory Used: Energy

Site Designation: ~~YD-2~~ Rinsate
Sample Code Number: ~~YOSD-1309-102~~ YOSD-1309
Sample Date:
Sample Time: 10:15 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***For Groundwater Samples***

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$

Comments

TD (ft):
SWL (ft):
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

***Site Conditions***

New Site: Yes No
Photo taken: Yes No
Site Type: DRY surface water process water monitoring well domestic well adit seep spring other:
Weather Conditions: calm breeze windy no precip. rain snow clear p. cloudy overcast
Air Temperature: °C °F

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
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**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: Tyler F. Best

Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** Yale Oil
**Project Code:** 11108.002
**Sample Team Member(s):** TS, SB
**Laboratory Used:** Energy

**Site Designation:** Rinsate
**Sample Code Number:** YOSD-1309-108
**Sample Date:** 9/4/13
**Sample Time:** 10:15 (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *Site Conditions*

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other: Rinsate
Weather Conditions: calm (breeze) windy
(no precip.) rain snow
clear (p. cloudy) overcast
Air Temperature: °C (80) °F

### *For Groundwater Samples*

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft):
SWL (ft):
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### *For Surface Water Samples*

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
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**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: Tyler E. Swed Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): JD, TS
Laboratory Used: Energy

Site Designation: YD-3
Sample Code Number: YOSD-1309-103
Sample Date: 9-4-13
Sample Time: 1100 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #: YOSD-1309-106
Duplicate Sample Time: 1115

### Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

### For Groundwater Samples

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$ Comments

TD (ft):
SWL (ft):
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 4.63 cfs Staff Gage: 0.65 ft

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
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| | | | | | | | |

Turbidity: (circle) clear slight moderate very

Sample Method: (describe) grab composite pump bailer other

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | 0.65 | |
| pH | 18.00 | |
| SC (µmhos/cm) | 1410 | 1410 |
| Turbidity (ntu) | clear | |
| $H_2O$ Tmp. (°C) | 23.2 | |
| Color | C | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: [signature] Page 1 of 2

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s): TB, JB
Laboratory Used: Energy

Site Designation: YD-4
Sample Code Number: YOSD-1309-104
Sample Date: 9/4/13
Sample Time: 10:00 (military)

### If Duplicate Sample Collected, Please Record Below

Duplicate Sample Code #:
Duplicate Sample Time:

### For Groundwater Samples

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft): TD
SWL (ft):
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### Site Conditions

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C 80 °F

### For Surface Water Samples

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 4.28 cfs Staff Gage: ~~1.74~~ 1.62

### Field Parameter Stabilization

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| 1000 | — | 0.59 | 7.94 | 1471 | Clear | 22.2 | Bugs on Water |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |

Turbidity: (circle) clear moderate slight very

Sample Method: (describe) grab composite pump bailer other

### Field Parameters

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | ~~110~~ | |
| DO (mg/l) | 0.59 | NA |
| pH | 7.94 | |
| SC (µmhos/cm) | 1471 | |
| Turbidity (ntu) | Clear | |
| $H_2O$ Tmp. (°C) | 22.2 | |
| Color | N/A | |
| Other: | | |

### Bottles Collected

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: Tyler R. Sweet Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** Yale Oil
**Project Code:** 11108.002
**Sample Team Member(s):** JB, TS
**Laboratory Used:** Energy

**Site Designation:** YD-5
**Sample Code Number:** YOSD-1309-105
**Sample Date:** 9/4/13
**Sample Time:** 09:00 (military)

### *If Duplicate Sample Collected, Please Record Below*

Duplicate Sample Code #:
Duplicate Sample Time:

### *For Groundwater Samples*

well volume formula: V = (TD-SWL)x(Dia.$^2$) / 25

Comments

TD (ft):
SWL (ft):
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

### *Site Conditions*

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm (breeze) windy
(no precip.) rain snow
clear (p. cloudy) overcast
Air Temperature: °C 80 °F

### *For Surface Water Samples*

Flow Method: (Marsh McBirney) Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm 4.69 cfs Staff Gage: 0.86

### *Field Parameter Stabilization*

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
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**Turbidity:** (circle) (clear) moderate slight very

**Sample Method:** (describe) (grab) composite pump bailer other

### *Field Parameters*

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | 0.54 | |
| pH | 7.46 | |
| SC (µmhos/cm) | 1470 | |
| Turbidity (ntu) | clear | |
| $H_2O$ Tmp. (°C) | 22.5 | |
| Color | clear | |
| Other: | | |

### *Bottles Collected*

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Bench mark elevation : 5.33 ft
Water Level elevation : 14.38 ft

Sample Team Member Signature: Tyler E. Sweet Page of

Water Sampling Form ~~ HF-430

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

Project Name: Yale Oil
Project Code: 11108.002
Sample Team Member(s):
Laboratory Used: Energy

Site Designation: DI Blank
Sample Code Number: YOSD-1309-107
Sample Date: 9-4-13
Sample Time: 0830 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #:
Duplicate Sample Time:

***Site Conditions***

New Site: Yes No Photo taken: Yes No
Site Type: DRY surface water process water
monitoring well domestic well adit seep
spring other:
Weather Conditions: calm breeze windy
no precip. rain snow
clear p. cloudy overcast
Air Temperature: °C °F

***For Groundwater Samples***

well volume formula: $V = \frac{(TD-SWL)x(Dia.^2)}{25}$ Comments

TD (ft):
SWL (ft):
Casing Diameter (I.D.")
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Water Level Recovery: slow moderate rapid

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
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| | | | | | | | |

**Turbidity:** (circle) clear moderate slight very

**Sample Method:** (describe) grab composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Other: | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 2 | 1000 ml | UF | H2SO4 | VPH | |
| 3 | 40 ml | UF | HCL | BTEX | |
| 1 | 1000 ml | UF | RAW | Commons | |
| 1 | 250 ml | UF | HNO3 | Total Metals | |
| 1 | 250 ml | UF | H2SO4 | N+N | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: Page of

HYDROMETRICS, INC. Consulting Scientists, Engineers, & Contractors

# STREAM GAGING - MARSH MCBIRNEY METER

PROJECT NAME: Yale Oil # 11108.002

SAMPLE # SITE: YD-1 DATE 9/4/2013

| DIST FROM INITIAL POINT (ft) | WIDTH (FT) | DEPTH (FT) | OBSER-VATION DEPTH | | | AREA (W x D) | POINT VELOCITY (FT/SEC) | DISCHARGE (CFS) |
|---|---|---|---|---|---|---|---|---|
| 2.0 | | 0 | | | | 0.00 | 0.00 | 0.00 |
| 3.0 | 1.00 | 0.10 | | | | 0.10 | 0.00 | 0.00 |
| 4.0 | 1.00 | 0.40 | | | | 0.40 | 0.00 | 0.00 |
| 5.0 | 1.00 | 0.60 | | | | 0.60 | 0.02 | 0.01 |
| 6.0 | 1.00 | 0.70 | | | | 0.70 | 0.22 | 0.15 |
| 7.0 | 1.00 | 0.90 | | | | 0.90 | 0.36 | 0.32 |
| 8.0 | 1.00 | 0.80 | | | | 0.80 | 0.36 | 0.29 |
| 9.0 | 1.00 | 1.00 | | | | 1.00 | 0.52 | 0.52 |
| 10.0 | 1.00 | 1.10 | | | | 1.10 | 0.45 | 0.50 |
| 11.0 | 1.00 | 1.20 | | | | 1.20 | 0.50 | 0.60 |
| 12.0 | 1.00 | 1.30 | | | | 1.30 | 0.49 | 0.64 |
| 13.0 | 1.00 | 1.20 | | | | 1.20 | 0.40 | 0.48 |
| 14.0 | 1.00 | 1.30 | | | | 1.30 | 0.38 | 0.49 |
| 15.0 | 1.00 | 1.25 | | | | 1.25 | 0.27 | 0.34 |
| 16.0 | 1.00 | 1.10 | | | | 1.10 | 0.08 | 0.09 |
| 17.0 | 1.00 | 0.50 | | | | 0.50 | 0.00 | 0.00 |
| 18.0 | 1.00 | 0.00 | | | | 0.00 | 0.00 | 0.00 |
| | | | | | | | TOTAL CFS____ | 4.43 |

MEAS CONDITIONS

___ GOOD (5%)
___ FAIR (8%)
___ POOR (12%)
___ V. POOR (20%)

STREAM BOTTOM prioritize 1-3

___BOULDERS
__COBBLES
__GRAVEL
__SAND
__1_SILT

WEATHER

CALM BREEZE WIND
NO PRECIP RAIN SNOW
CLEAR P. CLOUDY O. CAST

Angle X-Sec W/Stream 90°__X___ Other_____

GAGE HT_1.34_____ AIR TEMP___25_____°F H2O TEMP___22_____°C

COMP BY_____ PERSONNEL: JB, TS_____

HYDROMETRICS, INC. Consulting Scientists, Engineers, & Contractors

# STREAM GAGING - MARSH MCBIRNEY METER

PROJECT NAME: Yale Oil # 11108.002

SAMPLE # SITE: YD-3 DATE 9/4/2013

| DIST FROM INITIAL POINT (ft) | WIDTH (FT) | DEPTH (FT) | OBSER-VATION DEPTH | | | AREA (W x D) | POINT VELOCITY (FT/SEC) | DISCHARGE (CFS) |
|---|---|---|---|---|---|---|---|---|
| 3.0 | | 0 | | | | 0.00 | 0.00 | 0.00 |
| 3.5 | 0.50 | 0.20 | | | | 0.10 | 0.00 | 0.00 |
| 4.0 | 0.50 | 0.40 | | | | 0.20 | 0.46 | 0.09 |
| 4.5 | 0.50 | 0.40 | | | | 0.20 | 0.67 | 0.13 |
| 5.0 | 0.50 | 0.40 | | | | 0.20 | 0.80 | 0.16 |
| 5.5 | 0.50 | 0.40 | | | | 0.20 | 0.78 | 0.16 |
| 6.0 | 0.50 | 0.40 | | | | 0.20 | 0.97 | 0.19 |
| 6.5 | 0.50 | 0.50 | | | | 0.25 | 0.88 | 0.22 |
| 7.0 | 0.50 | 0.50 | | | | 0.25 | 1.00 | 0.25 |
| 7.5 | 0.50 | 0.55 | | | | 0.28 | 1.02 | 0.28 |
| 8.0 | 0.50 | 0.57 | | | | 0.29 | 0.95 | 0.27 |
| 8.5 | 0.50 | 0.60 | | | | 0.30 | 1.00 | 0.30 |
| 9.0 | 0.50 | 0.60 | | | | 0.30 | 0.87 | 0.26 |
| 9.5 | 0.50 | 0.70 | | | | 0.35 | 0.78 | 0.27 |
| 10.0 | 0.50 | 0.70 | | | | 0.35 | 0.87 | 0.30 |
| 10.5 | 0.50 | 0.70 | | | | 0.35 | 0.90 | 0.32 |
| 11.0 | 0.50 | 0.70 | | | | 0.35 | 0.92 | 0.32 |
| 11.5 | 0.50 | 0.60 | | | | 0.30 | 0.84 | 0.25 |
| 12.0 | 0.50 | 0.65 | | | | 0.33 | 0.82 | 0.27 |
| 12.5 | 0.50 | 0.55 | | | | 0.28 | 0.95 | 0.26 |
| 13.0 | 0.50 | 0.60 | | | | 0.30 | 0.85 | 0.26 |
| 13.5 | 0.50 | 0.55 | | | | 0.28 | 0.24 | 0.07 |
| 14.0 | 0.50 | 0.00 | | | | 0.00 | 0.00 | 0.00 |
| | | | | | | | TOTAL CFS____ | 4.63 |

MEAS CONDITIONS

___ GOOD (5%)
___ FAIR (8%)
___ POOR (12%)
___ V. POOR (20%)

STREAM BOTTOM prioritize 1-3

___BOULDERS
_1_COBBLES
_2_GRAVEL
_3_SAND
___SILT

WEATHER

CALM BREEZE WIND
NO PRECIP RAIN SNOW
CLEAR P. CLOUDY O. CAST

Angle X-Sec W/Stream 90°__X___ Other_____

GAGE HT__.56_____ AIR TEMP___25_____°F H2O TEMP___22_____°C

COMP BY_____ PERSONNEL: JB, TS_____

HYDROMETRICS, INC. Consulting Scientists, Engineers, & Contractors

# STREAM GAGING - MARSH MCBIRNEY METER

PROJECT NAME: Yale Oil # 11108.002

SAMPLE # SITE: YD-4 DATE 9/4/2013

| DIST FROM INITIAL POINT (ft) | WIDTH (FT) | DEPTH (FT) | OBSER-VATION DEPTH | | | AREA (W x D) | POINT VELOCITY (FT/SEC) | DISCHARGE (CFS) |
|---|---|---|---|---|---|---|---|---|
| 1.0 | | 0 | | | | 0.00 | 0.00 | 0.00 |
| 1.5 | 0.50 | 0.15 | | | | 0.08 | 0.00 | 0.00 |
| 2.0 | 0.50 | 1.60 | | | | 0.80 | 0.00 | 0.00 |
| 3.0 | 1.00 | 1.60 | | | | 1.60 | 0.17 | 0.27 |
| 4.0 | 1.00 | 1.45 | | | | 1.45 | 0.33 | 0.48 |
| 5.0 | 1.00 | 1.40 | | | | 1.40 | 0.37 | 0.52 |
| 6.0 | 1.00 | 1.45 | | | | 1.45 | 0.32 | 0.46 |
| 7.0 | 1.00 | 1.20 | | | | 1.20 | 0.39 | 0.47 |
| 8.0 | 1.00 | 1.35 | | | | 1.35 | 0.33 | 0.45 |
| 9.0 | 1.00 | 1.25 | | | | 1.25 | 0.32 | 0.40 |
| 10.0 | 1.00 | 1.35 | | | | 1.35 | 0.30 | 0.41 |
| 11.0 | 1.00 | 1.25 | | | | 1.25 | 0.30 | 0.38 |
| 12.0 | 1.00 | 1.25 | | | | 1.25 | 0.23 | 0.29 |
| 13.0 | 1.00 | 1.20 | | | | 1.20 | 0.11 | 0.13 |
| 14.0 | 1.00 | 1.00 | | | | 1.00 | 0.03 | 0.03 |
| 15.0 | 1.00 | 0.90 | | | | 0.90 | 0.00 | 0.00 |
| 16.0 | 1.00 | 0.00 | | | | 0.00 | 0.00 | 0.00 |
| | | | | | | | TOTAL CFS____ | 4.28 |

MEAS CONDITIONS

___ GOOD (5%)
___ FAIR (8%)
___ POOR (12%)
___ V. POOR (20%)

STREAM BOTTOM prioritize 1-3

___BOULDERS
_1_COBBLES
_2_GRAVEL
_3_SAND
___SILT

WEATHER

CALM BREEZE WIND
NO PRECIP RAIN SNOW
CLEAR P. CLOUDY O. CAST

Angle X-Sec W/Stream 90°__X___ Other_____

GAGE HT__1.52_____ AIR TEMP___20_____°F H2O TEMP_____°C

COMP BY_____ PERSONNEL: TFS, CJL_____

HYDROMETRICS, INC. Consulting Scientists, Engineers, & Contractors

# STREAM GAGING - MARSH MCBIRNEY METER

PROJECT NAME: Yale Oil # 11108.002

SAMPLE # SITE: YD-5 DATE 9/4/2013

| DIST FROM INITIAL POINT (ft) | WIDTH (FT) | DEPTH (FT) | OBSER-VATION DEPTH | | | AREA (W x D) | POINT VELOCITY (FT/SEC) | DISCHARGE (CFS) |
|---|---|---|---|---|---|---|---|---|
| 0.5 | | 0.01 | | | | 0.00 | 0.00 | 0.00 |
| 1.0 | 0.50 | 0.15 | | | | 0.08 | 0.25 | 0.02 |
| 1.5 | 0.50 | 0.18 | | | | 0.09 | 0.00 | 0.00 |
| 2.0 | 0.50 | 0.10 | | | | 0.05 | 0.04 | 0.00 |
| 2.5 | 0.50 | 0.30 | | | | 0.15 | 0.22 | 0.03 |
| 3.0 | 0.50 | 0.20 | | | | 0.10 | 0.80 | 0.08 |
| 3.5 | 0.50 | 0.25 | | | | 0.13 | 1.37 | 0.17 |
| 4.5 | 1.00 | 0.35 | | | | 0.35 | 0.60 | 0.21 |
| 5.0 | 0.50 | 0.40 | | | | 0.20 | 1.07 | 0.21 |
| 5.5 | 0.50 | 0.40 | | | | 0.20 | 1.48 | 0.30 |
| 6.0 | 0.50 | 0.45 | | | | 0.23 | 1.59 | 0.36 |
| 6.5 | 0.50 | 0.40 | | | | 0.20 | 1.74 | 0.35 |
| 7.0 | 0.50 | 0.50 | | | | 0.25 | 1.05 | 0.26 |
| 7.5 | 0.50 | 0.50 | | | | 0.25 | 1.46 | 0.37 |
| 8.0 | 0.50 | 0.20 | | | | 0.10 | 1.59 | 0.16 |
| 8.5 | 0.50 | 0.50 | | | | 0.25 | 2.13 | 0.53 |
| 9.0 | 0.50 | 0.20 | | | | 0.10 | 0.72 | 0.07 |
| 9.5 | 0.50 | 0.40 | | | | 0.20 | 1.69 | 0.34 |
| 10.0 | 0.50 | 0.40 | | | | 0.20 | 1.69 | 0.34 |
| 10.5 | 0.50 | 0.35 | | | | 0.18 | 1.69 | 0.30 |
| 11.0 | 0.50 | 0.30 | | | | 0.15 | 1.69 | 0.25 |
| 11.5 | 0.50 | 0.30 | | | | 0.15 | 1.69 | 0.25 |
| 12.0 | 0.50 | 0.10 | | | | 0.05 | 1.69 | 0.08 |
| 12.5 | 0.50 | 0.00 | | | | 0.00 | 1.69 | 0.00 |
| 13.0 | 0.50 | 0.00 | | | | 0.00 | 1.69 | 0.00 |
| 13.5 | 0.50 | 0.00 | | | | 0.00 | 1.69 | 0.00 |
| 14.0 | 0.50 | 0.00 | | | | 0.00 | 1.69 | 0.00 |
| | | | | | | | TOTAL CFS____ | 4.69 |

MEAS CONDITIONS

___ GOOD (5%)
___ FAIR (8%)
___ POOR (12%)
___ V. POOR (20%)

STREAM BOTTOM prioritize 1-3

___BOULDERS
__COBBLES
__GRAVEL
__SAND
__1_SILT

WEATHER

| | | |
|---|---|---|
| CALM | BREEZE | WIND |
| NO PRECIP | RAIN | SNOW |
| CLEAR | P. CLOUDY | O. CAST |

Angle X-Sec W/Stream 90°__X___ Other_____

GAGE HT___0.86_____ AIR TEMP___20_____°F H2O TEMP___22_____°C

COMP BY_____ PERSONNEL: JB, TS_____

# SEDIMENT SAMPLING FORMS

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: YL PROJECT NAME & NO: 1108.002

WELL ID: YD-1 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | YD-1-SS-A | 1415 | | | | Black, Organic, Sand No Stain No Odor |
| 6" | | | YD-1-SS-B | 1420 | | | No Gravels | Black organic Sand No Stain, Slight Odor |
| 12" | | | YD-1-SS-C | 1425 | | | | Black ~~Clay~~ Silty Clay No Stain, No Odor (Greyish green?) |
| 18" | | | | | | | | |
| 24" | | | | | | | | |
| | | | | | | | 20 yds West of Fence over Ditch ½ way Between culvert & Berm | |

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# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: 11108.002

WELL ID: YD-3 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | YD-3-SS-A | ~~1245~~ 1250 | | | | Black, Organic, Silty Sand No Sheen, Slight Odor |
| 6" | | | YD-3-SS-B | ~~1250~~ 1245 | | | YD-3-SS-BD 1255 | SAA w/ gravels |
| 12" | | | YD-3-SS-C | | | | | Could not recover Sample |
| 18" | | | | | | | | |
| 24" | | | | | | | | |

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Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Vale PROJECT NAME & NO: 11108.002

WELL ID: YD-4 RECORDED BY: CJB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | YD-4-SS-A 1135 | | | | | Black, Organic, Soil No Sheen, No Odor |
| 6" | | | YD-4-SS-B 1130 | | | | | SAA w/ gravels 1" minus |
| 12" | | | YD-4-SS-C | | | | | No Sample Recovery |
| 18" | | | | | | | | |
| 24" | | | Rinsate YDSD-1307-607 1145 | | | | | |

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

# WELL LOG

Page ___ of ___

PROJECT INFORMATION:

CLIENT: Yale PROJECT NAME & NO: 11108.002

WELL ID: YD-5 RECORDED BY: JB

| DEPTH | GRAPHICAL LOG | WELL COMPLETION | SAMPLE | SAMPLE TYPE / TIME | HAMMER BLOWS | %CORE RECOVERY | NOTES ON: WATER LEVELS, DRILLING FLUID, DRILLING RATE, WELL COMPLETION | DESCRIPTION AND CLASSIFICATION |
|---|---|---|---|---|---|---|---|---|
| 0 | | | YD-5-SS-A 1205 | | | | Used Hand Scoops for Additional Material | Dark Wet Sand w/ 1" Gravels, No Odor, No Sheen |
| 6" | | | YD-5-SS-B 1210 | | | | Used Hand Scoops for additional Material | " SAA |
| 12" | | | YD-5-SS-C 1200 | | | | Core Only | " SAA |
| 18" | | | | | | | | |
| 24" | | | | | | | | |

# APPENDIX C

# MONITORING WELL AND SOIL BORING LOGS

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: 1-ST-A

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228586.22; Northing 564293.2
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 4

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 1-ST-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' West Trench, East end (+3), station 193': 0-2.2', clayey silt, lightt brown, dry, 3" minus gravels, no stain/odor; 2.2-3', clayey silt, black stain and odor, visible product |
| 5 | | | | | 5 | | |
| 10 | | | | | 10 | | |
| 15 | | | | | 15 | | |
| 20 | | | | | 20 | | |
| 25 | | | | | 25 | | |



GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: 2-ST-A

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228983.53; Northing 564577.1
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 4

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 2-ST-A | | | | 3.0 - 4.0' | | 3.0 - 4.0' East Trench, center upstream 2', end of abandoned YPL pipeline; 3-3.4', sandy silt, no stain, no odor, dry, light gray and brown; 3.4-4', dark gray, stain and odor, slightly moist |
| 5 | | | | | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: 3-ST-A

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228915.51; Northing 564532.9
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 4

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 3-ST-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' East Trench, West end; 2-3', silty clay, brown; 3-4', gray silty clay, stain/odor, wood debris, few gravels |
| 5 | | | | | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: 3-ST-B

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228915.51; Northing 564532.9
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 7

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 5 | | | | | | | |
| | 3-ST-B | | | | 6.0 - 7.0' | | 6.0 - 7.0' East Trench, West end; 6-7.3', sandy silt, gray, wood debris, stain/odor, gas |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: 4-ST-A

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229170.92; Northing 564713.2
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 4

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 4-ST-A | | | | 3.0 - 4.0' | | 3.0 - 4.0' Separator Sump, East end, 10' East from end; 3-4', silty clay, wet at 3', product, soft sediments, odor, saturated sludge, black |
| 5 | | | | | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: 5-ST-A

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229121.11; Northing 564676.7
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 5 | 5-ST-A | | | | 4.0 - 5.0' | | 4.0 - 5.0' North side where crack in drip-off between East Trench and separator exists; 4-5.2', stain, odor, black silty clay |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 1

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228209.625; Northing 564468.7669
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 1-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy silt with gravel, light to medium brown, silty sand |
| 5 | 1-SB-A | | | | 4.0 - 4.8' | | 4.0 - 4.8' 4-4.2', SAA; 4.2-4.84', minor gravels, sand silty, slightly moist, no stain, no odor |
| 10 | 1-SB-B | | | | 8.0 - 11.0' | | 8.0 - 11.0' 8-11', sandy gravel, brown, large to medium cobbles, no stain, no odor |
| 15 | 1-SB-C | | | | 11.0 - 15.0' | | 11.0 - 15.0' 11-15', more sand than above horizon, sandy gravel, brown, large to medium cobbles, no stain, no odor |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 10

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: 10-SS: E2228276.916; N564365.5238; 10-SB: 2228265.72; N564353.6

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 16

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 10-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 3-point composite: surface fill gravel, sandy, dry |
| | 10-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 3-point composite: surface fill gravel, sandy, dry, asphalt chunk |
| | 10-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 3-point composite: surface fill gravel, clayey sand with pebbles, brick, silty clay |
| 5 | 10-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-5.5', silty sand, slightly moist, light brown, stain, no odor; 5.5-6' sand, silt, very moist, light brown, no stain, no odor |
| 10 | 10-SB-B | | | | 8.0 - 12.0' | | 8.0 - 12.0' 8-12', sandy gravel, moist to wet, medium brown, some fines |
| 15 | 10-SB-C | | | | 12.0 - 16.0' | | 12.0 - 16.0' 12-14', sandy gravel, moist to wet, medium brown, some fines; 14-16', silty sand, wet, medium brown, no cohesion |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 100

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 100-SS:E2230277.638; N564635.9136; 100-SB: E2230243.01; N564685.0
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 7.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 100-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: poorly sorted fill gravel with sand, damp, slight clayey sand |
| | 100-SB-A | | | | 2.0 - 3.0' | | 2.0 - 3.0' 2-3', cobbles and gravel, 20% fine-course sand, medium brown, moist, cobbles to 8" |
| 5 | | | | | | | |
| | 100-SB-B | | | | 5.5 - 6.5' | | 5.5 - 6.5' 5.5-6.5', sandy gravels with cobbles, moist, light to dark brown, poorly sorted sand, 20% fines, round to subround, gravels and cobbles |
| | 100-SB-C | | | | 6.5 - 7.5' | | 6.5 - 7.5' 6.5-7.5', sandy gravels with cobbles, moist, light to dark brown, poorly sorted sand, 20% fines, round to subround, gravels and cobbles |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 101

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 101-SS: E2230479.871; N564777.5188; 101-SB: E2230477.74; N564777.3
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 8.2

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 101-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 4-point composite: poorly sorted sandy gravel, damp with cobbles |
| | 101-SB-A | | | | 2.0 - 3.0' | | 2.0 - 3.0' 2-3', cobbles and gravel, 65-75%, very coarse with fine sand, poorly sorted, 25-35%, medium brown, moist, no odor |
| 5 | | | | | | | |
| | 101-SB-B | | | | 6.6 - 7.2' | | 6.6 - 7.2' 6.2-7.2', sandy gravel with cobbles; wet to moist, medium brown, poorly sorted sand, subround to round cobbles |
| | 101-SB-C | | | | 7.2 - 8.2' | | 7.2 - 8.2' 7.2-8.2', sandy gravel with cobbles; wet to moist, medium brown, poorly sorted sand, subround to round cobbles |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 102

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2228971.085; Northing 563495.1269

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 14.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 102-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 3-point composite: silty sand, dry, fine, grayish yellow, clay loamy wet |
| | 102-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 3-point composite: silty sand, dry, grayish yellow |
| | 102-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 3-point composite: silty sand, dry, fine, grayish yellow, clay loamy wet |
| | 102-SB-A | | | | 2.0 - 3.3' | | 2.0 - 3.3' 2-3', heavily cobbled, medium to large stones, unconsolidated, large cobbles at 3' |
| 5 | | | | | | 5 | |
| | 102-SB-B | | | | 5.7 - 11.0' | | 5.7 - 11.0' 8-11.5', sandy gravel, light brown, wet, no stain or odor |
| 10 | | | | | | 10 | |
| | 102-SB-C | | | | 11.0 - 14.5' | | 11.0 - 14.5' 11.5-14.5', more sand than gravel, light brown, wet, no stain or odor |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 103

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229174.333; Northing 563639.5902
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 14

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 103-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 3-point composite: sandy silt, loamy, silty clay, damp, sandy loam, dark brown |
| | 103-SB-A | | | | 2.0 - 3.0' | | 2.0 - 3.0' 2-3', unconsolidated sand and gravel with medium to large assorted cobbles |
| 5 | | | | | | | |
| | 103-SB-B | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', silty sand, brown, wet, gravel, no stain, no odor |
| 10 | | | | | | | |
| | 103-SB-C | | | | 11.5 - 14.0' | | 11.5 - 14.0' 11.5-14', sandy gravel, brown, wet, no stain, no odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 104

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229322.117; Northing 563740.8113
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 8

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 104-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: loamy, gravel, sandy silt, grayish brown to dark brown, organics |
| | 104-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3.5', sandy gravel, dry, cobbles to 3", increasing sand at 3.25' |
| 5 | 104-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', sandy gravel, moist to wet, medium brown, subround |
| | 104-SB-C | | | | 6.5 - 8.0' | | 6.5 - 8.0' 6.5-8', sandy gravel, moist to wet, medium brown, subround |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 105

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229423.234; Northing 563811.6139
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 11

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 105-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty, minor sandy, minor gravel, light gray to brown |
| | 105-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', silt with gravels, very fine, dry, tan, increasingly more gravels up to 2" in size |
| 5 | | | | | | | |
| | 105-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-8', sand, wet, medium brown, some small gravels, poorly sorted |
| | 105-SB-C | | | | 8.0 - 11.0' | | 8.0 - 11.0' 8-10.5', sand, wet, medium brown, poorly sorted, no stain or odor; 10.5-11', gravel with sand, wet, medium brown |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 106

Date Hole Started: Date Hole Finished:

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 106-SS: E2229524.35; 106-SB: E2229520.35; N563882.4166
Recorded By:
Drilling Company:
Driller:
Drilling Method:
Drilling Fluids Used:
Purpose of Hole:
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 6.8

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 106-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy silt, minor gravel, light gray to light brown |
| | 106-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', sandy silt, olive brown, slightly moist to very moist, 1" minus gravels, no stain, no odor |
| 5 | 106-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', wet, sandy silt, olive brown, 1" minus gravels, no stain, no odor |
| | 106-SB-C | | | | 6.0 - 6.8' | | 6.0 - 6.8' 6-6.8', wet silty sand, olive brown, minimal material with stain/odor |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 107

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229625.467; Northing 563953.2192
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 8

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 107-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silt, minor sand and gravel, light gray |
| | 107-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', moist to very moist, silty clay, olive brown, 2" minus gravels, no stain or odor |
| 5 | 107-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-5', very moist, olive brown, 1" minus gravel; 5-6', wet olive brown, 1" minus gravel, silty sand, no stain or odor |
| | 107-SB-C | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-8', wet silty sand, olive brown with some black wet organic, no stain, no odor, 1-2" gravels |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 108

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 108-SS: E2229821.5; N564021.3; 108-SB: E2229804.6; N564026.5
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 7

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 108-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 3-point composite: sandy, pointy gravel with cobbles, brown hydrocarbon |
| | 108-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', increasing gravel,content, increasing silt, gravelly sand, sand; 3-3.9', out of gravel, silty sand, moist, moderate to well sorted quartz grains, moisture content higher than above, no odor |
| | 108-SB-B | | | | 4.0 - 4.5' | | 4.0 - 4.5' 4-4.5', wet, light brown, silty sand, 3" minus gravels, no stain/odor; 4.5-6', wet brown sand, 3" minus gravels, no stain/odor |
| 5 | | | | | | 5 | |
| | 108-SB-C | | | | 6.0 - 7.0' | | 6.0 - 7.0' 6-7', wet, brown, sand, 3" minus gravels, no stain/odor |
| 10 | | | | | | 10 | |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 109

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 109-SS: E2230004.571; N564182.2408; 101-SB: E2229996.8; N564179.29
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 7

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 109-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 3-point composite: poorly sorted sandy gravel, damp |
| | 109-SB-A | | | | 4.0 - 5.0' | | 4.0 - 5.0' 4-5', dark brown, sandy gravel 3" minus, moist, no stain, no odor |
| 5 | 109-SB-C | | | | 5.0 - 7.0' | | 5.0 - 7.0' 5', wet, 5" minus cobbles and gravels, brown sand, no stain, no odor |
| | 109-SB-B | | | | 6.0 - 4.0' | | 6.0 - 4.0' 4-6', wet, 5" minus cobbles and gravels, brown sand, no stain, no odor |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 11

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228382.884; Northing 564436.5391
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 10

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 11-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: gravel, sandy with silt, dry, moist, light brown to black |
| 5 | 11-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-4.5',sand, dark gray, sandy silt, medium gray, low moisture, no cohesion, low odor; 4.5-5', light gray, sandy silt to dark gray sand, moderate odor; 5.5-6', sandy silt, dark gray, light gray, clay, stained with black, moderate moisture, moderate cohesion |
| 10 | 11-SB-B | | | | 8.0 - 10.0' | | 8.0 - 10.0' 8-10', sandy gravel, moist, medium gray, stain and odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 12

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: 12-SS: E2228483.703; N564499.767; 12-SB: E2228483.70; N564497.767

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 12-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: gravel with silty sand, light brown, moist |
| | 12-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: gravel with silty sand, clayey gravel, blue-black, minor gravel |
| | 12-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: sandy clay with wood, blue-gray, gravelly with sand |
| | 12-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', 2" gravel, gray, clayey silt, moist, stain and odor |
| 5 | | | | | | 5 | |
| | 12-SB-B | | | | 8.0 - 9.0' | | 8.0 - 9.0' 8-9', medium round cobbles, heavy odor and staining, sandy gravel |
| 10 | | | | | | 10 | |
| | 12-SB-C | | | | 12.0 - 15.0' | | 12.0 - 15.0' 12-15', sandy gravel, light brown, wet, odor and stain |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 13

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228584.67; Northing 564578.7822
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 14.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 13-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: course clay gravel, minor sandy, blue-black |
| 5 | | | | | | | |
| | 13-SB-A | | | | 6.0 - 6.6' | | 6.0 - 6.6' 4-5', moist clayey silt, gray, stain and odor; 5-6', very moist, clay, gray, stain and odor |
| | 13-SB-B | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sandy gravel, wet, medium gray, stain and odor, subround to round |
| 10 | | | | | | | |
| | 13-SB-C | | | | 11.5 - 14.5' | | 11.5 - 14.5' 11.5-14', sand, wet, medium gray, stain and odor, poorly sorted; 14-14.5', sand, gravel, wet, medium gray, subround |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 14

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228685.638; Northing 564649.7975
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 14-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy, clayey gravel, black, coarse sandy clay, olive brown, damp, brick chunk |
| 5 | | | | | | | |
| | 14-SB-A | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-8', black, 2" minus gravel, stain/odor/sand, moist |
| 10 | | | | | | | |
| | 14-SB-B | | | | 12.0 - 6.0' | | 12.0 - 6.0' 6-12', sand gravel, product in soil |
| 15 | 14-SB-C | | | | 15.0 - 12.0' | | 15.0 - 12.0' 12-15', sand, silt, gravel, saturated sand, silt gravel with oil |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 15

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228786.606; Northing 564720.8128
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 14

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 15-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: poorly sorted gravel with silty sand, minor clay, damp, olive brown |
| 5 | 15-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 3-5.3', silty, gray, odor, gravels; 5.3-6'; sand, brown, gray, odor, moist |
| | 15-SB-B | | | | 7.8 - 8.8' | | 7.8 - 8.8' 7.8-8.8', sandy gravel, small-medium cobbles, round, sub-round, heavily stained, heavy odor |
| | 15-SB-C | | | | 8.0 - 14.0' | | 8.0 - 14.0' 8-14', black, strong odor, stain, sheen, oily sand gravel |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 16

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228887.574; Northing 564791.828
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 13

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 16-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand, minor gravel, olive brown to brown, damp |
| 5 | 16-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', clayey silt, black/gray, slightly cohesive, odor/stain |
| | 16-SB-B | | | | 8.0 - 9.5' | | 8.0 - 9.5' 8-9.5', silty clay, black/gray, water/oil at 9', gravels |
| 10 | | | | | | | |
| | 16-SB-C | | | | 13.0 - 8.0' | | 13.0 - 8.0' 8-13', black, sandy gravel, oil, stain, odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 17

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228988.541; 17-SS: N564862.8433; 17-SB: N564880.8433
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 9.2

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 17-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty clay loam, olive brown, damp, no gravel |
| 5 | 17-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-5.5', silty clay, black, stain/odor; 5.5 to 6', gray, clay, stain/odor |
| | 17-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 8-8.8', silty sand to gravel, water at 8.8', oil |
| | 17-SB-C | | | | 8.0 - 9.2' | | 8.0 - 9.2' 8.8-9.2', sand saturated with oil, some gravel to 1" |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 18

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 18-SS: E2229089.36; 18-SB: E2229114.36; N564934.0712
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 18-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: poorly sorted gravel with silty sand, damp, olive brown, odor |
| | 18-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', silty sand with some gravel to 1", gray/black, odor |
| 5 | | | | | | | |
| | 18-SB-B | | | | 7.7 - 8.5' | | 7.7 - 8.5' 7.5-8.5', sandy gravel, small-medium cobbles, round-sub-round, odor, some sheen, brown-tan |
| | 18-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', black sandy gravel, stain, oil, medium odor |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 19

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 19-SS: E2229190.477; 19-SB-A: E2229170.4766; N565004.8738; 19-SB-B &C: E2228755.6962; N564549.7442
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 15.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 19-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sandy gravels, damp, cobbles, dark brown |
| | 19-SB-A | | | | 4.0 - 4.8' | | 4.0 - 4.8' 4-4.8', black clayey silt, odor, slightly moist |
| 5 | | | | | | | |
| | 19-SB-B | | | | 6.5 - 8.0' | | 6.5 - 8.0' 6.5-8', sandy gravel, wet, dark gray to black, stain and odor |
| | 19-SB-C | | | | 8.0 - 15.5' | | 8.0 - 15.5' 8-9', sandy gravel, wet, heavy stain and odor; 9-15.5', light stain and odor |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 2

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2228310.7412; Northing 564539.5695

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 15.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 2-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand, gravel, gray brown |
| | 2-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: silty sand, gravel, gray brown |
| | 2-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: clay, olive brown, silty sand, gravel, dark to olive brown, clay-dense sticky, orange mottling |
| | 2-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3', silt, light brown, low moisture no odor; 3.0-3.5', sand silt, light brown, low moisture no odor, low cohesion; 3.5-4', cobbles, gravels .75 to 8", light brown, silty sand, no odor, low moisture |
| 5 | | | | | | | |
| | 2-SB-B | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', odor, no stain, grey to light brown, large grain sand with gravels |
| 10 | | | | | | | |
| | 2-SB-C | | | | 11.5 - 15.5' | | 11.5 - 15.5' 11.5-15.5', very slight odor, no stain, gray to light brown, large grain sand with gravels |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 20

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2228251.602; Northing 564193.6046

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 20-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand, light brown, coal pieces, nails, fire brick gravel |
| | 20-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: silty clay, olive brown, clay silt, dark brown |
| | 20-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: clayey silt, olive brown, cobbles |
| 5 | 20-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', silty clay, light brown, silty moist, no stain, no odor, clay with mottling at 6'. |
| | 20-SB-B | | | | 8.0 - 6.0' | | 8.0 - 6.0' 6-6.5', clayey silt, light brown, lightly moist, white mottling; 6.5-7.5, sandy clay, light brown, moist; 7.5-8 ft, wet, sandy clay, light brown, no stain, no odor; 8 ft, cobbles |
| 10 | 20-SB-C | | | | 9.0 - 15.0' | | 9.0 - 15.0' 9-15', sandy gravel, medium brown, wet, subangular |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 21

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2228351.23; Northing 564256.5337

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 21-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 4-point composite: sandy gravel, light brown, damp, slight stain |
| | 21-SS-B | | | | 0.5 - 1.0' | | |
| | 21-SS-C | | | | 1.0 - 2.0' | | 0.5 - 1.0' 4-point composite: sandy gravel, light brown, gravels, clayey sand, broken brick pieces |
| | | | | | | | 1.0 - 2.0' 4-point composite: clay, damp, light to dark brown, some orange, clayey silt |
| 5 | 21-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', clay, cohesive, some mottling, sandy, moist |
| | 21-SB-B | | | | 7.0 - 8.0' | | 7.0 - 8.0' 7-7.8', gravelly sand, wet, medium brown, round to subround, water at 7.8' |
| | 21-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sandy gravel, wet, gray to black, stain and odor |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 22

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2228452.346; Northing 564337.3363

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 10.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 22-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy gravel, sandy clay, olive brown, wood pieces |
| | 22-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: sandy clayey gravel, silty sandy gravel, tar gravel, black, minor asphalt |
| | 22-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: silty sandy gravel, brick and concrete, sandy clay, blue black, bone fragments |
| 5 | | | | | | 5 | |
| | 22-SB-A | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-7', silty sand, moist, light gray, hydrocarbon stained, no free hydrocarbon product, clay content increasing |
| | 22-SB-B | | | | 8.0 - 10.0' | | 8.0 - 10.0' 8-10' silty sand, moist, light gray, hydrocarbon stained, no free hydrocarbon product, clay content increasing; 7-7.5', becoming more moist, siltier, very moist to saturated with water, also slight hydrocarbon sheen, very strong odor, hydrocarbon product |
| 10 | | | | | | 10 | |
| | 22-SB-C | | | | 10.0 - 10.5' | | 10.0 - 10.5' 10-10.5 silty sand, moist, light gray, hydrocarbon stained, no free hydrocarbon product, clay content increasing; slight hydrocarbon sheen, very strong odor, hydrocarbon product |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 23

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228553.463; Northing 564408.1389
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 23-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand gravel, olive brown, sandy gravel, clayey silt |
| 5 | | | | | | | |
| | 23-SB-A | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-7.5', sandy silt with gravel, moist, dark gray to black, slightly cohesive, gravels are subround, stain and odor at 7', increasing in moisture, gravels are 5" |
| | 23-SB-B | | | | 8.0 - 10.0' | | 8.0 - 10.0' 7.5-9.75', sandy clay, very moist, black, some gravels, stain and odor, hit free product at 9.5' |
| 10 | | | | | | | |
| | 23-SB-C | | | | 10.5 - 11.5' | | 10.5 - 11.5' 9.75-11.5', sandy gravel, wet, black, stain and odor, subrounded to round, gravel size .5" |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 25

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2228755.696; Northing 564549.7442

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 25-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: poorly sorted gravel with silty sand, damp, asphalt millings, gray-brown to olive brown, |
| | 25-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: poorly sorted gravel, silty sand, asphalt millings, clay, black |
| | 25-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: clayey sandy gravel, poorly sorted, damp, olive brown to black, odor |
| | 25-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-2.8', sandy brown; 2.8-3.6', gravels, and sand, some black, sandy soil, odor, slight stain/sheen; 3.6-4', same with more gravel, clay lenses |
| 5 | | | | | | 5 | |
| | 25-SB-B | | | | 7.0 - 8.0' | | 7.0 - 8.0' 7-8', very moist, wet, stain and odor, product, black, sandy gravels, with cobbles |
| | 25-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sandy gravel, wet, dark gray, medium odor and stain |
| 10 | | | | | | 10 | |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 26

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2228856.813; Northing 564620.5468

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 14.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 26-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy silt gravel, olive brown, odor, |
| | 26-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: silty sand, dark brown and black, silty clay, gravel |
| | 26-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: silty clay, clayey silt, black to olive brown |
| 5 | | | | | | 5 | |
| | 26-SB-A | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-7.8', dark gray, clay, moist, stain and odor; 7.8-8', black, silty sand, very moist, stain and odor. |
| | 26-SB-B | | | | 8.1 - 11.0' | | 8.1 - 11.0' 8.1-11', sandy gravel, wet, heavy odor and stain, subangular to angular |
| 10 | | | | | | 10 | |
| | 26-SB-C | | | | 11.0 - 14.5' | | 11.0 - 14.5' 11-14.5', sandy gravel, wet, heavy odor and stain, subangular to angular |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 27

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 27-SS: E2228957.929; N564676.3494; 27-SB-A,B: E2228957.929; N564679.35; 27-SB-C: N564612.3494
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 13

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 27-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand, gravel, clayey silt, odor, brown to black |
| 5 | | | | | | | |
| | 27-SB-A | | | | 6.0 - 7.0' | | 6.0 - 7.0' 6-7', black with gray streaks, clayey silt, stain and odor, 1" minus gravel |
| | 27-SB-B | | | | 7.5 - 8.5' | | 7.5 - 8.5' 7.5-8.5', sandy gravel, dark gray, wet, odor and stain, subround to round, gravel sized from pea to 2+" |
| | 27-SB-C | | | | 8.0 - 13.0' | | 8.0 - 13.0' 8-13', sandy gravel, wet, dark gray to gray, subround, heavy odor and stain |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 28

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2229059.046; Northing 564747.152

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 28-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy silt, gravel, light brown, silty clay minor gravel |
| | 28-SS-B | | | | 0.5 - 1.0' | | |
| | 28-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: clayey silt, black and light brown, brick fragments, silty clay |
| 5 | | | | | | 5 | |
| | 28-SB-A | | | | 6.0 - 7.3' | | 6.0 - 12.0' 5-point composite: sandy silt, gravel, clayey silt, light brown |
| | 28-SB-B | | | | 7.3 - 8.5' | | 7.3 - 6.0' 6-7.3', dark gray, very plater clay, moist, odor, brown petro liquid at 7' |
| | 28-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sandy gravel, wet, odor and stain, subround to round |
| 10 | | | | | | 10 | 8.5 - 7.3' 7.3-8.5', silty gravel, wet, dark gray, free product, stain and odor, subround to round |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 29

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2229160.163; Northing 564832.9546

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 29-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: poorly sorted gravel, silty sand, brown, damp, silty clayey loam |
| | 29-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: clay, sandy, grayish and reddish brown, minor gravel, dry |
| | 29-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: clayey silt, dry -black, strong odor, gravelly silt clay loam, tan |
| 5 | | | | | 5 | | |
| | 29-SB-A | | | | 6.0 - 6.7' | | 6.0 - 6.7' 6-6.7', dark gray, black clay, odor, moist, and sheen |
| | 29-SB-B | | | | 6.7 - 8.0' | | 6.7 - 8.0' 6.7-8', sandy silt and medium to large size cobbles, ample product with very strong odor and sheen |
| | 29-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sand with gravel, wet, black, poorly sorted, subround, stain and odor |
| 10 | | | | | 10 | | |
| 15 | | | | | 15 | | |
| 20 | | | | | 20 | | |
| 25 | | | | | 25 | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 3

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228411.8578; Northing 564610.3721
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 3-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy gravel with silt blue gray, damp, sandy matrix, strong odor |
| 5 | 3-SB-A | | | | 4.0 - 5.4' | | 4.0 - 5.4' 4-5.4', minor gravel, brown, silty sand, slightly moist, no stain/odor |
| | 3-SB-B | | | | 7.5 - 8.0' | | 7.5 - 8.0' 7.5-8', brown, sandy gravel and cobbles, no stain, no odor |
| 10 | 3-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sandy gravel, gray, medium cobbles, moderate staining moderate odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 30

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229261.279; Northing 564903.7572
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 30-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: poorly sorted gravel with sand, damp, silty loam |
| 5 | 30-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', damp, black, stray odor |
| | 30-SB-B | | | | 8.0 - 9.9' | | 8.0 - 9.9' 8-9.9', water at 7.9 feet |
| 10 | 30-SB-C | | | | 9.9 - 15.0' | | 9.9 - 15.0' 9.9-15', sandy gravel, wet, dark gray to black, odor and stain, subround |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 31

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: E2229362.396; 31-SS: N564974.5598; 31-SB: N564954.5598

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 31-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty clay, gravel, some organics, light to dark brown |
| | 31-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: silty clay, gray to brown, pebbles, brown/black sand |
| | 31-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: silty clay, brown, pebbles, cobbles, white precipitate |
| 5 | | | | | | 5 | |
| | 31-SB-B | | | | 5.5 - 7.0' | | 5.5 - 7.0' 5.5-7', sandy clay, dark gray to black, moist to wet, moderate stain and odor |
| | 31-SB-A | | | | 6.0 - 7.5' | | 6.0 - 7.5' 6-7.5', very most, black, silty clay, stain and odor |
| | 31-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', gravelly sand, wet, black, poorly sorted, subround to round |
| 10 | | | | | | 10 | |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 32

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 32-SS: E2229463.513; N565045.3624; 32-SB: N565021.3624
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 32-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: wet clay, sandy pea gravel, hydrocarbon odor |
| | 32-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3.7', sandy clay, dark brown-black, moist, odor, slight stain; 3.7-4', back sand, odor, stain, slightly moist |
| 5 | 32-SB-B | | | | 5.0 - 7.5' | | 5.0 - 7.5' 5-7.5', wood in sample, clay silt, moist, medium olive, gray, moderate cohesion |
| 10 | | | | | | | |
| | 32-SB-C | | | | 12.0 - 15.0' | | 12.0 - 15.0' 12-15', fine grain sand with little visible product, some mixed gravels also with sand, chunks of wood at 8-12' interval |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 33

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229564.629; Northing 565106.165
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 16

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 33-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty clay, tan color, white precipitate, some cobbles, orange mottling |
| 5 | 33-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-5.2', olive brown, black, moist, some stain, slight odor, clayey sand; 5.2-6' black clay, odor, stain, moist |
| | 33-SB-B | | | | 8.0 - 9.0' | | 8.0 - 9.0' liquid at 8.2', fine sandy gravel, gray-black, odor, stain, sheen |
| 10 | | | | | | | |
| | 33-SB-C | | | | 12.0 - 16.0' | | 12.0 - 16.0' 12-16', black oil standing, mixed gravel and sand, saturated with product |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 34

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: E2229665.746; 34-SS: N565186.9676; 34-SB: N565166.9676
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 34-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: pea gravel, asphalt, sandy with cobbles, oily stained pea gravel with sand |
| 5 | | | | | | | |
| | 34-SB-A | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-8', black, firm sand, heavy odor, product sheen |
| | 34-SB-B | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-10.5', silty clay, moist, black to medium gray, stain and odor; 10.5-11.5', sandy wet, black, poorly sorted, stain and odor |
| 10 | | | | | | | |
| | 34-SB-C | | | | 11.5 - 15.0' | | 11.5 - 15.0' 11.5-15', sandy wet, black, poorly sorted, stain and odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 35

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: E2229766.862; 35-SS: N565257.7702; 35-SB: N565265.7702

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 35-SS-A | | | | 0.0 - 0.5' | | 0.0 - 6.0' 5-point composite: sandy pea gravel, asphalt |
| 5 | 35-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-5.8', sandy silt with slightly moist, dark gray, cohesion, odor and stain; 5.8-6', silty sand, slightly moist, medium gravel, not cohesive, odor and stain |
| 10 | 35-SB-B | | | | 8.5 - 11.5' | | 8.5 - 11.0' 8.5-11', petro contamination, gravel and fine sand mixed, black color |
| 15 | 35-SB-C | | | | 11.0 - 15.0' | | 11.0 - 15.0' 11-15', course gravel/sand mix, light odor, gray |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 36

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2228422.032; Northing 564165.4171

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 10

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 36-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand with pebbles, wood debris, asphalt chunks, black to brown |
| | 36-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: silty sand with gravel, cobbles, clayey silt concrete chunks, wood debris, glass |
| | 36-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: silty clay, silty sand with pebbles, brown |
| | 36-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 0-1.5', fill sand, silty with gravel, coal pieces, brick fragments, glass |
| 5 | | | | | | | |
| | 36-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-7.5', sand, fine, silt, moist, olive brown, well sorted, saturated with water at 7', some black mottling |
| | 36-SB-C | | | | 8.0 - 10.0' | | 8.0 - 10.0' 7.5'-10', becoming siltier, highly iron oxide throughout sample, clay, stronger, no odor to depth |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 37

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228523.149; Northing 564236.2197
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 15.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 37-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand with gravel, brown, sandy silt, wood chips, pebbles |
| | 37-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', silt, some clay, minor sand, moist, dark olive brown, 3.5' slight mottling of silt (iron, black), more moist at 4' |
| 5 | | | | | | | |
| | 37-SB-B | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sandy gravels, wet, dark gray to black, odor and stain, subround |
| 10 | | | | | | | |
| | 37-SB-C | | | | 11.5 - 15.5' | | 11.5 - 15.5' 12-15.5', fine sand, some pea gravels, wet, black, odor and stain, poorly sorted sand |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 38

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2228624.266; Northing 564307.0223

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 11

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 38-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy gravel, olive brown, silt, dark brown with roots |
| | 38-SS-B | | | | 0.5 - 1.0' | | |
| | 38-SS-C | | | | 1.0 - 2.0' | | 0.5 - 1.0' 5-point composite: tar gravels, black, silty gravel, olive brown with cobbles, silty sand, olive to light brown |
| | 38-SB-A | | | | 2.0 - 4.0' | | 1.0 - 2.0' 5-point composite: silty sand gravel, large cobbles, clayey silt |
| | | | | | | | 2.0 - 4.0' 2-4', fill, gravels, cobbles, silty sand, medium brown, dry at surface |
| 5 | | | | | | 5 | |
| | 38-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-7', sandy silt with clay, very moist, dark brown, moderate cohesion, orange mottling |
| | 38-SB-C | | | | 8.0 - 11.0' | | 8.0 - 11.0' 8-11', sandy gravel, wet, medium gray to black, stain and odor |
| 10 | | | | | | 10 | |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 39

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 39-SS: E2228725.382; N564372.8249; 39-SB: E2228730.3822; N564377.8249
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 15.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 39-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy clay gravel, light to olive brown, tar gravel, coal dust |
| | 39-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', cobbles with gravel, black, silty sand clay, stain and odor, slightly moist, very compact |
| 5 | | | | | | | |
| | 39-SB-B | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', gravels, very little sand, wet, black, free product in sample |
| 10 | | | | | | | |
| | 39-SB-C | | | | 11.5 - 15.5' | | 11.5 - 15.5' 11.5-15.5', sandy gravels, wet, black, free product |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 4

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228512.974; Northing 564681.1747
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 10.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 4-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand, grayish black, sandy clay, brown, wet |
| 5 | | | | | | | |
| | 4-SB-A | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-7.3', gray clayey silt, stain/odor, slightly moist; 7.3-7.75'; moist, clay, gray, stain and odor; 7.75-8', silty sand, gray, moist, stain and odor |
| | 4-SB-B | | | | 8.0 - 10.5' | | 8.0 - 10.5' 8-10.5', cobble and sand/silt composition, water at 10' |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 40

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228826.499; Northing 564448.6276
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 19.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 40-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy silt with gravel, some pebbles, roots, clay pieces, gray to dark brown |
| | 40-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: sandy silt with sorted gravels, cement pieces, some pebbles, gray to brown |
| | 40-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: sandy silt, cobbles, gray to brown, cinders, wood debris |
| 5 | | | | | | 5 | |
| | 40-SB-A | | | | 6.0 - 7.5' | | 6.0 - 7.5' 6-6.8', black clay, slightly moist, stain/odor; 6.8-7', black sand, moist, stain/odor; 7-7.5', black clayey silt, moist, stain/odor |
| | 40-SB-B | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', gravelly sand, very moist, dark gray to black, poorly sorted, subround to round |
| 10 | | | | | | 10 | |
| | 40-SB-C | | | | 11.5 - 19.5' | | 11.5 - 19.5' 11.5-19.5', gravelly sand, very moist, dark gray to black, poorly sorted, subround to round |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 41

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228927.616; Northing 564519.4302
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 16

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 41-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy silt with pebbles, gray to brown, clinker |
| 5 | | | | | | | |
| | 41-SB-A | | | | 6.0 - 6.6' | | 6.0 - 6.6' 6-6.6', clayey sand, odor, stain, dark brown to black, slightly moist |
| | 41-SB-B | | | | 8.0 - 9.2' | | 8.0 - 9.2' 8-9.2', small-medium cobbles, round to subround, rocky sand, visible product and strong odor, dark brown to black |
| 10 | | | | | | | |
| | 41-SB-C | | | | 12.0 - 16.0' | | 12.0 - 16.0' 12-16', sandy gravel, wet, dark gray, odor and stain |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 42

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2229028.732: Northing 564590.2328

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 42-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy silt, brown, orange cinders |
| | | | | | | | 0.5 - 1.0' 5-point composite: sandy silt with gravel, clinker cinders, brown to dark brown |
| | | | | | | | 1.0 - 2.0' 5-point composite: sandy silt and gravel, orange clinker, brown to black, silty clay |
| 5 | | | | | | 5 | |
| | 42-SS-B | | | | 6.0 - 12.0' | | 6.0 - 7.0' 6-7', clay, gray, odor and sheen and stain, moist |
| | 42-SB-A | | | | 7.0 - 6.0' | | |
| | 42-SB-B | | | | 7.2 - 8.2' | | 7.2 - 8.2' 7.2-8.2', heavy odor and stained, small-medium cobbles, round to subround, silty sand, dark, visible product |
| | 42-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sandy gravel, wet, dark gray, odor and stain, subround |
| 10 | | | | | | 10 | |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 43

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2229129.849; Northing 564661.0354

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 43-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty clay, tan to olive brown |
| | 43-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: silty clay, black clay, sandy silt, brick pieces, tan to reddish gray |
| | 43-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: silty clay, brown to dark brown, some gravels, black stain |
| | 43-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2.2-3.5', reddish brown, sandy silt, dry, no stain, odor; 3.5-4', dark gray, moist, stain/odor, clay |
| 5 | | | | | | | |
| | 43-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 7.3-8.3', heavily graveled, dark, black, small-medium gravel, heavily odored, stained, sandy, subround to round |
| | 43-SB-C | | | | 8.3 - 11.5' | | 8.3 - 11.5' 8.3-11.5', sandy gravel, wet, dark gray, odor and stain |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 44

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2229230.965; Northing 564731.838

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 6

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 44-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty clay, loam, dry, tan, organics, minor gravels |
| | 44-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: silty clay, loam, dry, tan, cobbles, minor gravel |
| | 44-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: silty clay, loam, dry, tan, gravelly, cobbles, hard and dense clay/silt |
| | 44-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 0-3.5', silt with some sand, dry; 3.3-3.5', clay with silt, damp; 3.5-4.0', odor, black to dark brown, clay with silt and sludge |
| 5 | 44-SB-B | | | | 4.0 - 2.0' | 5 | 4.0 - 2.0' 3.1-4.5', black, odor, gravel |
| | 44-SB-C | | | | 6.0 - 4.0' | | 6.0 - 4.0' 4.5-6', black, odor, and with OCC pebbles |
| 10 | | | | | | 10 | |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 45

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: E2229332.059; N564802.6406; 45-SB-A: E2229325.71, N564809.0

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 45-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sandy loam, tan, dry, clay loam, dark brown |
| | 45-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: silty sandy loam, sludge, black, orange mottling |
| | 45-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: silty sand loam, sandy sludge, black, wet, cobbles |
| | 45-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', black, odor, clayey sandy loam, very moist |
| | 45-SB-B | | | | 4.0 - 4.9' | | 4.0 - 4.9' 4-4.9', liquid at 4', black stain, odor, clayey sand, very moist |
| 5 | | | | | | 5 | |
| | 45-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sandy silt, medium rounded cobbles, heavily odored, stained and sheen, visible product |
| 10 | | | | | | 10 | |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 46

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2229433.199; Northing 564873.4432

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 46-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand, gray to dark brown, small rocks |
| | 46-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: silty sand, gray brown, ashy, coal chunks, pebbles |
| | 46-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: silty sand, small rocks, small white chunks |
| 5 | 46-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', light brown, silt, some sand; 5-5.75', damp, medium grained sand; 5.75-6.2', sandy gravel, cobbles to 2', odor beginning at 6.0' |
| | 46-SB-B | | | | 5.0 - 6.2' | | 5.0 - 6.2' 5-6.2', sandy clay, dark gray, moist to wet, stain and odor |
| 10 | 46-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', gravelly sand, wet, dark gray to black, round to subround, stain and odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 47

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2229534.315; Northing 564944.2458

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 47-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: black, pea gravel, sandy, pebbles, light gray silty sand |
| | 47-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: light gray silty sand with coal dust |
| | 47-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: olive brown silty sand, minor clay, orange mottling, clayey sand |
| 5 | 47-SB-B | | | | 5.0 - 7.0' | | 5.0 - 7.0' 5-7', sandy clay, dark gray, moist to wet, stain and odor |
| | 47-SB-A | | | | 6.0 - 7.7' | | 6.0 - 7.7' 6-6.5', very moist, clayey sand, dark brown, odor and stain; 6.5-7.7', sandy clay, dark gray, very moist, stain and odor |
| | 47-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5' |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 48

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229635.432; Northing 565015.0484
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 9.2

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 48-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy pea gravel, oil stained, silty sand, olive, coal dust |
| 5 | 48-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 2-4', light tan, silty sand, slightly moist, minor black specs, likely cover cave in, no stain, no odor |
| | 48-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-6.8', tan, sandy, very moist; 6.8-8' wet dark tan, sandy, no stain, odor for all |
| | 48-SB-C | | | | 8.0 - 9.2' | | 8.0 - 9.2' 8-9.2', dark tan, wet, sand, no stain, no odor |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 49

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229736.548; Northing 565085.851
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 14.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 49-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sand and pea gravel, asphalt, black sand, silty clay, smell, coal dust |
| 5 | | | | | | | |
| | 49-SB-A | | | | 6.0 - 7.2' | | 6.0 - 7.2' 6-7', black, stain, odor, silty clay, very moist; 7-7.2', sandy silt, black, gravels, stain, odor |
| | 49-SB-B | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sandy gravels, wet, dark gray, subround, odor and stain |
| 10 | | | | | | | |
| | 49-SB-C | | | | 11.5 - 14.5' | | 11.5 - 14.5' 12-14.5', sand with pea gravel, wet, dark gray, subround to round, odor and stain |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 5

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228614.469; Northing 564751.8374
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 5-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy gravel, dark brown, minor gravel, blue-gray to black |
| 5 | | | | | | | |
| | 5-SB-A | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-6.8', SAA; 6.8-7.3', SAA but moist; 7.3-7.9'; clay, moist, gray, stain and odor; 7.9-8' gray, silty sand, stain and odor, 2" gravels |
| | 5-SB-B | | | | 8.0 - 12.0' | | 8.0 - 12.0' 8-12', saturated oil/sediment, odor |
| 10 | | | | | | | |
| | 5-SB-C | | | | 12.0 - 15.0' | | 12.0 - 15.0' 12-15', saturated oil/sediment, odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 50

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229837.665; Northing 565156.6536
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 14

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 50-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 4-point composite: coarse gray sand with large gravels, cobbles, brick chunks, coal |
| 5 | | | | | | | |
| | 50-SB-A | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-7.5', very moist clayey silt, dark gray, no stain, odor; 7.5-8', sandy silt, very moist, dark gray, no stain, no odor |
| | 50-SB-B | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sandy gravel, gray to tan, medium odor, cohesive |
| 10 | | | | | | | |
| | 50-SB-C | | | | 11.5 - 14.0' | | 11.5 - 14.0' 11.5-14', sandy gravel, tan to light gray, fine grained small-medium cobbles, no odor, some stain |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 51

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229938.782; Northing 565227.4562
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 12

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 51-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy cobbles, gravel, clayey silt, hydrocarbon smell, dark brown |
| 5 | 51-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-5.5', silty clay, slightly moist, dark gray, stain and odor; 5.5-6', sandy silt, slightly moist, black, stain, odor; 6-7', clayey, black, moist, stain and odor |
| | 51-SB-B | | | | 8.0 - 9.0' | | 8.0 - 9.0' 8-9', coarse gravel, some sand, black with contamination |
| 10 | 51-SB-C | | | | 9.0 - 12.0' | | 9.0 - 12.0' 9-12', sheen on water, sand with some various sized gravel, medium gray, color |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 52

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228578.795; Northing 564049.1435
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 10

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 52-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: thick layer of organic material, sandy gravel, moist, medium gray to orange-brown, clayey silt |
| 5 | 52-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', medium dark, fine grain, sandy silt, low moisture, low cohesion, no odor, no gravels |
| | 52-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-7', medium dark, fine grain, sandy silt, wet soils, 2" of gray clay at 7', no odor; 7-8', saturated brown sand, no odor |
| 10 | 52-SB-C | | | | 8.0 - 10.0' | | 8.0 - 10.0' 8-10', saturated coarse brown sand, no odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 53

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228695.068; Northing 564205.9057
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 12

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 53-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand with gravel, fill material |
| | 53-SB-A | | | | 2.0 - 2.9' | | 2.0 - 2.9' 2-2.9', dry, sandy gravel, darker brown at 2.5', but still dry |
| 5 | | | | | | 5 | |
| | 53-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-0-6.5', red/brown, silty sand, moderate moisture, no odor, 40% gravels and cobbles; 6.5-8', liquified gray clay, saturated, 70% gravels <1", 30% cobbles 1-2" |
| 10 | | | | | | 10 | |
| | 53-SB-C | | | | 10.0 - 12.0' | | 10.0 - 12.0' 10-12', sheen and free product in sample, sand/sediment |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 54

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: E2228796.185; 54-SS: N564262.7083; 54-SB: N564276.7083

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 8.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 54-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: coal dust, sands, clinker chunks, very compacted silty sands with cobbles, wood debris |
| | 54-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: tan silty sand, coal dust with sand and clinker |
| | 54-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: sandy coal dust, gray sand, clinker |
| 5 | | | | | | 5 | |
| | 54-SB-A | | | | 6.0 - 7.0' | | 6.0 - 7.0' 6-7', dark gray to black sand, strong odor |
| | 54-SB-C | | | | 7.0 - 10.0' | | 7.0 - 10.0' 7.5-10', oil sheen, visible product |
| | 54-SB-B | | | | 8.0 - 8.5' | | 8.0 - 8.5' 8-8.5', water at 8', sands, gravels <1", cobbles 1-2", approx 60% product sheen on water, liquified clays, silts, strong odor |
| 10 | | | | | | 10 | |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 55

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228897.302; Northing 564354.5109
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 10

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 55-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: coal dust, sands, some gravel, dark brown, silty sand |
| 5 | 55-SB-A | | | | 4.0 - 5.8' | | 4.0 - 5.8' 4-5', silty clay, dark brown, dry, no odor; 5.0-5.5', sandy silt, medium dark brown, dry, slight odor; 5.5-5.75', fine grain gray sand, transitioning to gray clay and black clay, medium to strong odor, moderately moist, moderately cohesive, slight sheen |
| | 55-SB-B | | | | 5.5 - 7.5' | | 5.5 - 7.5' 5.5-6.5', clay, moist, medium gray, stain and odor |
| | 55-SB-C | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-8', visible sheen and product on soil. |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 56

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: E2228998.418; 56-SS: N564403.3136; 56-SB: N564418.3136

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 10

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 56-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 4-point composite: coal dust, some organics, coal, pebbles, gravels, sandy loam |
| | 56-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 4-point composite: sandy coal dust with gravel, sandy pea gravel, light gray, coal dust |
| | 56-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 4-point composite: sandy coal dust with gravel, sandy pea gravel, light gray, coal dust |
| 5 | | | | | | | |
| | 56-SB-A | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-6.5', light gray clay, hydrocarbon sheen, moderate odor; 6.5-7.5', fine black sand, hydrocarbon sheen, moderate odor |
| | 56-SB-B | | | | 6.5 - 8.5' | | 6.5 - 8.5' 6.5-8.5', sandy clay, moist to wet, medium gray to black, slight odor and stain, moderate cohesion |
| | 56-SB-C | | | | 8.0 - 10.0' | | 8.0 - 10.0' 8-10', visible oil sheen and product in soil |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 57

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229095.535; Northing564489.1162
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 12

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 57-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: coal dust with sand, some clinker, organics, light gray to brown |
| 5 | 57-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-4.5', coarse red/brown, moist, very slight odor, 10% gravels; 4.5-6', wet, coarse, dark gray sand, odor, 15% small gravels |
| | 57-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-6.5', coarse dark gray wet sand with gravels to black coarse sand, saturated, strong odor; 6.5-7', black saturated coarse sand |
| 10 | 57-SB-C | | | | 8.0 - 12.0' | | 8.0 - 12.0' 8-12', gravelly sand, wet, dark gray to black, subround to round, stain and odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 58

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: E; 2229200.651; 58-SS, 58-SB-A: N564555.9188; 59-SB-B&C: N564559.9188

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 14

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 58-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: coal cinders and light yellowish fragments, pea gravel, silt loam with minor sand, brown |
| | 58-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: coal dust, cement chunks, light gray, some metal, sandy silty |
| | 58-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: coal dust, cement debris, gray to black color |
| 5 | | | | | | 5 | |
| | 58-SB-A | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-7', silty sand, light brown, moist, no odor, clay, highly cohesive; 7-7.5', light gray to dark gray, fine sands, strong odor followed by light gray to black clay, strong odor with sheen; 7.5-8', gray to black clay, odor and sheen, moist and cohesive |
| 10 | | | | | | 10 | |
| | 58-SB-B | | | | 10.0 - 10.8' | | 10.0 - 10.8' 10-10.8', medium grain, dark gray sand, liquified clay, dark gray/black, saturated, mod odor |
| | 58-SB-C | | | | 10.8 - 14.0' | | 10.8 - 14.0' 10.8-14', sandy gravel, wet, black, strong odor and stain |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 59

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228765.871; Northing 564104.7891
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 8.7

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 59-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand with gravel and cobbles, dark gray |
| 5 | 59-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-5.3', damp sand with silt, medium brown, cobbles gravel at 5.3' |
| | 59-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-8', medium coarse dark brown sands, 40% gravels/cobbles .5-2", saturated with dark brown product skim on water, moderate odor |
| | 59-SB-C | | | | 8.0 - 8.7' | | 8.0 - 8.7' 8-8.7', sandy wet, 2" gravels, mod odor and skin |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 6

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 6-SS-A: E2228715.208; N564822.78; 6-SB E2228704.5976; N564833.39
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 16

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 6-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy, clayey gravel, brown, gravel, plantar sheeting, silty sand |
| 5 | 6-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', silty clay, black, odor/stain, silty sand |
| | 6-SB-B | | | | 8.0 - 12.0' | | 8.0 - 12.0' 8-12', black, sandy gravel, stain, oil and odor |
| 10 | | | | | | | |
| | 6-SB-C | | | | 12.0 - 16.0' | | 12.0 - 16.0' 12-16', black, sandy gravel, stain, oil and odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 60

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228866.988; Northing 564175.5917
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 15.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 60-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 4-point composite: black silty sand, gray silty clay, gravel, fill material |
| 5 | 60-SB-A | | | | 4.0 - 5.3' | | 4.0 - 5.3' 4-5', damp, dark gray to black, silty clay, odor; 5-5.3', black damp, gravel with sand, cobbles to 3", odor |
| | 60-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-8', coarse black, dark gray sands, 50% gravels/cobbles .5-2.5", saturated, moderate odor |
| 10 | 60-SB-C | | | | 8.0 - 15.5' | | 8.0 - 15.5' 8-15.5', gravelly sand, wet, dark gray, subround, stain and odor, poorly sorted |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 61

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2228968.104; Northing 564246.3943

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 9

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 61-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: compact silty sand, cobbles, gravel |
| | 61-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: silty sand with poorly sorted gravels, black sand, cobbles |
| | 61-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: silty sandy clay with gravels, hydrocarbon smell, brown color to light gray |
| | 61-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-2.1', damp, dark brown to black clay with silt, 5% pebbles; 2.1-4.0', damp black clay, light gray |
| 5 | | | | | | 5 | |
| | 61-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-8', light with clay, black, wet |
| | 61-SB-C | | | | 8.0 - 9.0' | | 8.0 - 9.0' 8-9', light with clay, black, wet |
| 10 | | | | | | 10 | |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 62

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229069.221; Northing 564317.197
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 9

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 62-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: blueish-gray silty clay, slight hydrocarbon smell, sandy gravel with concrete chunks, cobbles, tan color |
| 5 | 62-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-5', coarse black sand, heavy stain/heavy odor, fine black sand; 5-6', fine and medium black sand, heavy odor/stain, wet |
| | 62-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6.1-6.5', saturated black sand, clay; 6.5-8', saturated black coarse sand, 10% small gravels, moderate odor |
| | 62-SB-C | | | | 8.0 - 9.0' | | 8.0 - 9.0' 8-9', sandy gravel, wet, dark gray to black, heavy stain and odor |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 63

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229170.337; Northing 564387.9996
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 8

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 63-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: black silty clay, damp, sandy gravel |
| | 63-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3.7', clay with silt, black, strong odor; 3.7-4.0', gravel, wet, strong odor |
| 5 | 63-SB-B | | | | 4.0 - 5.3' | | 4.0 - 5.3' 4-5.3', gravel, wet, strong odor |
| | 63-SB-C | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-8', coarse dark gray/black sands, 50 gravels and cobbles .5-2.5", fully saturated, strong odor/product sheen/skim |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 64

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229271.454; Northing 564454.8022
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 15.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 64-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand, light brown, broken concrete, cinder block, damp, poorly sorted gravel |
| 5 | 64-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-4.5', damp sand, clay, turns black at 4.2', strong odor; 4.5-6', damp, black, sandy, strong odor |
| | 64-SB-B | | | | 6.0 - 6.7' | | 6.0 - 6.7' 6-7', wet gravel, sandy, visible product |
| 10 | 64-SB-C | | | | 8.0 - 15.5' | | 8.0 - 15.5' 8-15.5', gravelly sand, wet, dark gray, pea sized gravel, stain and odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 65

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2229387.728; Northing 564615.5644

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 65-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: organic material, degraded asphalt, silty clay, coal dust, black color, ballast |
| | 65-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: coal dust minor, gray brown, silty sand, gravel, asphalt |
| | 65-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: sandy silt, gray brown, gravel, some clayey sand |
| 5 | | | | | | | |
| | 65-SB-A | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-7', brown, damp, roots, scattered cobbles; 7-7.2', more damp, brown silt, gravel, cobbles; 8', increasing cobbling and moisture content, small-medium gravel |
| | 65-SB-B | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11'; silty clay, wet, olive brown |
| 10 | | | | | | | |
| | 65-SB-C | | | | 11.5 - 15.0' | | 11.5 - 15.0' 11-15', sandy gravel, wet, medium brown |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 66

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: E2229589.961; 66-SS: N564757.1696; 66-SB: N564857.1696
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 7

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 66-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: pea gravel, sandy silt, damp, dark brown, organics, loam |
| | 66-SB-B | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', silty clay, moist, light brown, cohesive and nonorganic, orange and gray mottling |
| 5 | 66-SB-C | | | | 4.0 - 5.5' | | 4.0 - 5.5' 4-4.2', silty clay, moist, light brown, cohesive and nonorganic, orange and gray mottling; 4.2-5.5', gravelly clay, wet, light olive brown to black, cohesive, light odor and stain |
| | 66-SB-A | | | | 6.0 - 7.0' | | 6.0 - 7.0' 6-7', light brown, sandy silt, dry, no stain/odor |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 67

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: E2229792.194; 67-SS: N564898.7748; 67-SB: N 564928.7748

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 16

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 67-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy loam, coal dust, gravely sands, olive brown, sandy gravel |
| | 67-SS-B | | | | 0.5 - 1.0' | | |
| | 67-SS-C | | | | 1.0 - 2.0' | | 0.5 - 1.0' 5-point composite: silty sand, light brown, some gravel, large chunks of coal with coal dust, clayey sands, some gravel |
| | | | | | | | 1.0 - 2.0' 5-point composite: silty sand, grayish yellow, chunk of coal, clayey sands, white precipitate |
| 5 | 67-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 2-4', sand, light brown, slight moisture, no odor; 4-4.5', sandy clay, light gray with gravels, no odor; 4.5-5', silty sand, light brown, medium moisture no odor; 5-5.5', clay, light brown, highly cohesive; 5.5-6', light gray, streaked with white clay, wet sticky, no odor |
| | 67-SB-B | | | | 6.0 - 7.0' | | 6.0 - 7.0' 6-7', brown, saturated clay, mottled with orange and black, some saturated light brown silts, no odor |
| | 67-SB-C | | | | 8.0 - 16.0' | | 8.0 - 16.0' 8-12', sandy gravel, wet, dark brown to reddish brown; 12-16', gravelly sand, wet, dark gray, slight odor and stain |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 68

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229994.427; Northing 565040.38
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 8

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 68-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: loam, sand with some gravel, gray, silty sand, scrap metal, dark gray silty sand with organics |
| | 68-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', gravelly sand, medium brown, moist, subrounded to rounded, gravels from .25 to 6" |
| 5 | 68-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', gravelly sand, medium brown, wet, subround to round, 30% gravel, poorly sorted sand |
| | 68-SB-C | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-8', gravelly sand, medium brown, wet, subround to round, 30% gravel, poorly sorted sand |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 69

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: 69-SS: E2230196.66; N565181.9852; 69-SB: N565192.0

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 10

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 69-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sandy loam, organics, some gravel |
| | 69-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: silty sand, some organics, dark brown, some pebbles, light brown to gray |
| | 69-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: silty sand with pebbles, large cobbles, light gray to brown, white precipitate |
| | 69-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3.5', very fine silts, tan, dry, no odor; 3.5-4', medium dark silty sand, some moisture, no odor, 40% gravels and cobbles .75 to 8" |
| 5 | 69-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-5.5', sandy gravels, medium brown, subround to round, 20% sand; 5.5-6', gravels, and cobbles, subround to round |
| 10 | 69-SB-C | | | | 8.0 - 10.0' | | 8.0 - 10.0' 6-8', rocky gravel; 8-9', large gravel, sand; 9-11', small-medium gravel, dark gray, no odor or stain |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 7

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228816.324; Northing 564893.5826
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 14

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 7-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 4-point composite: black, clayey sandy gravel, greenish-gray, gravel |
| 5 | | | | | | | |
| | 7-SB-A | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-7.2', silty sand, moist, medium gray, no cohesion, stain and odor; 7.2-8', sand clay, moist, medium gray, moderate cohesion, stain and odor |
| | 7-SB-B | | | | 8.0 - 9.5' | | 8.0 - 9.5' 8-9.5', sand clay, wet, medium gray, moderately cohesive, stain and odor, some sheen |
| 10 | | | | | | | |
| | 7-SB-C | | | | 12.0 - 14.0' | | 12.0 - 14.0' 12-14', saturated, oil, gray stain, fine grain sand |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 70

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: E2230398.894; 70-SS: N565333.5904; 70-SB: E2230421.79; N565309.9

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 8

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 70N-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 3-point composite: dark black, clayey loam with gravel, ballast |
| | 70-SS-A | | | | 0.5 - 0.5' | | 0.5 - 0.0' 3-point composite: silty sandy loam, dark brown |
| | 70-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', sand, gravels and cobbles 50/50; .5-4", light brown, no odor |
| 5 | 70-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', sandy gravel, moist to wet, medium to dark brown, subround to round, poorly sorted |
| | 70-SB-C | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-8', sandy gravel, moist to wet, medium to dark brown, subround to round, poorly sorted |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 71

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2228720.4; Northing 563846.9103

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 71-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: gravel, sandy clay, cobbles, medium to dark gray |
| | 71-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: clayey silt, greenish brown, moist, big rocks at bottom |
| | 71-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: sandy silt, greenish brown, cobbles, light to medium gray |
| | 71-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-2.5', sandy silt, slightly moist, brownish red, angular gravels, no cohesion; 2.5-3.5', silt, dry, medium brown, no cohesion, fairly consolidated; 3.5-4.4, coarse sand with gravels, medium brown, no cohesion, unconsolidated, subround gravels |
| 5 | | | | | | | |
| | 71-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-6.5', sandy cobbles, moist, medium brown, subround to round, gravel to cobbles; 6.5-8', sand, wet, medium brown, well sorted, subround, some gravels |
| | 71-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sandy gravel, wet, medium brown, round to subround, rotting flesh smell, hair in sample |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 72

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228922.633; Northing 563988.5155
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 9.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 72-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: black sandy silt with poorly sorted gravels, tan silty clay |
| 5 | 72-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-5', sandy silt, moist, light brown, no cohesion; 5-6', silty clay, very moist, light brown, moderate cohesion |
| | 72-SB-B | | | | 6.0 - 7.5' | | 6.0 - 7.5' 6-7.5', silty sand, wet, light brown, slight cohesion |
| | 72-SB-C | | | | 7.5 - 9.5' | | 7.5 - 9.5' 7.5-9.5', silty sand, wet, light brown, slight cohesion |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 73

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229038.907; Northing 564145.2777
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 10.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 73-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: compacted sandy gravel, brick chunks |
| | 73-SB-A | | | | 2.0 - 3.2' | | 2.0 - 3.2' 2-3.2', dry, sandy, gravel, concrete bricks, backfill, rubble |
| 5 | | | | | | | |
| | 73-SB-B | | | | 7.5 - 8.5' | | 7.5 - 8.5' 7.5-8.5', silty gravel, wet, dark gray to black, sheen and slight odor |
| | 73-SB-C | | | | 8.0 - 10.5' | | 8.0 - 10.5' 8-10.5', sand, wet, black, odor and stain, some gravels |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 74

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: E2229140.023; 74-SS: N564216.0804; 74-SB: N564191.0804
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 74-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: most, sandy gravel, dark brown |
| | 74-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', concrete pieces up to 8", cobbles up to 8", 50% gravels, silty sand, tan/brown, moist at 3.5', no odor |
| 5 | 74-SB-B | | | | 5.0 - 6.5' | | 5.0 - 6.5' 4.5-6.5', exceptionally rocky, many artificial concrete chunks present throughout boring, very limited amounts of fines, no stain, no odor |
| | 74-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sandy gravel, wet, dark gray, stain and odor |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 75

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: 75-SS: E2229247.14; 75-SB: E2229228.64; N564286.883

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 12

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 75-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: gravel, cobbles, dry, sandy, medium gray |
| | 75-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: gravel, cobbles, dry, sandy, medium gray, minor bits of wood and styrofoam |
| | 75-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: gravel, cobbles, dry, sandy, medium gray, broken concrete |
| | 75-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', native soil, medium brown turns damp at 2.5', sandy gravel turns wet at 4', no odor or stain |
| 5 | 75-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-5.7', coarse sand, gravel, moist, no odor or stain |
| 10 | 75-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-12', sandy gravel, wet, dark gray, subround, stain and odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 76

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 76-SS: E2229342.257; N564357.6856; 76-SB: E2229356.4; N564343.5456
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 7.4

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 76-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: clayey sands, dark brown silty sand, gravel, fill material |
| | 76-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3.3', slightly moist, dark brown, sandy silt, some gravel; 3.3-3.8', moist, dark brown, clayey loam, no odor or stain; 3.8-4', dark brown to black |
| 5 | 76-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-4.2', brown, moist, no odor/stain, sandy loam; 4.2-6', very moist, no odor/stain, sandy loam, brown |
| | 76-SB-C | | | | 6.0 - 7.4' | | 6.0 - 7.4' 6-7.1', very moist, brown, fine sand, no odor or stain; 7.1-7.4', gravelly sand, gravel |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 77

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2229109.709; Northing 564044.1611

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 16

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 77-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: gravel, broken concrete, weeds, cobbles |
| | 77-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: gravel, broken concrete, weeds, cobbles |
| | 77-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: gravel, broken concrete, weeds, cobbles, silty sandy gravel, loam, brown |
| | 77-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3.5', rubble, concrete with gravel; 3.5-4', damp, dark brown, silty clay, sand |
| 5 | 77-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-4.5', damp, dark brown, silty clay with sand; 4.5-6', silty clay with pebbles, dark brown, wet |
| 10 | 77-SB-C | | | | 8.0 - 15.5' | | 8.0 - 15.5' 8-12', gravel with wet sand, dark gray, some stain; 12-16', sand with gravel, wet, dark gray, some stain, poorly sorted |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 78

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229210.826; Northing 564114.9638
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 8

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 78-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: suspected asbestos material, fill, cobbles, silty sand, broken concrete, asphalt |
| | 78-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', sand silt, moist, olive brown, moderately cohesive, orange mottling |
| 5 | 78-SB-B | | | | 4.0 - 5.5' | | 4.0 - 5.5' 4-4.8', sand silt, moist, olive brown, moderately cohesive, orange mottling; 4.8'-5.5', gravels, wet, olive brown, no cohesion, subround |
| | 78-SB-C | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-8', sandy gravel, wet, medium brown with black flecks, subround to round |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 79

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 79-SS: E2229311.943; N564185.7664; 79-SB: N564163.7664
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 6

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 79-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: fill, cobbles, silty, dry, gray and tan |
| | 79-SB-B | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3.7', dark brown, very moist, clayey loam, no odor/stain; 3.7-4', brown, fine sand, very moist, some red mottling |
| 5 | 79-SB-C | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', very moist, brown, some black and reddish clayey fine sand, no odor or stain |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 8

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228917.441; Northing 564964.3852
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 8-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 3-point composite: clayey silty sand with minor gravel, blue-gray |
| | 8-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', fill, gravel, sandy silt, medium olive gray, slightly moist, slightly cohesive |
| 5 | | | | | | | |
| | 8-SB-B | | | | 7.8 - 8.8' | | 7.8 - 8.8' 7.8-8.8', gravel, medium, round to subround, some sand present, heavily stained and sheen, very heavy odor |
| | 8-SB-C | | | | 8.8 - 15.0' | | 8.8 - 15.0' 9-11.5', sand, fine medium grained, white, tan, gray, some small-medium cobbles, odor and stain |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 80

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229413.059; Northing 564256.5648
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 5.8

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 80-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: gravelly loam, sand, minor gravel, gray, brownish |
| | 80-SB-A | | | | 2.0 - 2.5' | | 2.0 - 2.5' 0-2', silty with clay, 10% small pebbles, dark brown, moist |
| | 80-SB-B | | | | 2.5 - 3.5' | | 2.5 - 3.5' 2-2.5', moist, light brown, sand; 2.5-3.5', sandy gravel, light brown |
| | 80-SB-C | | | | 3.5 - 5.8' | | 3.5 - 5.8' 4-5.8', black, silty with clay, strong odor |
| 5 | | | | | | | |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 81

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229513.333; Northing 564413.3312
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 7

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 81-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand, some gravel, fill material |
| | 81-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', hydrocarbon-coated black gravels and sand, light odor, slight sheen, not enough to seep from particles, 3.75' silty clayey black saturated with hydrocarbon odor, cobbles 4-6", some root fragments |
| 5 | 81-SB-B | | | | 5.0 - 6.0' | | 5.0 - 6.0' 5-6', 5" minus cobbles and gravels, wet at 5", black, stain, odor, silty stain |
| | 81-SB-C | | | | 6.0 - 7.0' | | 6.0 - 7.0' 6-7', 5" minus cobbles and gravels, black, stain and odor, sand |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 82

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: 82-SS: E2229739.566; N564554.9364; 82-SB: E2229723.19; N564549.3

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 24

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 82-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: poorly sorted sandy gravel with cobbles, damp, some orange mottling |
| | 82-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: sand, some gravel, clayey sand, grayish blue, brown clay and sand |
| | 82-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: white mottling, damp, sandy clay, blueish gray, poorly sorted sand, gravely sands, river gravel |
| 5 | 82-SB-A | | | | 4.0 - 6.0' | 5 | 4.0 - 6.0' 4-4.5', brown, sandy gravel, 4" minus gravels, no stain/odor; 4.5-4.9', brown sandy gravel, 1-6" gravels, no stain/odor |
| | 82-SB-B | | | | 5.0 - 6.0' | | 5.0 - 6.0' 5-6', wet, light brown sand, 5" minus cobbles with 1/2" to 1" gravels, no stain/odor, slight sheen |
| | 82-SB-C | | | | 6.0 - 7.0' | | 6.0 - 7.0' 6-7', wet, black, stain and odor, 5" minus cobbles with 1" gravels, and sand |
| 10 | | | | | | 10 | |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 83

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 83-SS: E2229933.867; N564696.4443; 83-SB: E2229995.21; N564739.5
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 8

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 83-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: gravely sand, poorly sorted, cobbles, damp, clayey sand |
| | 83-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3.5', sandy silt with gravel, slightly moist, medium brown, more larger subround gravels at surface; 3.5-3.9', well sorted sand with gravels, moist, light tan to dark brown, gravels from .25-1", subrounded; 3.9-4.2', silty sand with gravels, moist medium brown, no cohesion |
| 5 | | | | | | | |
| | 83-SB-B | | | | 6.0 - 7.0' | | 6.0 - 7.0' 6-7', wet, light brown, 3" minus gravels and sand, no stain/odor |
| | 83-SB-C | | | | 7.0 - 8.0' | | 7.0 - 8.0' 7-8', 6" minus cobbles and gravels, black stain, odor |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 84

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: 84-SS: E2230146.1; N564838.0495; 84-SB: E2230160.67; N564855.2

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 15.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 84-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: gravely sand with scattered cobbles, sandy gravel, damp |
| | 84-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: gravely sands, poorly sorted, cobbles, asphalt, damp |
| | 84-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: gravely sands with cobbles, poorly sorted |
| 5 | 84-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 2-4', brown sand, slightly moist, no odor/slight stain; 4-4.5', cobbles, gravel, sandy, slightly moist, no stain, odor |
| | 84-SB-B | | | | 7.5 - 8.5' | | 7.5 - 8.5' 7.5-8.5', sandy gravels with cobbles, moist, light to dark brown, poorly sorted sand, round to subround gravels and cobbles, water at 7.5' |
| 10 | 84-SB-C | | | | 10.5 - 15.5' | | 10.5 - 15.5' 10.5-15.5, sandy gravel, medium-large cobbles, loose sand, no stain, no odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 85

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 85-SS: E2230338.334; N564979.6547; 85-SB: E2230297.22; N564951.0
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 7.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 85-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sand, gravel, poorly sorted, damp, light stain, blueish gray layer, black stain |
| | 85-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3.5', gravelly sand, moist, medium dark brown, some fine ground clasts, .25 to 5", stain and odor |
| 5 | | | | | | | |
| | 85-SB-B | | | | 5.5 - 6.5' | | 5.5 - 6.5' 5.5-6.5', sandy gravels with cobbles, wet to moist, dark gray, slight odor and stain, round to subround, water at 5.5' |
| | 85-SB-C | | | | 6.5 - 7.5' | | 6.5 - 7.5' 6.5-7.5', sandy gravels with cobbles, wet to moist, dark gray, slight odor and stain, round to subround |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 86

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2230540.567; Northing 565136.2599
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 7

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 86-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 4-point composite: poorly sorted gravel sand mix with cobbles, silty sand, damp |
| | 86-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3.2', silty sand with cobbles, medium brown, slightly moist, subrounded, cobble size 4" to 12" |
| 5 | | | | | | 5 | |
| | 86-SB-B | | | | 5.5 - 6.5' | | 5.0 - 6.5' 5.5-6.5', water at 5.5', silty sand and mostly small-medium cobbles, no odor or sheen |
| | 86-SB-C | | | | 6.5 - 7.0' | | 6.5 - 7.0' 6.5-7', silty sand, light brown, small cobbles, no odor or sheen |
| 10 | | | | | | 10 | |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 87

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2228862.005; Northing 563644.6771
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 7.2

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 87-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty clay, gravel, loamy, dark brown to grayish brown |
| | 87-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3', silty sand, slightly moist, light brown, not cohesive, some white calcareous specks; 3.0-3.8', clayey silt, slightly moist, medium brown, slightly cohesive, orange mottling; 3.8-4', sandy, slightly moist, medium olive brown, not cohesive, some silt |
| 5 | 87-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-4.5', sandy, slightly moist, medium olive brown, not cohesive, some silt; 4.5-5.5', sandy silt, very moist, olive brown, mild cohesion, orange mottling; 5.5-6.5', sandy wet, medium brown, no cohesion, sand, grains, ore, subround, some orange mottling |
| | 87-SB-C | | | | 6.5 - 7.2' | | 6.5 - 7.2' 6.5-7.2', gravelly sand, wet, medium brown, no cohesion, rounded to subrounded gravel, .25-1" |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 88

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229064.238; Northing 563786.2823
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 88-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy/silty gravel, cobbles, light to medium gray |
| | 88-SB-A | | | | 2.0 - 3.8' | | 2.0 - 3.8' 2-2.5', silt, medium brown, moist, slightly cohesive; 2.5-3', orange staining; 3.0-3.8', increased moisture, fine grained silty sand |
| | 88-SB-B | | | | 3.8 - 4.2' | | 3.8 - 4.2' 3.8-4.2', water table and gravel |
| 5 | | | | | | | |
| | 88-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11.5', sandy gravel, wet, medium brown, subround, no stain or odor |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 89

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229180.512; Northing 563943.0445
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 11.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 89-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: loamy gravel, light grayish brown |
| | 89-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', gravely and silty sand, moist, water at 3.7' |
| 5 | 89-SB-B | | | | 4.0 - 5.9' | | 4.0 - 5.9' 4-5.9', light brown, sandy with clay, at 5.7', sandy gravel |
| 10 | 89-SB-C | | | | 8.0 - 11.5' | | 8.0 - 11.5' 8-11', sand with gravel, wet, pea gravel, subround, medium brown with black flecks, no stain or odor; 11-11.5', gravel to cobbles, wet very little soil, no stain or odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 9

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2228182.289; Northing 564292.5947

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 9.1

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 9-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy silt with gravel, gray brown |
| | 9-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: silt with pebbles, gravel, pipe and wood, sandy silt |
| | 9-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: silt, gray brown, sandy silt |
| | 9-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', sandy silt, dry, light brown, no cohesion, very uniform |
| 5 | | | | | | | |
| | 9-SB-C | | | | 8.0 - 11.0' | | 8.0 - 11.0' 8-11', gravely, sand, wet, medium brown, poorly sorted |
| | 9-SB-B | | | | 9.0 - 9.1' | | 9.0 - 8.0' 8-9', sandy gravel, tan-brown, small-medium, well rounded cobbles, no sheen or odor |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 90

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229281.629; Northing 564013.8472
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 7

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 90-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: cobbles, broken concrete, gravelly, loam, light grayish brown |
| | 90-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3.5', sandy loam with gravel, moist, medium brown, subround gravels, some organics, some orange mottling; 3.5-4', sandy silt, very moist, medium brown with some orange mottling, moderate cohesion |
| 5 | 90-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-5.3', sandy silt, very moist, medium brown with some orange mottling, moderate cohesion; 5.3-5.8', gravel, wet, medium brown, rounded to subrounded, .25-2" clasts |
| | 90-SB-C | | | | 6.0 - 7.0' | | 6.0 - 7.0' 5.8-7', coarse sand with gravels, wet, medium brown, subround |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 91

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2229382.745; Northing 564084.6498

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 14.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 91-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy, loam, minor gravelly, grayish brown |
| | 91-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: sandy, loam, minor gravelly, grayish brown |
| | 91-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: sandy, loam, minor gravelly, light grayish, greenish brown |
| | 91-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-2.7', brown silty loam, slightly moist, some cobbles, gray clay and orangish horizons; 2.7-4', brown sandy silt, slightly moist, no stain/odor |
| 5 | 91-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', sand with gravel, wet, medium brown, subround to round |
| | 91-SB-C | | | | 8.0 - 14.5' | | 8.0 - 14.5' 8-14.5', gravelly sand, wet, dark brown with black specks, slight odor, poorly sorted |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 92

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229483.862; Northing 564155.4524
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 10.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 92-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand, light grayish tan |
| | 92-SB-A | | | | 2.0 - 3.1' | | 2.0 - 3.1' 2-2.8', light tan, fine ground sand with silt, dry; 2.8-3.1', gravel, sandy, cobbles to 3" |
| 5 | 92-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', sandy gravel, wet, medium brown, subround to round, 40% sand |
| 10 | 92-SB-C | | | | 8.0 - 10.5' | | 8.0 - 10.5' 8-10.5', gravelly sand, wet, dark brown to dark gray, subround to round, poorly sorted, slight odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1_YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 93

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2229251.315; Northing 563841.9279

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 8

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 93-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: silty sand, grayish yellow |
| | 93-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: silty sand, grayish yellow |
| | 93-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: silty sand, grayish yellow |
| | 93-SB-A | | | | 2.0 - 3.1' | | 2.0 - 3.1' 2-3.1', coarse gravel, cobbles to 6", very little sand |
| 5 | 93-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', sandy gravel, moist to wet, medium brown, subround to round, pea size to 2" |
| | 93-SB-C | | | | 6.5 - 8.0' | | 6.5 - 8.0' 6.5-8', sandy gravel, moist to wet, medium brown, subround to round, pea size to 2" |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 94

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229352.431; Northing 563912.7306
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 8

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 94-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: clayey silt, silty sand, minor gravel, light dark gray |
| | 94-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', dry tan to light brown, sand with silt |
| 5 | 94-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4.4-5.5', sandy gravel, very moist, medium brown, subround to round |
| | 94-SB-C | | | | 6.0 - 8.0' | | 6.0 - 8.0' 5.5-8', poorly sorted, sand, wet, medium brown to dark brown, some gravels, slight sheen on water |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 95

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: 95-SS-A: E2229453.548; N563983.5332; 95-SB-A,B,C: E2229477.548; N564007.5332
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 11

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 95-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy silt, minor gravel, light gray |
| 5 | 95-SB-A | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-5.8', brown fine sandy silt, slightly moist, no odor or stain, orange horizon at 4.9" 5.8-6', moist gray/black clay, slight odor |
| | 95-SB-B | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-6.8', dark brown to black silty clay, some gravel, moist, slightly odor and stain; 6.8-8', very moist, dark brown to black gravelly sandy clay |
| 10 | 95-SB-C | | | | 8.0 - 11.0' | | 8.0 - 11.0' 8-11', sandy gravel, wet, dark brown, subround to round, no stain or odor |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 96

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229554.664; Northing 564054.3358
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 8

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 96-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy silt, no gravel, light gray to tan |
| | 96-SB-A | | | | 2.0 - 2.6' | | 2.0 - 2.6' 2-2.6', gravel, very loose, hole caving |
| 5 | 96-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-4.5', large cobbles, very moist, 40% sand and gravels, subround; 4.5-6', sandy gravel, wet, 30% sand, round to subround, medium brown |
| | 96-SB-C | | | | 6.0 - 8.0' | | 6.0 - 8.0' 6-8', sandy gravel, wet, 30% sand, round to subround, medium brown |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 97

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2229695.938; Northing 564211.098

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 7

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 97-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: sandy gravel, poorly sorted, brown |
| | 97-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: gravely sand, brown, to light brown |
| | 97-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: sandy gravel, poorly sorted gravel with large cobbles |
| | 97-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', gravelly sand, very slightly moist, medium brown, gravels, subrounded, no cohesion, rock size between .5 to 6" |
| 5 | 97-SB-B | | | | 4.0 - 6.0' | | 4.0 - 6.0' 4-6', 5" minus cobbles and gravels, brown, sand, no stain/odor, wet, at 5' slight odor |
| | 97-SB-C | | | | 6.0 - 7.0' | | 6.0 - 7.0' 6-7', 6" minus cobbles, flat-round gravels, sand, dk brown, wet, no stain/odorar |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |

GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

Soil Boring Log

## Hole Name: Grid 98

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description:
Descriptive Location: Easting 2229873.171; Northing 564352.7032
Recorded By: Hydrometrics, Inc.
Drilling Company:
Driller:
Drilling Method: Hand Auger; Air Knife; Geoprobe
Drilling Fluids Used:
Purpose of Hole: sample collection
Target Aquifer:
Hole Diameter (in):
Total Depth Drilled (ft): 5.5

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:
Date:
MP Description:
MP Height Above or Below Ground (ft):

Surface Casing Height (ft):
Riser Height (ft):
Ground Surface Elevation (ft):
MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 98-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: gravely sand fill material, dark |
| | 98-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-4', sand, dark brown, fine-medium sand, silty with gravel and cobbles, moist, at 3' slight mottling, more silt, slight odor; 3.4-4' silt and sandy, dark olive brown, very moist, broken core, iron stirred, black |
| | 98-SB-B | | | | 3.5 - 4.5' | | 3.5 - 4.5' 3.5-4.5', wet, silty 10%, sand 90%, light brown, no stain, no odor, 3" minus gravels |
| 5 | 98-SB-C | | | | 4.5 - 5.5' | | 4.5 - 5.5' 4.5-5.5', wet, sandy gravels, light brown, no stain, no odor, more gravels than sediment |
| 10 | | | | | | | |
| 15 | | | | | | | |
| 20 | | | | | | | |
| 25 | | | | | | | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers

Billings, Montana

Soil Boring Log

## Hole Name: Grid 99

Date Hole Started: Date Hole Finished: 2013

Client: ExxonMobil

Project: Yale Oil of South Dakota

County: Yellowstone State: Montana

Property Owner: Yale PLP

Legal Description:

Descriptive Location: Easting 2230075.404; Northing 564494.3084

Recorded By: Hydrometrics, Inc.

Drilling Company:

Driller:

Drilling Method: Hand Auger; Air Knife; Geoprobe

Drilling Fluids Used:

Purpose of Hole: sample collection

Target Aquifer:

Hole Diameter (in):

Total Depth Drilled (ft): 7

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | N | | |
| Surface Casing Used? | N | | |
| Screen/Perforations? | N | | |
| Sand Pack? | N | | |
| Annular Seal? | N | | |
| Surface Seal? | N | | |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | Y | auger and/or geoprobe | |

Static Water Level Below MP:

Date:

MP Description:

MP Height Above or Below Ground (ft):

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks:

| DEPTH | SAMPLE NUMBER | SAMPLE TYPE | BLOW COUNT | RECOVERY (feet) | DRILLING AND GEOTECHNICAL NOTES | GRAPHICS | GEOLOGICAL DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 99-SS-A | | | | 0.0 - 0.5' | | 0.0 - 0.5' 5-point composite: poorly sorted sand, olive brown |
| | 99-SS-B | | | | 0.5 - 1.0' | | 0.5 - 1.0' 5-point composite: poorly sorted sand, with some silt, blueish gray clay |
| | 99-SS-C | | | | 1.0 - 2.0' | | 1.0 - 2.0' 5-point composite: blueish gray silty clay, strong odor, poorly sorted sandy gravel with cobbles |
| | 99-SB-A | | | | 2.0 - 4.0' | | 2.0 - 4.0' 2-3.5' gravel, brown, silty sand, odor, stain; 3.5-4', sand, dark gray, stain and odor, moist |
| 5 | | | | | | 5 | |
| | 99-SB-B | | | | 5.5 - 6.0' | | 5.5 - 6.0' 5.5-6', black, wet, stain/odor, 10" minus cobbles and gravels, some sand 20%, mostly 1-2" gravels 80% |
| | 99-SB-C | | | | 6.0 - 7.0' | | 6.0 - 7.0' 6-7', black, wet, stain and odor, 7" minus cobbles and gravels, some sand 15%, mostly 1-2" gravels 65% |
| 10 | | | | | | 10 | |
| 15 | | | | | | 15 | |
| 20 | | | | | | 20 | |
| 25 | | | | | | 25 | |



GEOTECH_REV1 YALE SOIL BORINGS.GPJ HYDHLN2.GDT 11/26/13

# MONITORING WELL LOGS

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-10

Date Hole Started: 4-23-2013 Date Hole Finished: 4-23-2013

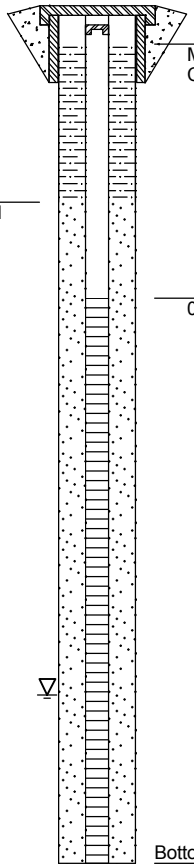
Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 720 1st Ave N
Recorded By: ajh, JS
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 4 1/4"
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 2-inch, flush threaded, Sch 40, PVC | 0'-15' |
| Surface Casing Used? | Y | 12" Surface Manhole | 0'-1' |
| Screen/Perforations? | Y | 0.010-inch slot, Sch 40, PVC | 5'-15' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 3.3'-15' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1'-3.3 |
| Surface Seal? | Y | Concrete Pad | 0'-1' |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | Y | Bailer | 9 Gallons |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 564497.82 Easting: 2228208.09
Static Water Level Below MP: 11.75 Surface Casing Height (ft): 0
Date: 5/16/2013 Riser Height (ft): -0.27
MP Description: Top of PVC Ground Surface Elevation (ft): 3106.53
MP Height Above or Below Ground (ft): -0.27 MP Elevation (ft): 3106.26

Remarks: Utility Clearance to 8' on 1-24-2013
No odor or evidence of Hydrocarbons
About .5' heave in bottom of hole from flowing sands.

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 1.0' **Sandy Gravel**
moist; light gray

1.0 - 3.0' **Silty Clay**
dry; olive brown

3.0 - 5.0' **Gravelly Sand**
dry; olive brown; 1" round pebbles

5.0 - 8.0' **Sandy Gravel**
dry; olive brown; minor sand at 7'

8.0 - 10.0' **Gravelly Sand**
slightly moist; light olive gray; non-cohesive; non-stratified; gravel fragment are rounded to well rounded; alluvium no odor; gravel to pebbles to 1" in diameter; variable composition; non-calcareous; cobbles at 10'

* met auger refusal at 10'; switched to smaller augers

10.0 - 12.0' **Gravelly Sand**
trace silt amidst sand with gravelly; lower half is gravel and less than 15% sand; wet at 10.3'; olive gray; non-cohesive; dense to very dense; unsatisfied; non-calcareous; alluvium; auger brought up pebbles 2"-4"

12.0 - 13.0' **Cobbles, Pebbles, Gravels**
wet

13.0 - 15.0' **Sandy Silt**
wet; moderate yellow brown; non-cohesive; loose structure; alluvium; sand ranges from fine to coarse; subrounded to poorly sorted; Arkose composition; no odor no evidence of hydrocarbons



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 11/22/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-11

Date Hole Started: 4-24-2013 Date Hole Finished: 4-24-2013

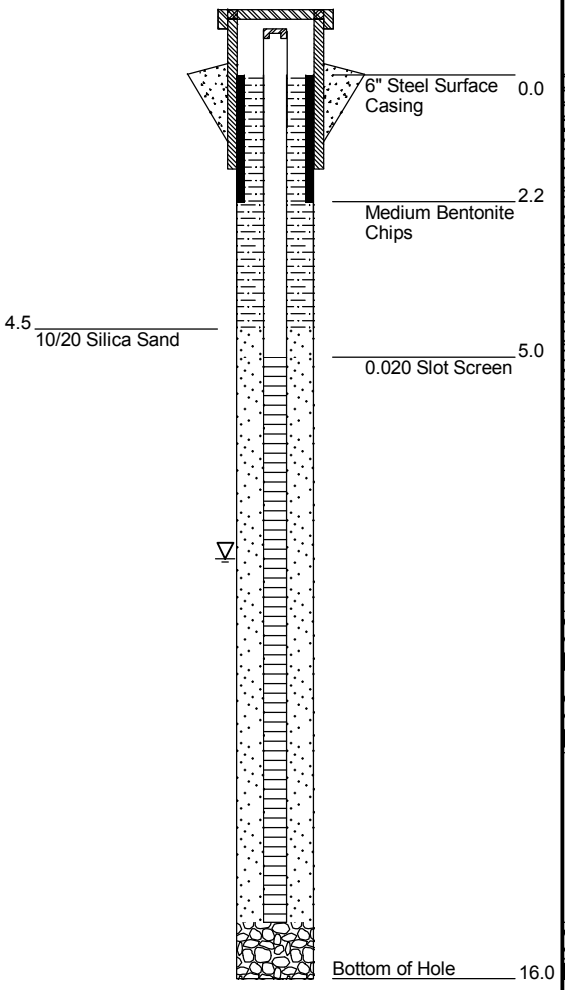
Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 600 1st Ave N
Recorded By: TFS, JS
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 6 1/4"
Total Depth Drilled (ft): 16

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 4-inch, flush threaded, Sch 40, PVC | +2.76'-15' |
| Surface Casing Used? | Y | 6" Steel | +2.76'-2.24' |
| Screen/Perforations? | Y | 0.020-inch slot, Sch 40 PVC | 5'-15' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 4.5'-15' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1'-4.5' |
| Surface Seal? | Y | Concrete Pad | 0'-1' |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | Y | Bailer | 45 Gallons |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 564140.37 Easting: 2228283.7
Static Water Level Below MP: 10.81 Surface Casing Height (ft): 2.76
Date: 5/16/2013 Riser Height (ft): 2.24
MP Description: Top of PVC Ground Surface Elevation (ft): 3106.15
MP Height Above or Below Ground (ft): 2.24 MP Elevation (ft): 3108.4

Remarks: Utility Clearance to 8' on 1-10-2013

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 0.8' **Gravel Fill**
2" minus

0.8 - 1.0' **Clayey Sandy Gravel**
occasional cobbles

1.0 - 7.0' **Sandy Clay**
brown; minor odor

7.0 - 8.0' **Clay with Minor Sand**
wet at 8'; white inclusions possibly bentonite; minor odor

8.0 - 9.0' **Clayey Silt with Sand**
moist to very moist; med brown; moderately cohesive; sand grains are subrounded to rounded; no odor or stain;

9.0 - 9.5' **Sandy Silt**
wet; medium brown; mildly cohesive; subrounded to rounded

9.5 - 12.0' **Gravel**
wet; light tan to black; subrounded to rounded; 1/4" up to 4" in size

12.0 - 15.0' **Sand**
wet; medium brown; subrounded to rounded; some small gravels to 1/4"

15.0 - 16.0' **Sandy Gravel**
wet; medium brown; some silt; no stain or odor; subrounded to rounded;



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 11/22/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-12

Date Hole Started: 4-30-2013 Date Hole Finished: 4-30-2013

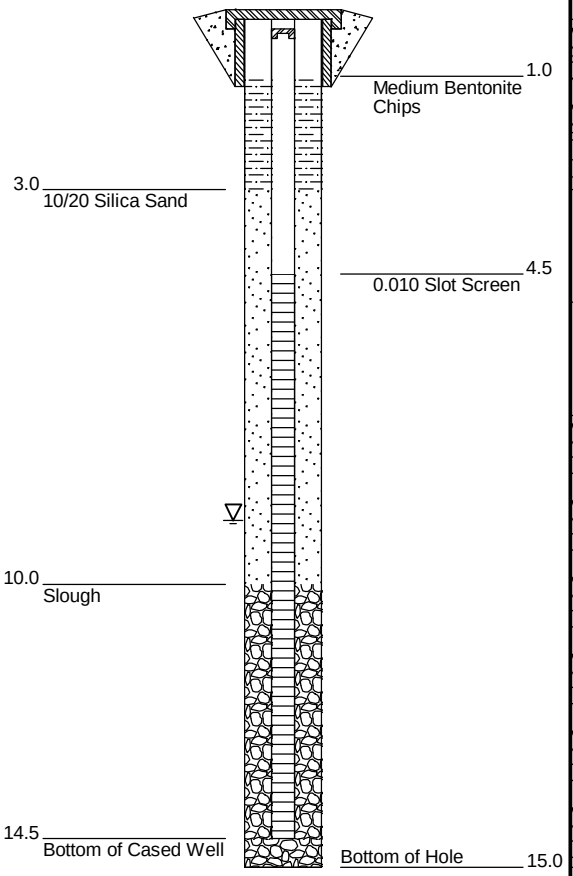
Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 600 1st Ave N
Recorded By: LJ, JS
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 4 1/4"
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 2-inch, flush threaded, Sch 40, PVC | 0'-14.5' |
| Surface Casing Used? | Y | 12" Surface Manhole | 0'-1' |
| Screen/Perforations? | Y | 0.010-inch slot, Sch 40, PVC | 4.5'-14.5' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 3'-10' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1'-3' |
| Surface Seal? | Y | Concrete Pad | 0'-1' |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 564421.07 Easting: 2228516.25
Static Water Level Below MP: 8.44
Date: 5/16/2013
MP Description: Top of PVC
MP Height Above or Below Ground (ft): -0.42
Surface Casing Height (ft): 0
Riser Height (ft): -0.42
Ground Surface Elevation (ft): 3105.31
MP Elevation (ft): 3104.89

Remarks: Utility Clearance to 8'

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 2.0' **Clayey Sandy Gravel**
surfaced parking lot, dense compacted

2.0 - 3.0' **Silty Sand**
damp; blue-gray; minor hydrocarbon odor; dense

3.0 - 5.0' **Silt**
w/ fine sand; blue-gray; loose; minor hydrocarbon odor

5.0 - 7.0' **Silt**
wet; blue-gray; loose; minor hydrocarbon odor

7.0 - 15.0' **Gravel**
wet; coarse gravels to +2" cobbles; hydrocarbon sheen and odor



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 3/19/15

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-13

Date Hole Started: 4-26-2013 Date Hole Finished: 4-26-2013

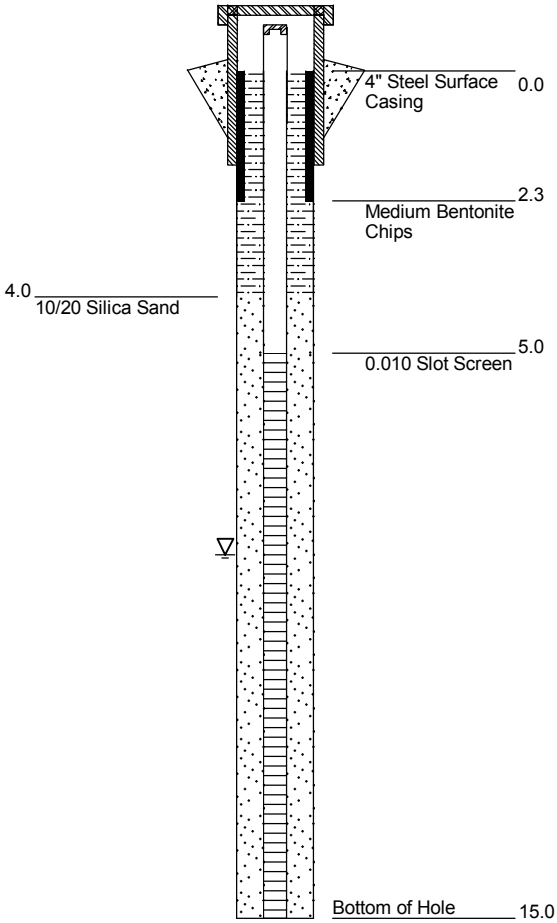
Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 600 1st Ave N
Recorded By: TFS, JS
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 4 1/4"
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 2-inch, flush threaded, Sch 40, PVC | +2.70'-15' |
| Surface Casing Used? | Y | 4" Steel | +2.7'-2.3' |
| Screen/Perforations? | Y | 0.010-inch slot, Sch 40, PVC | 5'-15' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 4'-15' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1'-4' |
| Surface Seal? | Y | Concrete Pad | 0'-1' |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 564350 Easting: 2228667.67
Static Water Level Below MP: 10.81 Surface Casing Height (ft): 2.70
Date: 5/16/2013 Riser Height (ft): 2.24
MP Description: Top of PVC Ground Surface Elevation (ft): 3105.81
MP Height Above or Below Ground (ft): 2.24 MP Elevation (ft): 3108.05

Remarks: Utility Clearance to 8'

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 0.8' **Asphalt and Tar**
hard

0.8 - 4.0' **Cobbles**
6"-8" diameter; flat (pancake shape/size); imbricated; stained matrix (sandy)

4.0 - 5.0' **Cobbles**
as above; very difficult for air knife/ air vac to extract cobbles

5.0 - 7.0' **Cobbles**
as above; difficulty continues; oil stained, moderate odor

7.0 - 8.0' **Gravel**
1"-2" in diameter; loose; sandy matrix

8.0 - 8.5' **Cobbles and Gravels**
>1"-9" in diameter; sandy matrix; stained and moderate odor

8.5 - 9.0' **Silty Sand**
moist; moderate brown; subangular

9.0 - 9.8' **Ash**
slightly moist; light gray; angular silty sand

9.8 - 11.0' **Silty Sand with Gravel**
moist; round to subrounded; odor and stain

11.0 - 12.0' **Sandy**
wet; dark gray; wet; subrounded; odor and stain

12.0 - 13.0' **Sandy Silt**
wet; light gray to tan; some gravels; odor and stain; possibly some ash

13.0 - 15.0' **Gravely Sand**
wet; dark brown; rounded to subrounded; finning upward; odor and free product



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 11/22/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-14

Date Hole Started: 4-29-2013 Date Hole Finished: 4-29-2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 600 1st Ave N

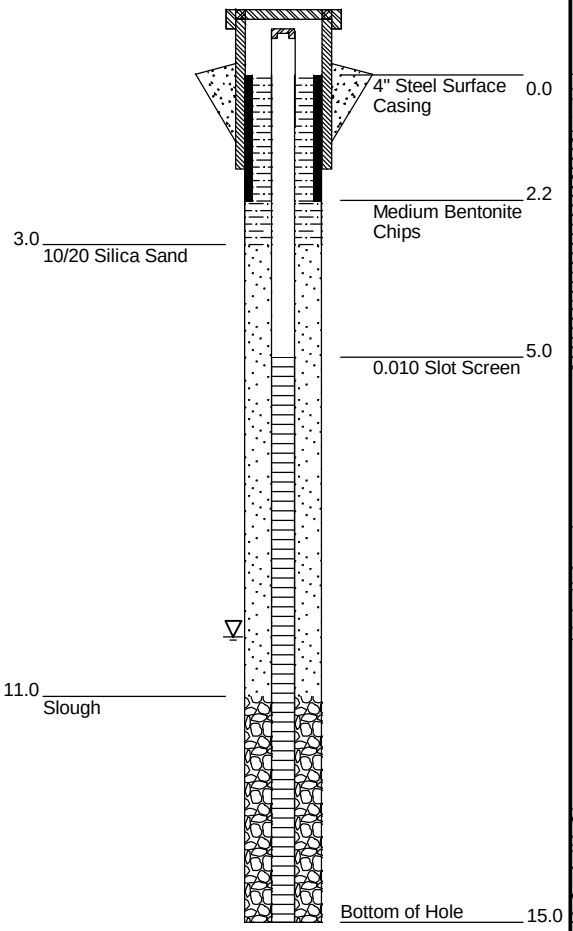
Recorded By: TFS, JB
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 4 1/4"
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 2-inch, flush threaded, Sch 40, PVC | +2.78'-15' |
| Surface Casing Used? | Y | 4" Steel | +2.78'-2.22' |
| Screen/Perforations? | Y | 0.010-inch slot, Sch 40, PVC | 5'-15' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 3'-11' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1'-3' |
| Surface Seal? | Y | Concrete Pad | 0'-1' |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 564579.65 Easting: 2228679.36
Static Water Level Below MP: 12.36 Surface Casing Height (ft): 2.78
Date: 5/16/2013 Riser Height (ft): 2.41
MP Description: Top of PVC Ground Surface Elevation (ft): 3104.71
MP Height Above or Below Ground (ft): 2.41 MP Elevation (ft): 3107.12

Remarks: Utility Clearance to 8'
3' of heave in bottom of hole from flowing sands.

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 0.3' **Asphalt**

0.3 - 1.0' **Sandy Gravely Silt**
moist; dark gray; slight to moderately cohesive; gravels <2"

1.0 - 2.0' **Clay w/ some Gravel**
moist; dark gray; very cohesive

2.0 - 4.0' **Silty Clay**
moist to damp; stain and odor

4.0 - 5.2' **Silty Clay**
some sand and round flat cobbles

5.2 - 8.0' **No Recovery**

8.0 - 9.0' **Gravelly Sand**
wet; light gray; pebbles up to 1/4" in size

9.0 - 10.0' **Course Sand w/ Pebbles**
wet; light gray; pebbles up to 1/4" in size

10.0 - 13.0' **No Recovery**

13.0 - 15.0' **Sandy Gravel**
wet; dark gray; stain and odor; subrounded to rounded



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 3/19/15

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-15

Date Hole Started: 5-2-2013 Date Hole Finished: 5-2-2013

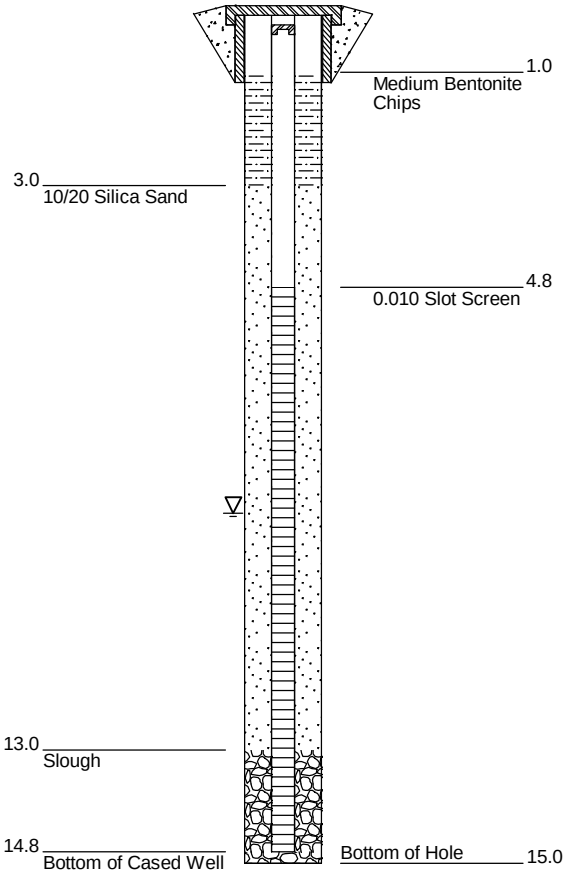
Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 338 Highway 87 E
Recorded By: LJ, JS
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 4 1/4"
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 2-inch, flush threaded, Sch 40, PVC | 0'-15' |
| Surface Casing Used? | Y | 12" Surface Manhole | 0'-1' |
| Screen/Perforations? | Y | 0.010-inch slot, Sch 40, PVC | 4.8'-14.8' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 3'-13' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1'-3' |
| Surface Seal? | Y | Concrete Pad | 0'-1' |
| **DEVELOPMENT/SAMPLING** | | | |
| Well Developed? | Y | Bailer | 11 Gallons |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 564856.41 Easting: 2228764.99
Static Water Level Below MP: 8.48 Surface Casing Height (ft): 0
Date: 5/16/2013 Riser Height (ft): -0.33
MP Description: Top of PVC Ground Surface Elevation (ft): 3105.40
MP Height Above or Below Ground (ft): -0.33 MP Elevation (ft): 3105.07

Remarks: Utility Clearance to 8'

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 0.3' **Asphalt**

0.3 - 1.0' **Clayey Sandy Gravel**
frozen

1.0 - 5.0' **Clayey Sandy Gravel**
clayey/ sandy; very compacted; dense

5.0 - 7.0' **Clay**
blue-black; plastic to dense; strong hydrocarbon odor

7.0 - 8.0' **Clay**
bluish gray; hydrocarbon odor

8.0 - 9.0' **Clay w/ Silt**
dark gray; stain and odor

9.0 - 15.0' **Gravel**
course; ~ 10% sand; cobbles up to +2"; strong odor



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 3/19/15

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-16

Date Hole Started: 4-30-2013 Date Hole Finished: 4-30-2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 338 Highway 87 E

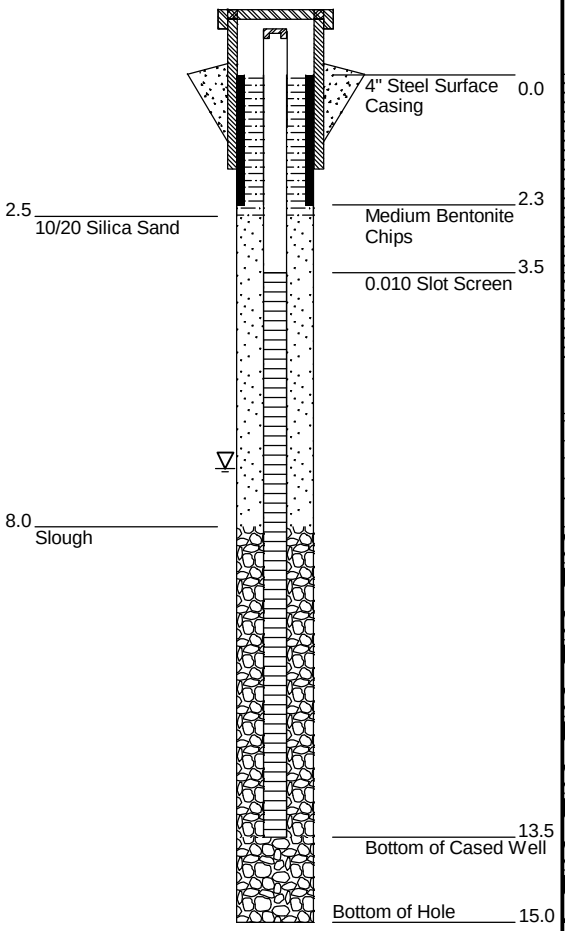
Recorded By: LJ, JP
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 4 1/4"
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 2-inch, flush threaded, Sch 40, PVC | +2.70'-15' |
| Surface Casing Used? | Y | 4" Steel | +2.7'-2.3' |
| Screen/Perforations? | Y | 0.010-inch slot, Sch 40, PVC | 3.5'-13.5' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 2.5'-8' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1'-2.5 |
| Surface Seal? | Y | Concrete Pad | 0'-1' |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | Y | Bailer | 25 Gallons |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 564705.43 Easting: 2229031.26
Static Water Level Below MP: 9.25 Surface Casing Height (ft): 2.70
Date: 5/16/2013 Riser Height (ft): 2.28
MP Description: Top of PVC Ground Surface Elevation (ft): 3102.00
MP Height Above or Below Ground (ft): 2.28 MP Elevation (ft): 3104.28

Remarks: Utility Clearance to 8'

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 3.5' **Silty Clay**
slightly moist; light brown; some brick bits and a few gravels

3.5 - 4.0' **Fine Sandy Clay**
dry; light brown; few gravels

4.0 - 5.0' **Silty Clay**
brown with rust staining to gray

5.0 - 6.0' **Clayey Silt**
moist; gray; slight hydrocarbon stain and odor

6.0 - 7.5' **Silty Sand**
moist; gray; slight hydrocarbon stain and odor

7.5 - 8.0' **Clayey Silt**
moist; gray; hydrocarbon stain and odor

8.0 - 15.0' **Sandy Gravel**
wet; black; strong hydrocarbon stain and odor



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 3/19/15

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-17

Date Hole Started: 4-30-2013 Date Hole Finished: 4-30-2013

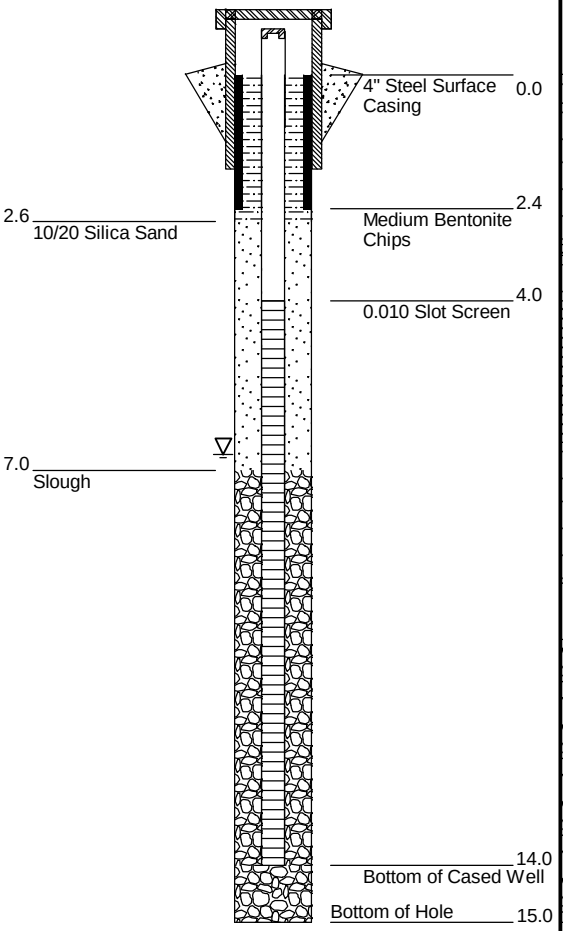
Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 338 Highway 87 E
Recorded By: LJ, TFS
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 4 1/4"
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 2-inch, flush threaded, Sch 40, PVC | +2.63'-14' |
| Surface Casing Used? | Y | 4" Steel | +2.63'-2.37' |
| Screen/Perforations? | Y | 0.010-inch slot, Sch 40, PVC | 4'-14' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 2.6'-7' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1.2'-2.6' |
| Surface Seal? | Y | Concrete Pad | 0'-1.2' |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | Y | Bailer | 20 Gallons |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 564657.09 Easting: 2229159.07
Static Water Level Below MP: 8.94 Surface Casing Height (ft): 2.63
Date: 5/16/2013 Riser Height (ft): 2.22
MP Description: Top of PVC Ground Surface Elevation (ft): 3102.59
MP Height Above or Below Ground (ft): 2.22 MP Elevation (ft): 3104.81

Remarks: Utility Clearance to 8'

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 0.5' **Sandy Silty Loam**
dry; dark brown to moderate brown

0.5 - 3.0' **Sandy Silt**
dry; moderate brown; some gravels

3.0 - 3.2' **Silty Clay**
dry; moderate brown; hard dense

3.2 - 4.0' **Sandy Silt**
moist; dark brown to black; moderate stain and odor

4.0 - 6.5' **Silty Clay**
moist; dark brown to black; shinny; moderate stain and odor; some sand

6.5 - 9.0' **Sandy Silt**
very moist to wet; dark gray; shinny; sandy silt; stain and odor

9.0 - 10.0' **Silty Sand**
wet; dark gray to black; stain and odor w/ some free product

10.0 - 15.0' **Sandy Gravel**
wet; pebbles up to 1" in diameter



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 3/19/15

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-18

Date Hole Started: 5-2-2013 Date Hole Finished: 5-2-2013

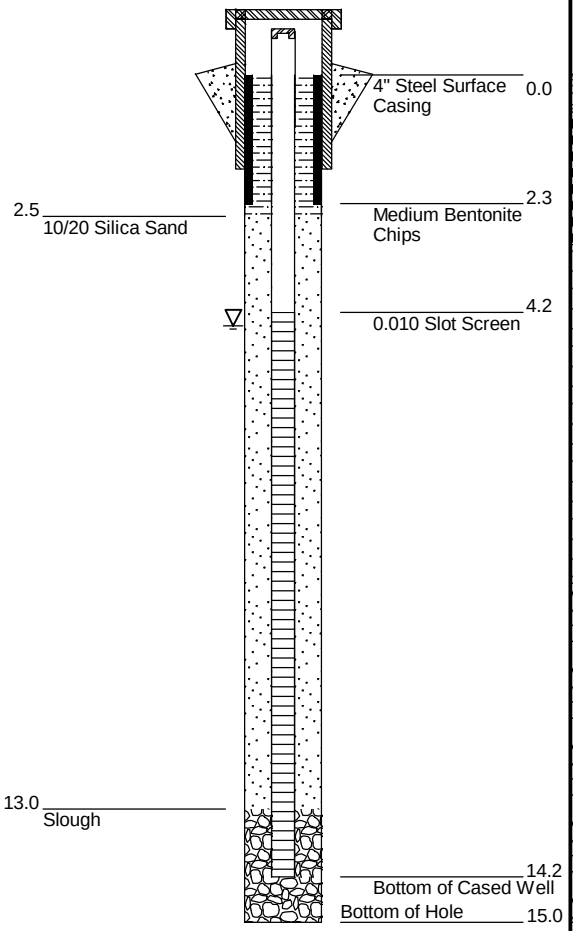
Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 1300 Minnesota Ave
Recorded By: LJ, JS
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 4 1/4"
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 2-inch, flush threaded, Sch 40, PVC | +2.72'-15' |
| Surface Casing Used? | Y | 4" Steel | +2.72'-2.28' |
| Screen/Perforations? | Y | 0.010-inch slot, Sch 40, PVC | 4.2'-14.2' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 2.5'-13' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1'-2.5' |
| Surface Seal? | Y | Concrete Pad | 0'-1' |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | N | | |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 564364.89 Easting: 2229058.01
Static Water Level Below MP: 6.74 Surface Casing Height (ft): 2.72
Date: 5/16/2013 Riser Height (ft): 2.30
MP Description: Top of PVC Ground Surface Elevation (ft): 3101.26
MP Height Above or Below Ground (ft): 2.30 MP Elevation (ft): 3103.56

Remarks: Utility Clearance to 8'

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 0.7' **Concrete**

0.7 - 3.0' **Clay**
wet; black; sticky; hydrocarbon odor

3.0 - 9.0' **Sand**
wet; black; strong hydrocarbon odor

9.0 - 15.0' **Gravel**



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 3/19/15

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-19

Date Hole Started: 2-26-2013 Date Hole Finished: 2-26-2013

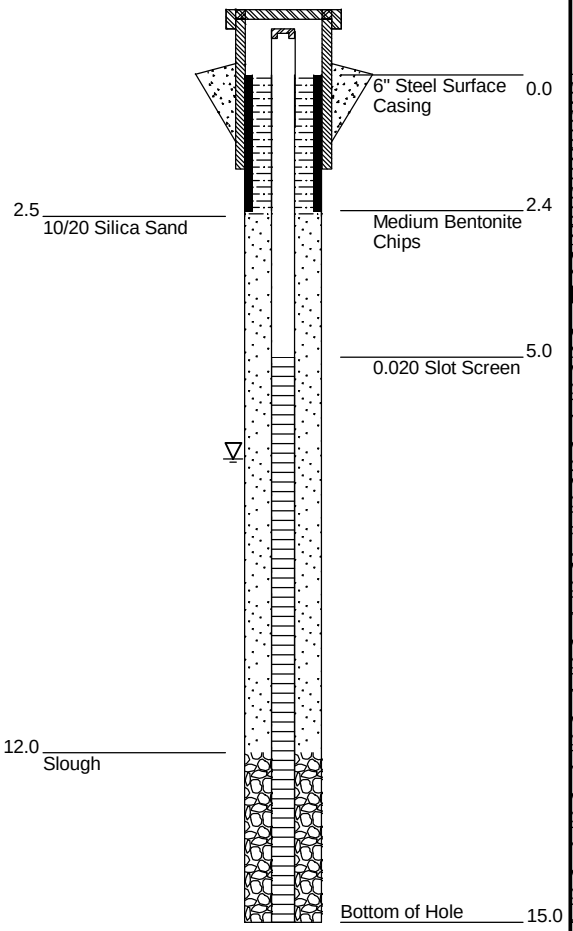
Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 1300 Minnesota Ave
Recorded By: TFS, JS
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: Water
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 6 1/4"
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 4-inch, flush threaded, Sch 40, PVC | +2.60'-15' |
| Surface Casing Used? | Y | 6" Steel | +2.6'-2.4' |
| Screen/Perforations? | Y | 0.020-inch slot, Sch 40 PVC | 5'-15' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 2.5'-12' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1'-2.5' |
| Surface Seal? | Y | Concrete Pad | 0'-1' |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | Y | Bailer | 60 Gallons |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 563872.17 Easting: 2229466.39
Static Water Level Below MP: 9.04
Date: 5/16/2013
MP Description: Top of PVC
MP Height Above or Below Ground (ft): 2.24
Surface Casing Height (ft): 2.60
Riser Height (ft): 2.24
Ground Surface Elevation (ft): 3101.50
MP Elevation (ft): 3103.74

Remarks: Utility Clearance to 8'
Large gravels were fluffing in the hole as augers were being pulled causing the gravels to be intermixed with the sand pack and the bentonite seal to be thin.

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 0.5' **Gravelly Clay**
frozen; brownish-gray

0.5 - 3.0' **Gravelly Clay**
unfrozen; same as above

3.0 - 5.0' **Silty Gravel w/ Cobbles**
loose

5.0 - 7.0' **Sandy Gravel**

7.0 - 8.0' **Sandy Gravel**
wet; as above

8.0 - 8.5' **Silty Sand w/ Gravel**
wet; med brown; subrounded; no odor; no cohesion

8.5 - 15.0' **Sandy Gravel**
wet; moderate brown with some light gray clasts; subrounded to rounded; no odor; no cohesion; clast size from fine sand to +2"

added water at 9' to combated heaving sands; had to pull auger because the steam was stuck; drill chattered a lot at ~9'



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 3/19/15

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-20

Date Hole Started: 4-25-2013 Date Hole Finished: 4-25-2013

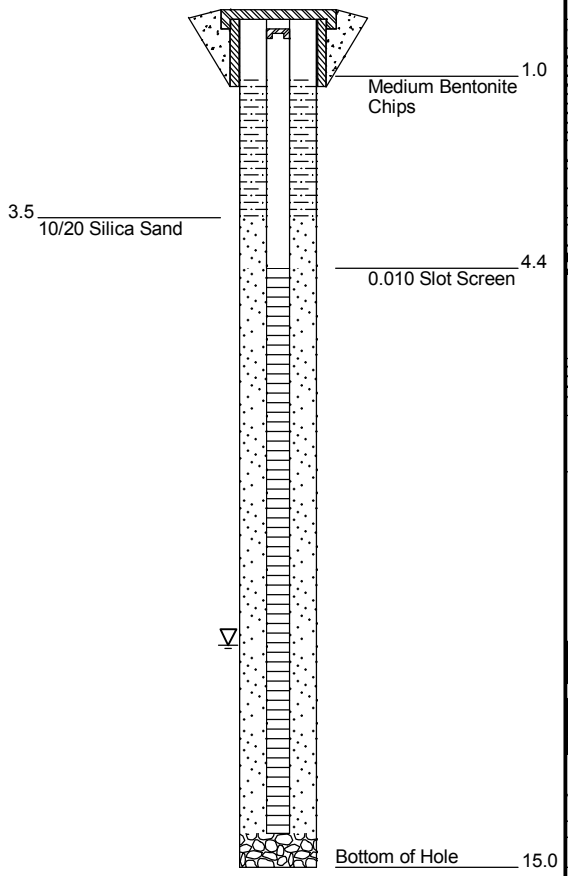
Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 500 1st Ave N
Recorded By: TFS, JS
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 4 1/4"
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 2-inch, flush threaded, Sch 40, PVC | 0'-15' |
| Surface Casing Used? | Y | 12" Surface Manhole | 0'-1' |
| Screen/Perforations? | Y | 0.010-inch slot, Sch 40, PVC | 4.4'-14.4' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 3.5'-14.4' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1'-3.5' |
| Surface Seal? | Y | Concrete Pad | 0'-1' |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | Y | Bailer | 20 Gallons |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 565050.28 Easting: 2229305.65
Static Water Level Below MP: 10.82 Surface Casing Height (ft): 0
Date: 5/16/2013 Riser Height (ft): -0.25
MP Description: Top of PVC Ground Surface Elevation (ft): 3101.81
MP Height Above or Below Ground (ft): -0.25 MP Elevation (ft): 3101.56

Remarks: Utility Clearance to 8'
.6' of heave in bottom of hole form flowing sands

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 0.5' **Clayey Silt w/ gravel**
moist; dark gray

0.5 - 1.0' **Clayey Silt w/ Sand**
damp; dark gray to brown

1.0 - 2.0' **Sandy Silt w/ Clay**
damp; dark brown

2.0 - 2.5' **Silty Sand**
black; some glass; some minus 1" gravel

2.5 - 3.5' **Sand**
orange; some scale flakes and some glass

3.5 - 4.0' **Silty Sand**
orange to black; some minus 2" gravel

4.0 - 4.5' **Clay**
black; hydrocarbon stain and odor; some brown wood fibers

4.5 - 6.0' **Clayey Silt**
moist; gray; hydrocarbon odor but no stain

6.0 - 6.5' **Silty Clay**
moist; medium gray; no stain or odor

6.5 - 7.0' **Sandy Silt**
wet; no stain or odor

7.0 - 8.0' **No Recovery**

8.0 - 11.0' **Sand**
wet; dark gray; subrounded; no cohesion; slight odor; poorly graded

11.0 - 13.0' **Cobbels**
no returns; driller thinks it was cobbles; rig was chattering

13.0 - 15.0' **Gravely Sand**
wet; dark gray; subrounded to rounded; well graded; finning upward



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 11/22/13

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-21

Date Hole Started: 4-29-2013 Date Hole Finished: 4-29-2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 338 Highway 87 E

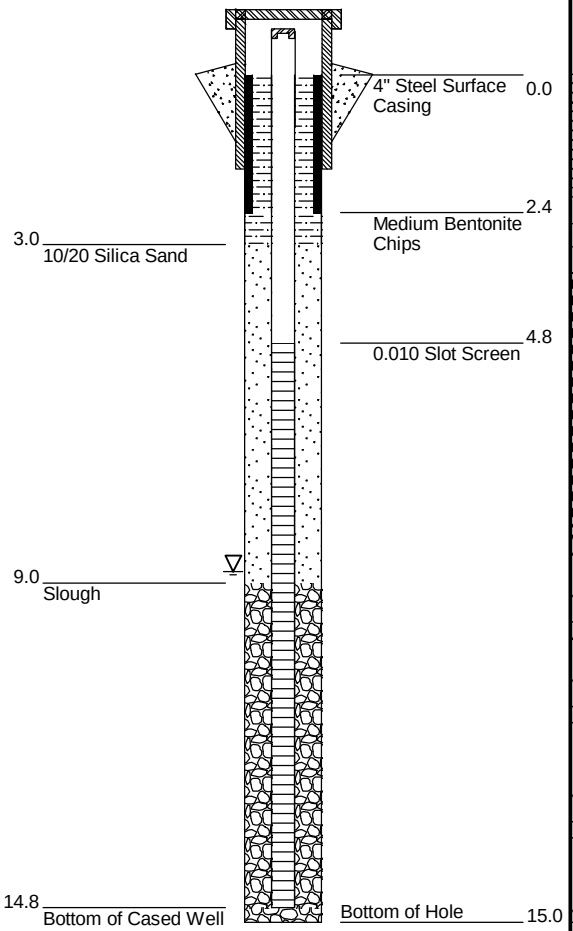
Recorded By: LJ, JS
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 4 1/4"
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 2-inch, flush threaded, Sch 40, PVC | +2.56'-15' |
| Surface Casing Used? | Y | 4" Steel | +2.56'-2.44' |
| Screen/Perforations? | Y | 0.010-inch slot, Sch 40, PVC | 4.75'-14.75' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 3'-9' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1'-3' |
| Surface Seal? | Y | Concrete Pad | 0'-1' |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | Y | Bailer | 32 Gallons |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 564811.77 Easting: 2229198.95
Static Water Level Below MP: 11.02 Surface Casing Height (ft): 2.56
Date: 5/16/2013 Riser Height (ft): 2.22
MP Description: Top of PVC Ground Surface Elevation (ft): 3102.10
MP Height Above or Below Ground (ft): 2.22 MP Elevation (ft): 3104.32

Remarks: Utility Clearance to 8'
6' of heave in bottom of hole form flowing sands

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 0.5' **Silty Clay**
slightly moist; olive brown; some roots

0.5 - 2.0' **Silty Clay**
dry; light brown; some roots

2.0 - 3.5' **Sandy Silt**
dry; light brown; no hydrocarbon stain or odor

3.5 - 8.0' **Clay**
moist; black; hydrocarbon stain and odor

8.0 - 8.5' **Sand w/ Cobbles**
moist; red brown;

8.5 - 10.0' **Sand w/ Pebbles**
strong hydrocarbon odor; pebbles 1/8" in size

10.0 - 15.0' **Sand w/ Pebbles**
pebbles 1/8" in size; some cobbles



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 3/19/15

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-22

Date Hole Started: 4-25-2013 Date Hole Finished: 4-25-2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 500 1st Ave N

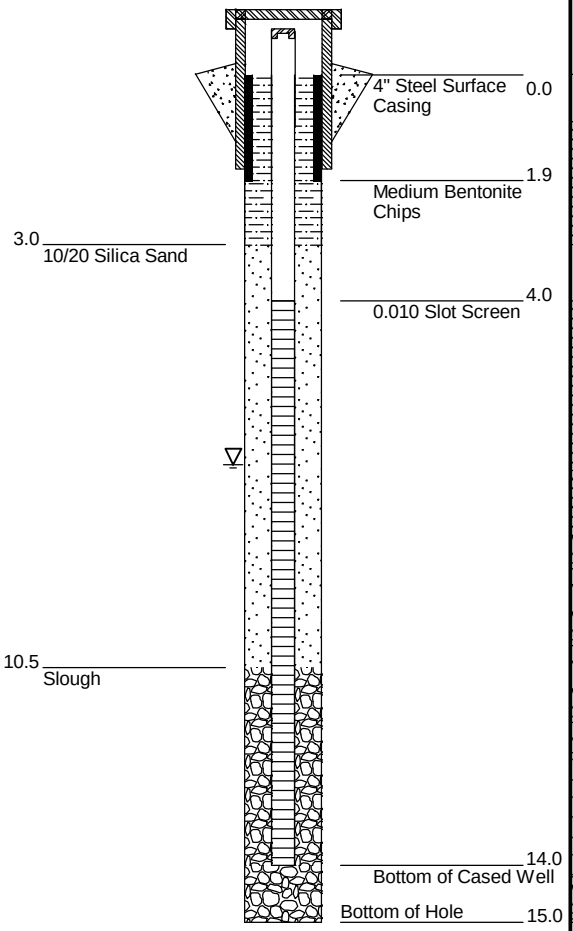
Recorded By: TFS, JS
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 4 1/4"
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 2-inch, flush threaded, Sch 40, PVC | +3.13'-15' |
| Surface Casing Used? | Y | 4" Steel | +3.13'-1.87' |
| Screen/Perforations? | Y | 0.010-inch slot, Sch 40, PVC | 4'-14' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 3'-10.5' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1'-3' |
| Surface Seal? | Y | Concrete Pad | 0'-1' |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | Y | Bailer | 20 Gallons |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 564968.33 Easting: 2229552.07
Static Water Level Below MP: 9.68
Date: 5/16/2013
MP Description: Top of PVC
MP Height Above or Below Ground (ft): 2.78
Surface Casing Height (ft): 3.13
Riser Height (ft): 2.78
Ground Surface Elevation (ft): 3102.11
MP Elevation (ft): 3104.89

Remarks: Utility Clearance to 8'
4.5' of heave in bottom of hole form flowing sands

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 0.8' **Asphalt Cinders**
loose; ground frost to 0.5'

0.8 - 3.0' **Silty Sand**
damp; brown to dark brown; fine to very fine grained with occasional gravel < 1/4" in diameter; loose

3.0 - 4.0' **No Recovery**

4.0 - 7.0' **Silty Clay**
wet; brownish black to gray; rusty brown mottling; strong odor

7.0 - 8.0' **Sludge**
wet; black; sandy, oily, strong odor and sheen

8.0 - 12.0' **Sandy Gravel**
wet; dark gray; subrounded to rounded; alluvium

12.0 - 14.2' **Sand**
wet; dark gray to black; rounded sand; no cohesion; some subrounded to rounded gravels

14.2 - 15.0' **Sandy Gravel**
moderate brown to dark gray; subrounded to rounded; finning upward



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 3/19/15

# Hydrometrics, Inc.

Consulting Scientists and Engineers
Billings, Montana

## Hole Name: YMW-23

Date Hole Started: 4-25-2013 Date Hole Finished: 4-25-2013

Client: ExxonMobil
Project: Yale Oil of South Dakota
County: Yellowstone State: Montana
Property Owner: Yale PLP
Legal Description: 01N, 26E, Section 34 SE1/4 NW1/4
Location Description: 500 1st Ave N

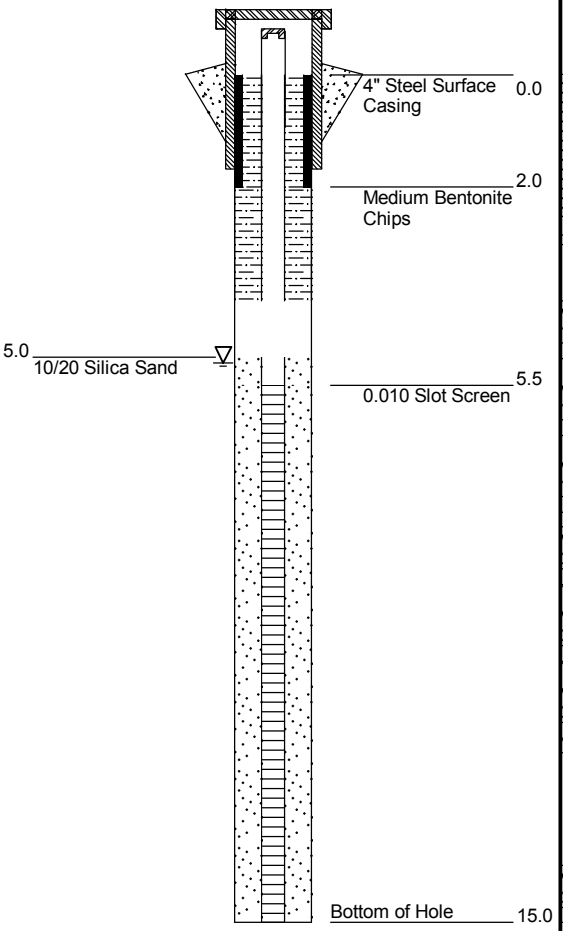
Recorded By: TFS, JS
Drilling Company: SK Geotechnical
Driller: John Mattheis
Drilling Method: Hollow Stem Auger
Drilling Fluids Used: None
Purpose of Hole: Install Monitor Well
Target Aquifer: Shallow Alluvial
Hole Diameter (in): 4 1/4"
Total Depth Drilled (ft): 15

| WELL COMPLETION | Y/N | DESCRIPTION | INTERVAL |
|---|---|---|---|
| Well Installed? | Y | 2-inch, flush threaded, Sch 40, PVC | +3.02'-15' |
| Surface Casing Used? | Y | 4" Steel | +3.02'-1.98' |
| Screen/Perforations? | Y | 0.010-inch slot, Sch 40, PVC | 5'-15' |
| Sand Pack? | Y | 10-20 Colorado Silica Sand | 4'-5.5' |
| Annular Seal? | Y | Bentonite 3/8" hole plug | 1'-4' |
| Surface Seal? | Y | Concrete Pad | 0'-1' |
| DEVELOPMENT/SAMPLING | | | |
| Well Developed? | Y | Bailer | 20 Gallons |
| Water Samples Taken? | N | | |
| Boring Samples Taken? | N | | |

Northing: 565367.71 Easting: 2230184.35
Static Water Level Below MP: 7.80 Surface Casing Height (ft): 3.02
Date: 5/16/2013 Riser Height (ft): 2.70
MP Description: Top of PVC Ground Surface Elevation (ft): 3099.42
MP Height Above or Below Ground (ft): 2.70 MP Elevation (ft): 3102.12

Remarks: Utility Clearance to 8'
5.5' of heave in bottom of hole form flowing sands

## WELL CONSTRUCTION




GRAPHICS

## GEOLOGICAL DESCRIPTION

0.0 - 2.5' **Silty Clay**
damp; dark brown; stiff; minor gravel < 2" in diameter

2.5 - 3.0' **Magnesium Salt**
white encrustation; very hard; source is magnesium salt used by MDOT as binder

3.0 - 4.0' **Asphalt Millings**
black; sandy pea-size gravel; week hydrocarbon odor; compacted

4.0 - 8.0' **Gravels**
damp; gray black; some sand and silt; loose; no hydrocarbon odor

8.0 - 12.0' **Sandy Gravel**
wet; olive brown; subrounded to rounded; clast size from sand to +2"; no cohesion

12.0 - 14.0' **Sand**
wet; moderate brown; subrounded; no cohesion

14.0 - 15.0' **Sandy Gravel**
wet; olive brown; subrounded to rounded; clast size from sand to 2"; finning upward



STANDARD_REV3 YALE OIL MONITORING WELLS.GPJ HYDHLN2.GDT 11/22/13

# APPENDIX D

# WELL DEVELOPMENT

# STANDARD OPERATING PROCEDURE FORM

## WELL DEVELOPMENT LOG ©
## HF-FORM-435

WELL No. YMW-10

### WELL DATA

Project Name_____ State_____ County
Location: T_____ R_____ Sec._____ Tract
Well Location (Narrative Description)

Well Depth (ft) 15.00 (@ 14.20 start) Dia (in) 2 Perf. Interval $V_B = (15.00 - 9.36)(\frac{4}{25}) = 0.9$ gal

Static Water Level 9.36 [ABOVE BELOW MP] $5 \cdot V_B = 4.5$ gal

MP Desc. PVC Meas Date & Time 5/22/13 1115

Aquifer Alluvial

### DEVELOPMENT DATA

Date_____ Date Started_____ Date Finished
Tot Development Time_____ Est. Yield at Start_____ Est. Yield at End ~0.5 gpm

Equipment: BAILER SAND PUMP COMPRESSOR SURGE BLOCK DRILLING
OTHER

Desc. of Equipment
Dev. Additives Used
Desc. of Packer & Surface Seals
Water Color & Turbidity: At Start Brown Very Turbid At End Lt. Brown Slight Turbidity to Clear

Static Water Level After Development:
Time 1130 SWL 14.33 Trend

Operator TS

Water Quality Samples Taken? YES NO

REMARKS
Bailed 4 gallons, let recover, bail 2 more gallons (6 total), let recover
Bail 3 more gallons (9 total)

# STANDARD OPERATING PROCEDURE FORM

## WELL DEVELOPMENT LOG ©
## HF-FORM-435

WELL No. YMW-11

### WELL DATA

Project Name_____ State_____ County
Location: T_____ R_____ Sec._____ Tract
Well Location (Narrative Description)

Well Depth (ft) 15.98 Dia (in) 4" Perf. Interval

$V_B = (15.98 - 11.42) \times 0.81 \frac{gal}{ft} = 3.69$ gal

Static Water Level 11.42 [ ABOVE BELOW MP]

$5 \times V_B = 18.45$ gal

MP Desc. PVC Meas Date & Time 5/21/13 1305

Aquifer Alluvium

### DEVELOPMENT DATA

Date 5/21/13 Date Started_____ Date Finished
Tot Development Time_____ Est. Yield at Start_____ Est. Yield at End ~ 5 gpm

Equipment: BAILER SAND PUMP COMPRESSOR SURGE BLOCK DRILLING
OTHER

Desc. of Equipment
Dev. Additives Used None
Desc. of Packer & Surface Seals Brown
Water Color & Turbidity: At Start Very Turbid At End Slight to clear

Static Water Level After Development:
Time 1330 SWL 14.75 Trend

Operator T.S.

Water Quality Samples Taken? YES NO

REMARKS

Start Bailing @ 0950, start Air Compressor 1000 Stop @ 1002 Cont. Bailing, 1010 to 1012 air compressor, bailed, 1125-1130 compressor Cont. Bailing. Bailed 35 gallons begin clearing, Continued to a total of 45 gallons



compressor had minor contribution, discontinued

# STANDARD OPERATING PROCEDURE FORM

## WELL DEVELOPMENT LOG ©
## HF-FORM-435

WELL No. YMW-15

### WELL DATA

Project Name_____ State_____ County
Location: T_____ R_____ Sec._____ Tract
Well Location (Narrative Description)

Well Depth (ft) 14.65 (14.50 stick) Dia (in) 2 Perf. Interval

$V_B = (14.50 - 8.49)(4/25) = 1.1$

$5 \cdot V_B = 5.6$

Static Water Level 8.49 [ ABOVE BELOW MP]

MP Desc. PVC Meas Date & Time 5/22/13 1045

Aquifer Alluvium

### DEVELOPMENT DATA

Date 5/22/13 Date Started_____ Date Finished
Tot Development Time_____ Est. Yield at Start_____ Est. Yield at End ~ 0.5 gpm

Equipment: BAILER SAND PUMP COMPRESSOR SURGE BLOCK DRILLING
OTHER

Desc. of Equipment
Dev. Additives Used
Desc. of Packer & Surface Seals
Water Color & Turbidity: At Start Very Turbid Black w/ sheen & odor At End

Static Water Level After Development:
Time 1100 SWL 14.05 Trend

Operator TJ

Water Quality Samples Taken? YES NO

REMARKS
1 Bailed approx 4 gallons, let recover, Bail 2 more (6 total), let recover, bail 5 more gallons (11 gallons total)

# STANDARD OPERATING PROCEDURE FORM

## WELL DEVELOPMENT LOG ©
## HF-FORM-435

WELL No. YMW-16

### WELL DATA

Project Name_____ State_____ County
Location: T_____ R_____ Sec._____ Tract
Well Location (Narrative Description)

Well Depth (ft) 15.23 (14.33 started TD) Dia (in) 2 Perf. Interval

$V_B = (15.23 - 7.80)(\frac{4}{25}) = 1.2$

Static Water Level 7.80 [ ABOVE BELOW MP]

$5 \cdot V_B = 6$

MP Desc. PVC Meas Date & Time 5/22/13 1245

Aquifer Alluvium

### DEVELOPMENT DATA

Date_____ Date Started_____ Date Finished
Tot Development Time_____ Est. Yield at Start_____ Est. Yield at End ~2 gpm

Equipment: BAILER SAND PUMP COMPRESSOR SURGE BLOCK DRILLING
OTHER

Desc. of Equipment
Dev. Additives Used
Desc. of Packer & Surface Seals
Water Color & Turbidity: At Start DK Gray Very Turbid At End Lt Grey Sl. Turbidity

Static Water Level After Development:
Time 1350 SWL 10.65 Trend

Operator TS

Water Quality Samples Taken? YES NO

REMARKS
25 gallons purged

# STANDARD OPERATING PROCEDURE FORM

## WELL DEVELOPMENT LOG ©
## HF-FORM-435

WELL No. YMW-17

WELL DATA

Project Name_____ State_____ County
Location: T_____ R_____ Sec._____ Tract
Well Location (Narrative Description)

Well Depth (ft) @ start 15.56 / 15.48 Dia (in) 2 Perf. Interval

$V_B = (15.56 - 8.48)(\frac{4}{25}) = 1.28$

Static Water Level 8.48 [ ABOVE BELOW MP]

5 $V_B$ = 6.4 gal

MP Desc. PVC Meas Date & Time 5/22/13 1210

Aquifer Alluvium

DEVELOPMENT DATA

Date 5/22/13 Date Started_____ Date Finished
Tot Development Time_____ Est. Yield at Start_____ Est. Yield at End <1 gpm

Equipment: BAILER SAND PUMP COMPRESSOR SURGE BLOCK DRILLING
OTHER

Desc. of Equipment
Dev. Additives Used
Desc. of Packer & Surface Seals
Water Color & Turbidity: At Start Very Turbid, Grey At End Lt Grey Sl. Turbidity

Static Water Level After Development:
Time 1235 SWL 10.74 Trend

Operator TS

Water Quality Samples Taken? YES NO

REMARKS Bailed to bottom of well
20 gallons Purged

# STANDARD OPERATING PROCEDURE FORM

## WELL DEVELOPMENT LOG ©
## HF-FORM-435

WELL No. V/MW-19

### WELL DATA

Project Name_____ State_____ County
Location: T_____ R_____ Sec._____ Tract
Well Location (Narrative Description)

Well Depth (ft) 16.60 (15.53 @ start) Dia (in) 4 Perf. Interval $V_B = \frac{(16.60 - 7.97)(42)}{25} = 5.5$

Static Water Level 7.97 [ABOVE BELOW MP] $5 \cdot V_B = 27.6$

MP Desc. PVC Meas Date & Time ~~1440~~ 1340

Aquifer Alluvium

### DEVELOPMENT DATA

Date 5/21/13 Date Started 1340 Date Finished 1500
Tot Development Time_____ Est. Yield at Start_____ Est. Yield at End ~ 7 gpm

Equipment: ~~BAILER~~ SAND PUMP COMPRESSOR SURGE BLOCK DRILLING
OTHER

Desc. of Equipment
Dev. Additives Used
Desc. of Packer & Surface Seals
Water Color & Turbidity: At Start Brown Very Turbid At End Brown Sl. Turbid to Clear

Static Water Level After Development:
Time 1440 SWL 9.85 Trend

Operator TS

Water Quality Samples Taken? YES NO

REMARKS After 20 gallons, Bailed to bottom of well, Bailed 60 gallons

TNI ~~HHL~~ II

# STANDARD OPERATING PROCEDURE FORM

## WELL DEVELOPMENT LOG ©
## HF-FORM-435

WELL No. VMW-20

### WELL DATA

Project Name_____ State_____ County
Location: T_____ R_____ Sec._____ Tract
Well Location (Narrative Description)
13.90 @ start

Well Depth (ft)_____ Dia (in) 2 Perf. Interval

$V_B = (13.90 - 5.89)\left(\frac{4}{25}\right) = 1.3$

Static Water Level 5.89 [ ABOVE BELOW MP]

$5 \cdot V_B = 6.4$

MP Desc. PVC Meas Date & Time 5/22/13 0950

Aquifer Alluvium

### DEVELOPMENT DATA

Date 5/22/13 Date Started_____ Date Finished
Tot Development Time_____ Est. Yield at Start_____ Est. Yield at End ~3gpm

Equipment: BAILER SAND PUMP COMPRESSOR SURGE BLOCK DRILLING
OTHER

Desc. of Equipment
Dev. Additives Used
Desc. of Packer & Surface Seals
Water Color & Turbidity: At Start Very turbid Dark Brown At End Lt Brown, slight turbid to clear

Static Water Level After Development:
Time 1016 SWL 6.92 Trend

Operator TS

Water Quality Samples Taken? YES ~~NO~~

REMARKS
1111 20 gallons purged

# STANDARD OPERATING PROCEDURE FORM

## WELL DEVELOPMENT LOG
## HF-FORM-435

WELL No. YMW-21

### WELL DATA

Project Name_____ State_____ County
Location: T_____ R_____ Sec._____ Tract
Well Location (Narrative Description)

Well Depth (ft) 16.72 (Start 16.73) Dia (in) 2 Perf. Interval $V_B = (16.73 - 8.29)(\frac{4}{25}) = 1.4$

Static Water Level 8.29 [ABOVE BELOW MP] $5 \times V_B = 6.8$

MP Desc. PVC Meas Date & Time 5/22/13 1330

Aquifer Alluvial

### DEVELOPMENT DATA

Date 5/22/13 Date Started_____ Date Finished
Tot Development Time_____ Est. Yield at Start_____ Est. Yield at End ~3 gpm

Equipment: BAILER SAND PUMP COMPRESSOR SURGE BLOCK DRILLING
OTHER

Desc. of Equipment
Dev. Additives Used
Desc. of Packer & Surface Seals Stain & Odor
Water Color & Turbidity: At Start Black Very Turbid At End slight Turbidity, Grey

Static Water Level After Development:
Time 1400 SWL 9.00 Trend

Operator TS

Water Quality Samples Taken? YES NO

REMARKS

Bailed 32 gallons

# STANDARD OPERATING PROCEDURE FORM

## WELL DEVELOPMENT LOG ©
## HF-FORM-435

WELL No. YMW-22

### WELL DATA

Project Name_____ State_____ County
Location: T_____ R_____ Sec._____ Tract
Well Location (Narrative Description)
16:13 BD Start

Well Depth (ft) 16.51 Dia (in) 2 Perf. Interval

$V_B = (16.51 - 10.13)\left(\frac{2^2}{25}\right) = 1.0$

Static Water Level 10.13 [ ABOVE BELOW MP]

$5 \cdot V_B = 5.1$

MP Desc. PVC Meas Date & Time 5/21/13 1625

Aquifer
Alluvium

### DEVELOPMENT DATA

Date 5/21/13 Date Started_____ Date Finished
Tot Development Time_____ Est. Yield at Start_____ Est. Yield at End ~6gpm

Equipment: BAILER SAND PUMP COMPRESSOR SURGE BLOCK DRILLING
OTHER

Desc. of Equipment
Dev. Additives Used
Desc. of Packer & Surface Seals
Water Color & Turbidity: At Start Very Turbid Brown At End Lt Brown Slight Turbid

Static Water Level After Development:
Time 1455 SWL 10.10 Trend

Operator T.S.

Water Quality Samples Taken? YES NO

REMARKS 20 gallons Purged

# STANDARD OPERATING PROCEDURE FORM

## WELL DEVELOPMENT LOG ©
## HF-FORM-435

WELL No. YMW-23

### WELL DATA

Project Name_____ State_____ County
Location: T_____ R_____ Sec._____ Tract
Well Location (Narrative Description)

Well Depth (ft) 16.56 (16.56 @ stick) Dia (in) 2" Perf. Interval

$V_B = (16.56 - 10.08)\left(\frac{2^2}{25}\right) = 1.0$

Static Water Level 10.08 [ ABOVE BELOW MP]

$5 \cdot V_B = 5.2$

MP Desc. PVC Meas Date & Time 5/21/13 1540

Aquifer Alluvium

### DEVELOPMENT DATA

Date 5/21/13 Date Started_____ Date Finished
Tot Development Time_____ Est. Yield at Start_____ Est. Yield at End ~6 gpm

Equipment: BAILER SAND PUMP COMPRESSOR SURGE BLOCK DRILLING
OTHER

Desc. of Equipment
Dev. Additives Used
Desc. of Packer & Surface Seals
Water Color & Turbidity: At Start Brown Very Turbid At End Brown Sl. Turbid

Static Water Level After Development:
Time 1605 SWL 10.25 Trend

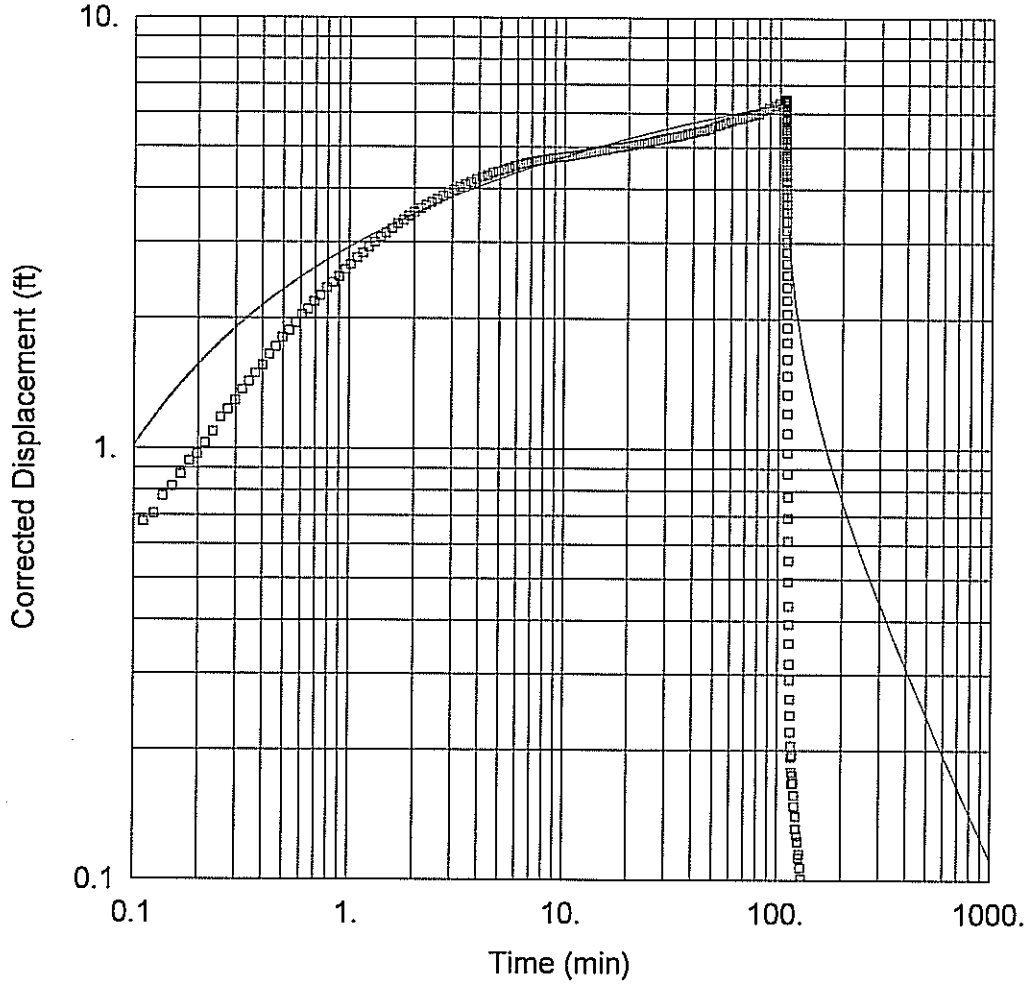
Operator TS

Water Quality Samples Taken? YES NO

REMARKS
1111 20 gallons total purged

# APPENDIX E

# AQUIFER TESTS




## WELL TEST ANALYSIS

Data Set: H:\PROJECTS\YALE OIL\11108\RI - Work Plan\Aquifer Testing\YMW-19.aqt
Date: 10/24/13 Time: 16:23:41

## PROJECT INFORMATION

Company: Hydrometrics
Client: Yale Oil
Project: 11108
Location: Billings, MT
Test Well: YMW-19
Test Date: 7/26/2013

## WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|---|---|---|
| YMW-19 | 0 | 0 |

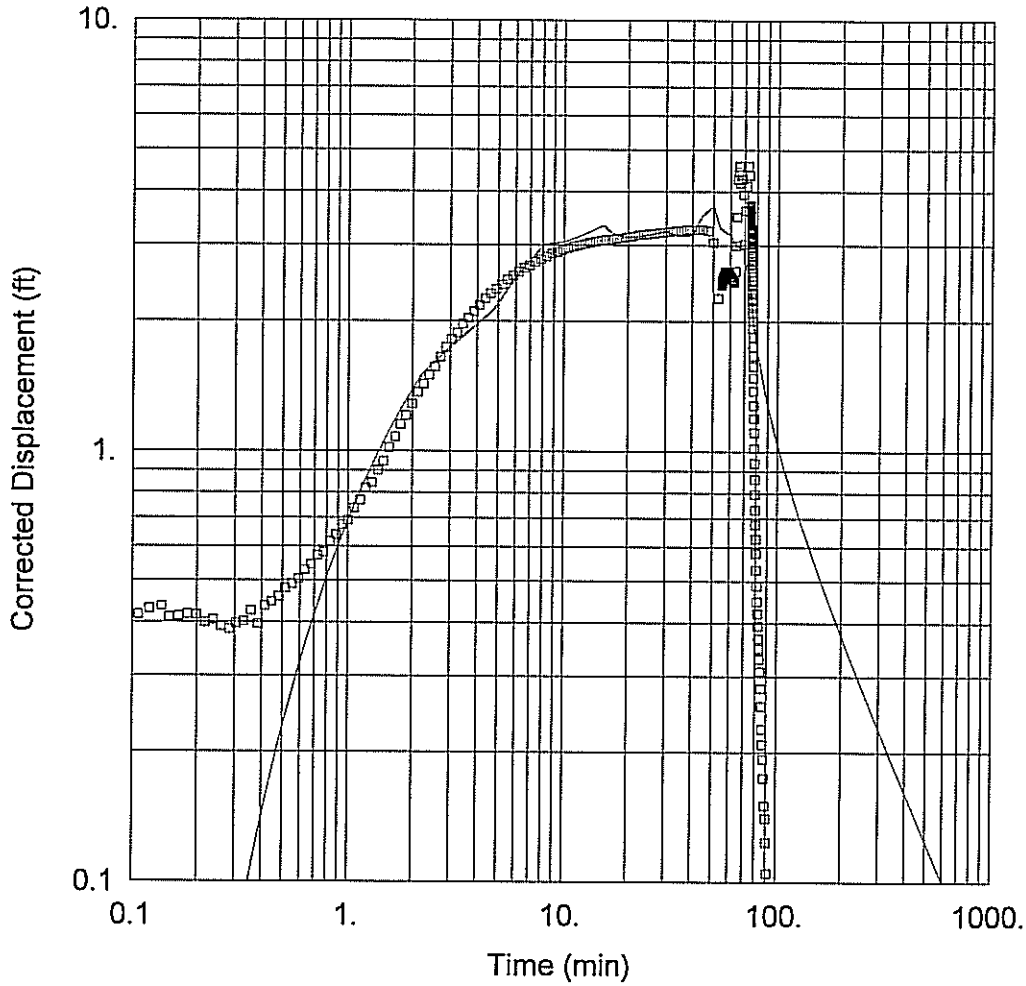
Observation Wells

| Well Name | X (ft) | Y (ft) |
|---|---|---|
| ▫ YMW-19 | 0 | 0 |

## SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 107. $ft^2$/day
S = 0.2185
Kz/Kr = 0.001
b = 20. ft




## WELL TEST ANALYSIS

Data Set: H:\PROJECTS\YALE OIL\11108\RI - Work Plan\Aquifer Testing\YMW-11.aqt
Date: 10/24/13 Time: 16:24:36

## PROJECT INFORMATION

Company: Hydrometrics
Client: Yale Oil
Project: 11108
Location: Billings, MT
Test Well: YMW-19
Test Date: 7/26/2013

## WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|---|---|---|
| YMW-11 | 0 | 0 |

Observation Wells

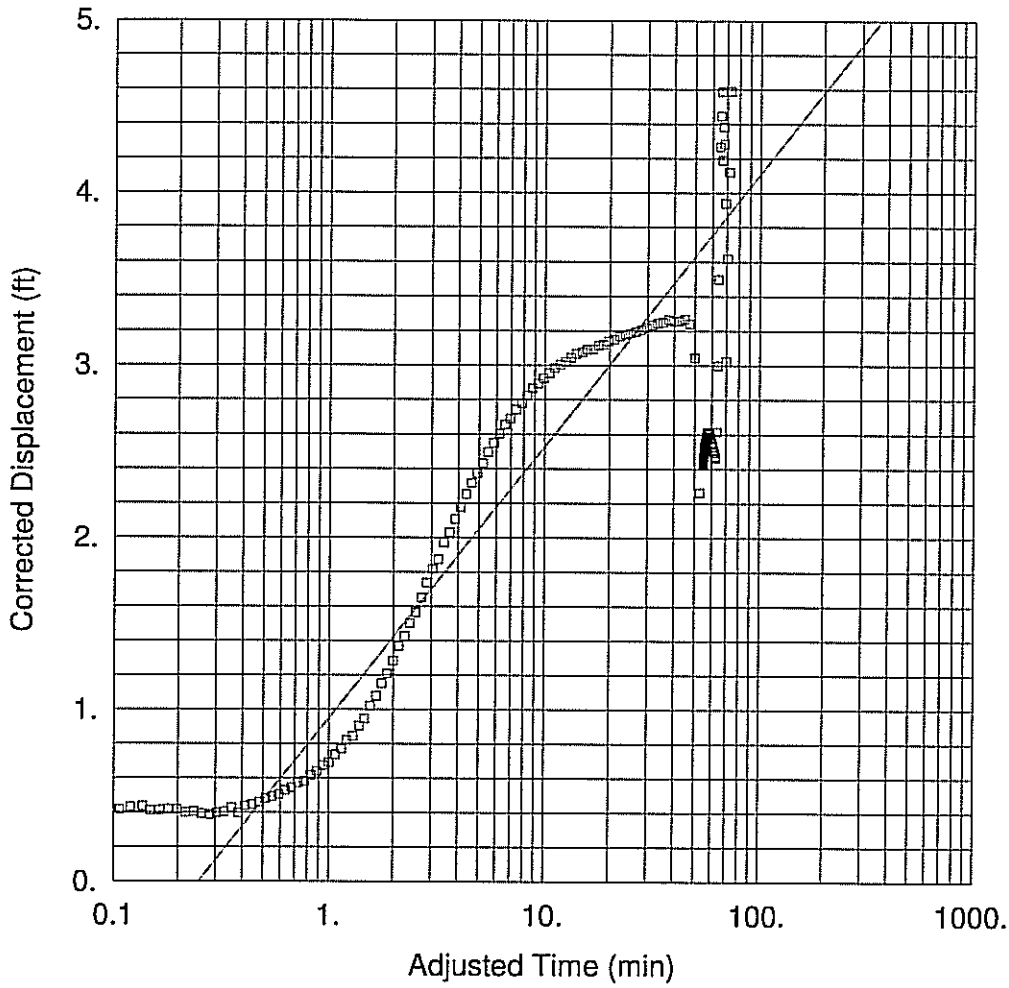
| Well Name | X (ft) | Y (ft) |
|---|---|---|
| ▫ YMW-11 | 0 | 0 |

## SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 22.23 $ft^2$/day
Kz/Kr = 1.

S = 1.144
b = 20. ft




## WELL TEST ANALYSIS

Data Set: H:\...\YMW-11_ave pumping rate.aqt
Date: 11/22/13 Time: 13:50:33

## PROJECT INFORMATION

Company: Hydrometrics
Client: Yale Oil
Project: 11108
Location: Billings, MT
Test Well: YMW-19
Test Date: 7/26/2013

## AQUIFER DATA

Saturated Thickness: 20. ft Anisotropy Ratio (Kz/Kr): 1.

## WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|---|---|---|
| YMW-11 | 0 | 0 |

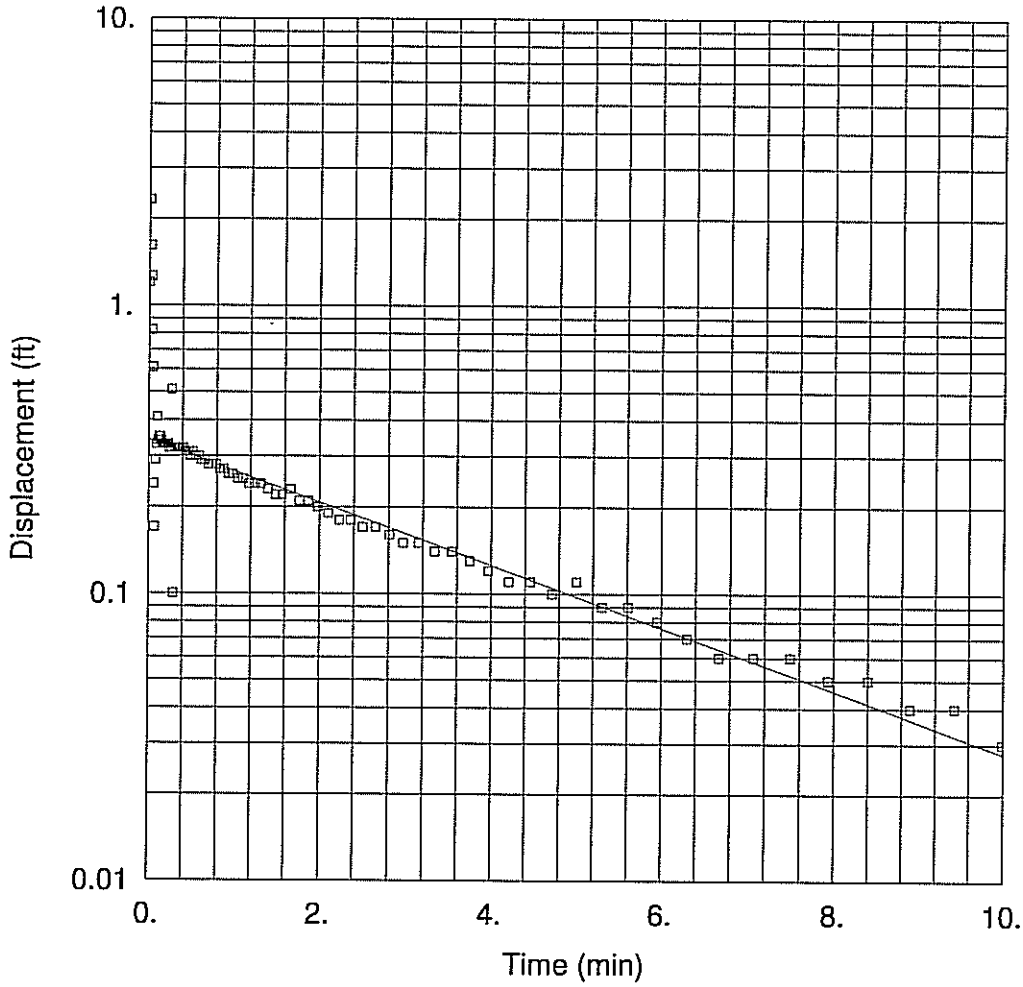
Observation Wells

| Well Name | X (ft) | Y (ft) |
|---|---|---|
| ▫ YMW-11 | 0 | 0 |

## SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 12.95 $ft^2$/day S = 0.1447




## WELL TEST ANALYSIS

Data Set: H:\PROJECTS\YALE OIL\11108\RI - Work Plan\Aquifer Testing\YMW-11 Slug In.aqt
Date: 11/22/13 Time: 13:52:58

## PROJECT INFORMATION

Company: Hydrometrics
Client: Yale Oil
Project: 11108
Location: Billings, MT
Test Well: YMW-11
Test Date: 10/04/13

## AQUIFER DATA

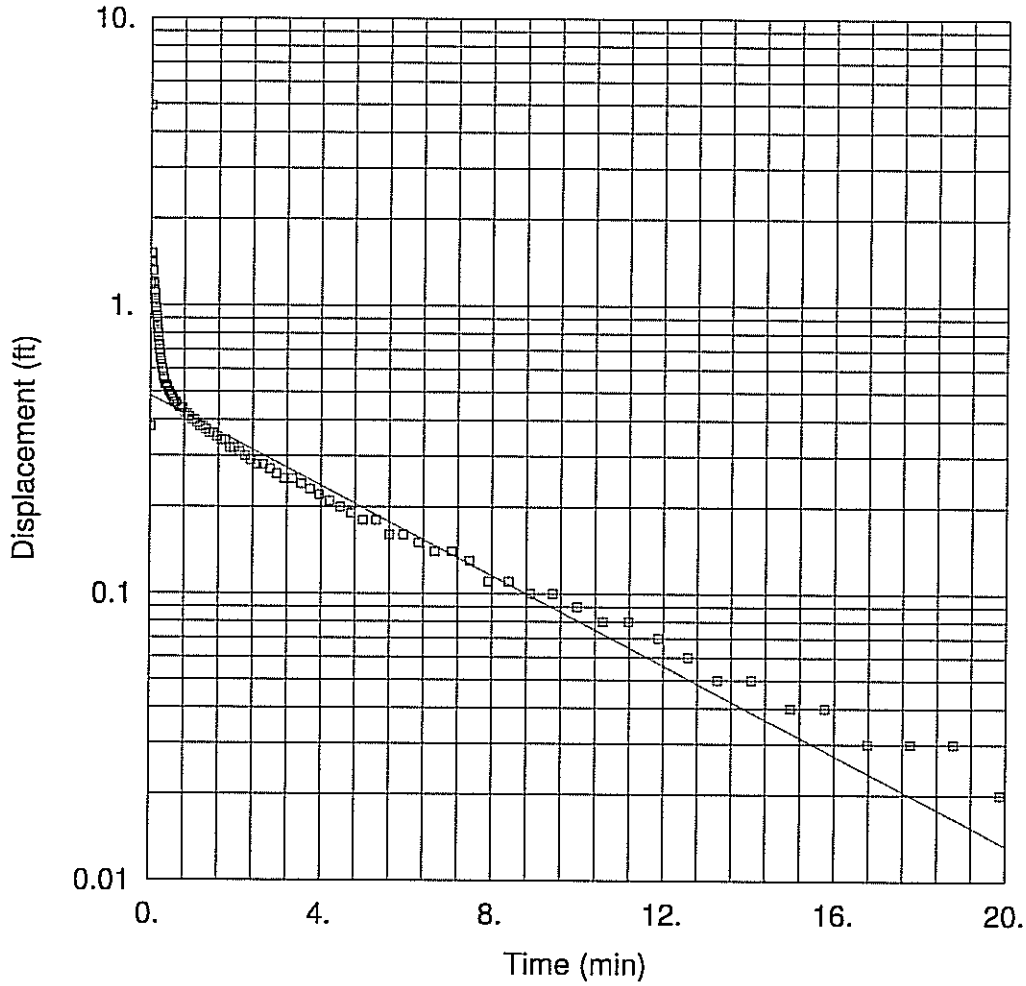
Saturated Thickness: 20. ft
Anisotropy Ratio (Kz/Kr): 1.

## WELL DATA (YMW-11)

Initial Displacement: 1.2 ft
Total Well Penetration Depth: 7.46 ft
Casing Radius: 0.125 ft
Static Water Column Height: 20. ft
Screen Length: 7.46 ft
Well Radius: 0.3333 ft

## SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.7428 ft/day
y0 = 0.3426 ft




## WELL TEST ANALYSIS

Data Set: H:\PROJECTS\YALE OIL\11108\RI - Work Plan\Aquifer Testing\YMW-11 Slug Out.aqt
Date: 11/22/13 Time: 13:53:14

## PROJECT INFORMATION

Company: Hydrometrics
Client: Yale Oil
Project: 11108
Location: Billings, MT
Test Well: YMW-11
Test Date: 10/04/13

## AQUIFER DATA

Saturated Thickness: 20. ft
Anisotropy Ratio (Kz/Kr): 1.

## WELL DATA (YMW-11)

Initial Displacement: 1.2 ft
Total Well Penetration Depth: 7.46 ft
Casing Radius: 0.125 ft
Static Water Column Height: 20. ft
Screen Length: 7.46 ft
Well Radius: 0.3333 ft

## SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.5316 ft/day
y0 = 0.4853 ft

# STANDARD OPERATING PROCEDURE FORM

## AQUIFER TEST DATA FORM© YMW19 _step

## HF-FORM-400

Project Yale Oil of SD Personnel RJL

Well Tested YMW-19 Test Date 7-25-2013 Wells Observed _____

### Test Description

Test Type: (circle)

1. Pumping Well (PW) Step Test 2. PW Drawdown 3. PW Recovery 4. Other_____

Pump hp. & type ~~Grundfos MQ~~ - 4" Pump Depth(ft)_____

Pump Installation Date/Time _____ Pump Removal Date _____

Avg. Discharge(gpm)____ Test Duration(min)_____ Max WL Change(ft)_____

Water Quality Sample Taken? yes no Sample # _____ Date/time _____

Specific Conductance(umhos/cm @25 C)_____ Temp( C)_____

### Test Well Description

**(See Diagram Next Page & Include in Field Book)**

Borehole Dia.(in)_____ Well Dia.(in)_____ Well Depth (ft) 16 ft-BMP

Perforated Zone(s) (ft)_____ Desc. of MP _____

GS Elev.(ft) _____ Stick-up Elev.(ft)_____ Stilling Tube Elev.(ft)_____

SWL below MP(ft) 7.48* SWL below GS(ft)_____ Date/Time _____

* before pump + instruments 7-25-2013 1455

### Observation Well Description

Obs. Well ID _____ Dist. From Pumping Well (ft)_____ Direction_____

Desc. of MP_____

Grnd Surface Elev.(ft)_____ Stick-up Elev.(ft)_____

SWL below MP(ft) _____ SWL below Grnd Surface(ft)_____

**(see sheet three for additional observation wells)**

### Flow Meter Description

Flow Meter Type: (circle)

1. Omega Paddle Wheel 1" 2" 4" 6" 8" 2. Totalizer 3. Other_____

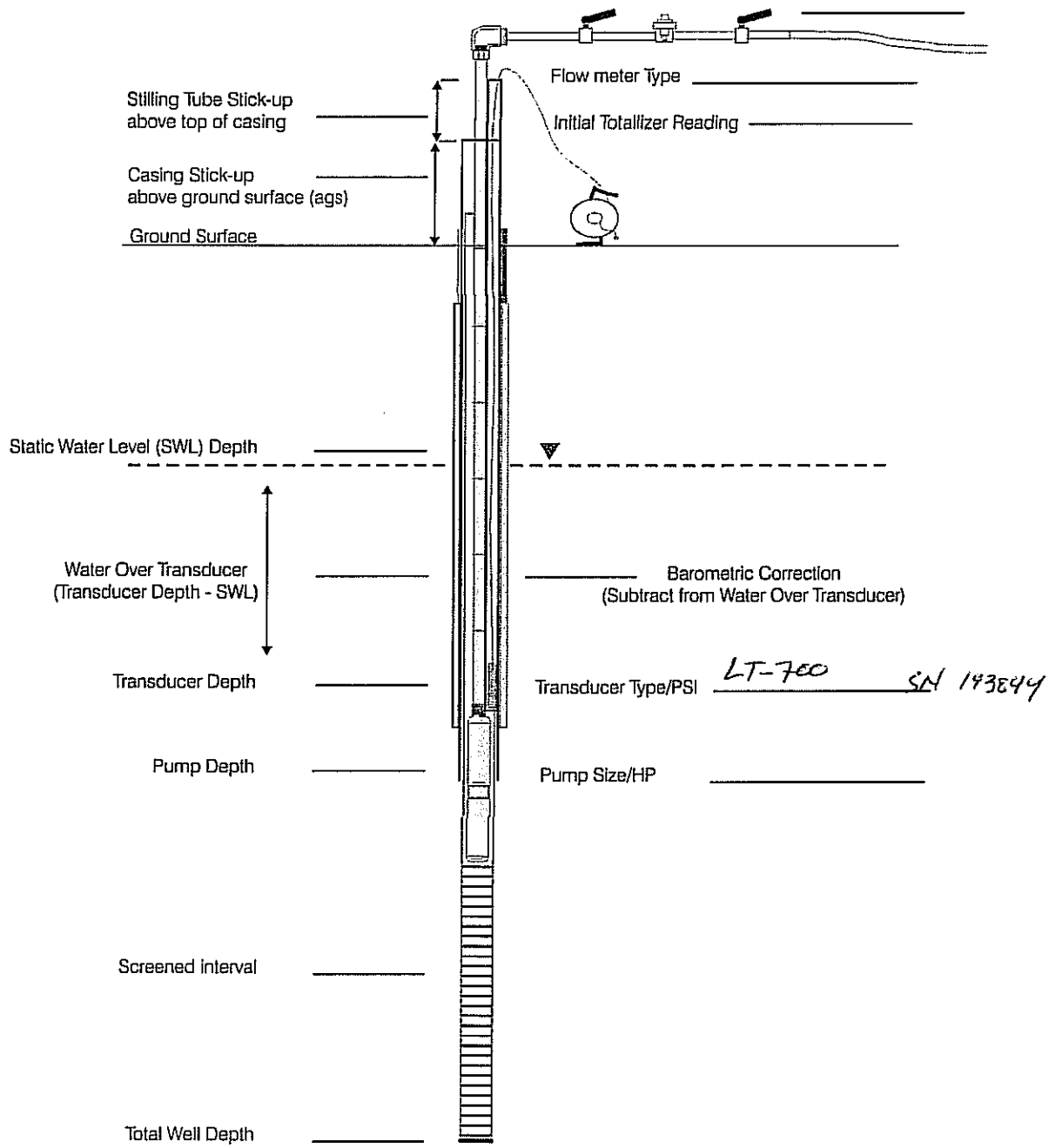
Paddle Wheel Data Logger:

Unit: gpm K-Factor: _____ Output: 4 MA (low) = _____ 20 MA (high) = _____

Totalizer start reading _____ date/time _____

Totalizer Final reading _____ date/time _____

**Hydrometrics, Inc.**
Consulting Scientists and Engineers




## AQUIFER TEST WELL SCHEMATIC DIAGRAM

| | |
|---|---|
| PROJECT: _____ | DATE: _____ |
| WELL NAME: _____ | RECORDED BY: _____ |

K:\APPS\AQWELL SCHEMATIC.CDR

# AQUIFER TEST DATA (Cont.)

## Transducer Setup / Calibration

Test Name _____ Data Logger Type (**Test Well**) _____ PSI/FT _____
Depth of Transducer_____ Initial Level Reading _____ (_____)
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

Test Name _____ Data Logger Type (**Obs. Well**)_____ PSI/FT _____
Depth of Transducer_____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____
**(see below for additional observation wells)**
Time: Computer _____ Transducer 1 _____ Transducer 2_____ Watch 1 ____
Watch 2____ Other _____

## Additional Observation Well/Transducer Descriptions

Obs. Well ID _____Dist. From Pumping Well (ft)_____ Direction_____
Desc. of MP_____
Grnd Surface Elev.(ft)_____ Stick-up Elev.(ft)_____
SWL below MP(ft) _____ SWL below Grnd Surface(ft)_____

Test Name _____ Data Logger Type (Obs. Well)_____ PSI/FT _____
Depth of Transducer_____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

---

Obs. Well ID _____Dist. From Pumping Well (ft)_____ Direction_____
Desc. of MP_____
Grnd Surface Elev.(ft)_____ Stick-up Elev.(ft)_____
SWL below MP(ft) _____ SWL below Grnd Surface(ft)_____

Test Name _____ Data Logger Type (Obs. Well)_____ PSI/FT _____
Depth of Transducer_____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

---

Obs. Well ID _____Dist. From Pumping Well (ft)_____ Direction_____
Desc. of MP_____
Grnd Surface Elev.(ft)_____ Stick-up Elev.(ft)_____
SWL below MP(ft) _____ SWL below Grnd Surface(ft)_____

Test Name _____ Data Logger Type (Obs. Well)_____ PSI/FT _____
Depth of Transducer_____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

# AQUIFER TEST DATA (Cont.)

Project Yale O:1 of SD Personnel RJL

Well Tested YMW-19 Test Date _____ Well Observed _____

Test Start Time: _____ Test Stop Time: _____

Pre-pumping step test

| elapsed | Date | Time | SWL | LT700 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 7-25-13 | 1543 | 7.50** | 7.35 | | | | | |
| | | 1547 | | | # start log | | | | |
| 1'13" | | 1548 | | | # started pump | | pump primed w/ fresh water | | |
| | | 1554 | | | # stopped pump – no prime | | | | |
| 10'52" | | 1557 | | | started pump again after adding prime | | | | |
| | | 1604 | | | # stopped @ 17 min | | primed none | | |
| 18'36" | | | | | | | | | |
| | | 1630 | | | Some Q starting | | | | |
| | | | | | | | | | |
| | | 1700 | | | Restarted log | | Q = 2 gpm | | (valved back) |
| | | 1700 | 8.20 | 6.706 | LT700 | has moved! | not @ starting datum | | |
| | | 1702 | 7.91 | 7.884 | pump off + on / surging | | | | |
| → | | 1710 | | | – switched pumps ← | | | | |
| | | 1715 | | | Started pumping | | Q = high when valved back | | |
| | | | | | pumped to intake immediately @ wide open | | | | |
| | | 1718 | 12.15 | 3.932 | began to recharge @ 3.5 gpm | | | | |
| 1 = 5.5' @ 3.5 gpm | | 1721 | 12.09 | 3.971 | 3.25 to 3.5 gpm | | (rising slightly) | | open valve @ 1725 |
| | | 1722 | 12.1 | 3.942 | 3.5 gpm | | | | |
| | | 1725 | 12.8 | 3.043 | Q = 5 gpm | | (too high) | | |
| | | 1726 | 14.2 | 1.695 | | | | | |
| | | 1727 | 15.25 | 0.776 | | | | | |
| | | 1728 | | 1.395 | valved | back | Q = 3.5 gpm | | |
| | | 1731 | 13.70 | 2.349 | | | | | |
| | | 1733 | | | pump off; let recover | | | | |
| | | 1735 | 8.51 | 7.287 | | | | | |
| | | 1740 | 7.65 | 8.430 | ~~pump on @ 3.5 gpm~~ | | | | |
| | | 1744 | — | — | pump on 3.5 gpm | | | | |
| | | 1745 | 11.12 | 4.773 | | | | | |
| | | 1747 | 12.45 | 3.534 | | | | | |
| | | 1753 | 13.15 | 2.935 | | | | | |
| | | 1755 | | | pump off | | to recover | | |

REMARKS ** = SWL after equipment installed.

Monika Johnson

# STANDARD OPERATING PROCEDURE FORM

## AQUIFER TEST DATA FORM©

## HF-FORM-400

Project Yale O:1 Personnel RJL
Well Tested YMW-19 Test Date 7-26-2013 Wells Observed NA

### Test Description

Test Type: (circle)
1. Pumping Well (PW) Step Test 2. PW Drawdown 3. PW Recovery 4. Other _____
Pump hp. & type _____ Pump Depth(ft) Intake @ 16' Bmp
Pump Installation Date/Time 7-25-2013 Pump Removal Date _____
Avg. Discharge(gpm) ____ Test Duration(min) _____ Max WL Change(ft) _____

Water Quality Sample Taken? yes no Sample # NJL Date/time _____
Specific Conductance(umhos/cm @25 C) NA Temp( C) _____

### Test Well Description
**(See Diagram Next Page & Include in Field Book)**

Borehole Dia.(in) _____ Well Dia.(in) 4.5 Well Depth (ft) 16 ft-Bmp
Perforated Zone(s) (ft) _____ Desc. of MP top PVC
GS Elev.(ft) _____ Stick-up Elev.(ft) 26" agS Stilling Tube Elev.(ft) NA
SWL below MP(ft) 7.51 SWL below GS(ft) _____ Date/Time 7-26-2013 0900

### Observation Well Description

Obs. Well ID _____ Dist. From Pumping Well (ft) _____ Direction _____
Desc. of MP _____ RJL
Grnd Surface Elev.(ft) _____ Stick-up Elev.(ft) _____
SWL below MP(ft) _____ SWL below Grnd Surface(ft) _____
**(see sheet three for additional observation wells)**

### Flow Meter Description

Flow Meter Type: (circle)
1. Omega Paddle Wheel 1" 2" 4" 6" 8" 2. Totalizer 3. Other Calibrated bucket
Paddle Wheel Data Logger:
Unit: gpm K-Factor: _____ Output: 4 MA (low) = _____ 20 MA (high) = _____
Totalizer start reading _____ date/time _____
Totalizer Final reading _____ date/time _____

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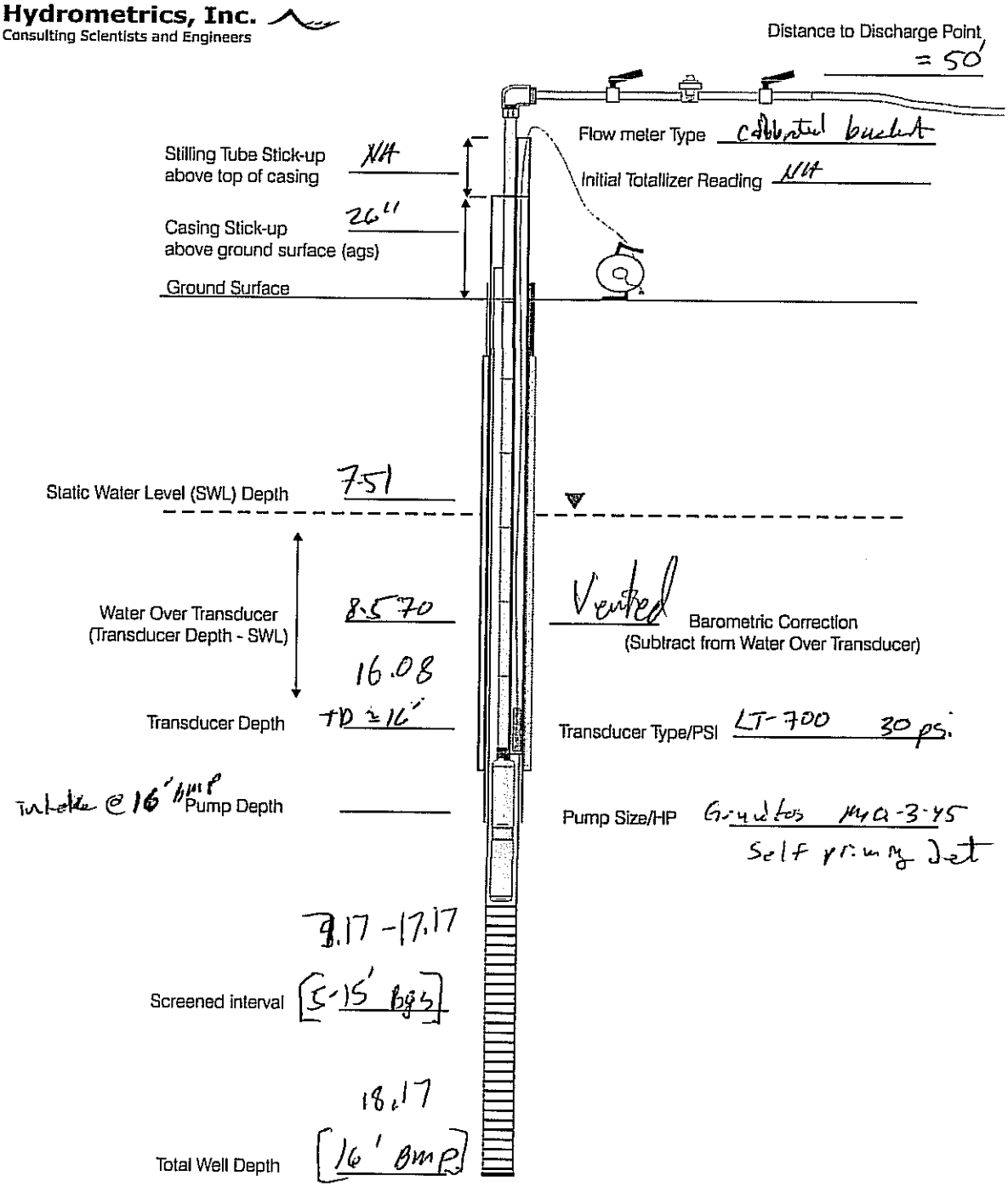


**AQUIFER TEST WELL SCHEMATIC DIAGRAM**

| | | | |
|---|---|---|---|
| PROJECT: | Yale Oil | DATE: | 7-26-2013 |
| WELL NAME: | YMW-19 | RECORDED BY: | RJL |

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Note Suction type pump schematic does not apply.

# AQUIFER TEST DATA (Cont.)

## Transducer Setup / Calibration

Test Name 1/MW-19 pump Data Logger Type (Test Well) LT-700 PSI/FT 30/69
Depth of Transducer 16' BMP Initial Level Reading 8.570 (feet)
Raise 1' Reading N/A Raise 2' Reading N/A Date/Time _____

Test Name _____ Data Logger Type (Obs. Well) _____ PSI/FT _____
Depth of Transducer _____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____
**(see below for additional observation wells)**
Time: Computer _____ Transducer 1 _____ Transducer 2 _____ Watch 1 _____
Watch 2 _____ Other _____

## Additional Observation Well/Transducer Descriptions

Obs. Well ID _____ Dist. From Pumping Well (ft) _____ Direction _____
Desc. of MP _____
Grnd Surface Elev.(ft) _____ Stick-up Elev.(ft) _____
SWL below MP(ft) _____ SWL below Grnd Surface(ft) _____

Test Name _____ Data Logger Type (Obs. Well) _____ PSI/FT _____
Depth of Transducer _____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

---

Obs. Well ID _____ Dist. From Pumping Well (ft) _____ Direction _____
Desc. of MP _____
Grnd Surface Elev.(ft) _____ Stick-up Elev.(ft) _____
SWL below MP(ft) _____ SWL below Grnd Surface(ft) _____

Test Name _____ Data Logger Type (Obs. Well) _____ PSI/FT _____
Depth of Transducer _____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

---

Obs. Well ID _____ Dist. From Pumping Well (ft) _____ Direction _____
Desc. of MP _____
Grnd Surface Elev.(ft) _____ Stick-up Elev.(ft) _____
SWL below MP(ft) _____ SWL below Grnd Surface(ft) _____

Test Name _____ Data Logger Type (Obs. Well) _____ PSI/FT _____
Depth of Transducer _____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

# AQUIFER TEST DATA (Cont.)

Project Yale O;1 (Ymw-19) Personnel RJL

Well Tested Ymw 19 Test Date 7-26-2013 Well Observed N/A

Test Start Time: 0945 (elapsed) Test Stop Time: log @ 0945 pump @ 09:45:05

| Date | Time | SWL | DTW | Q: | | Notes: | | |
|---|---|---|---|---|---|---|---|---|
| 7-26-2013 | 0:30 | 9.60 | | | | | | |
| | 1:00 | 10.60 | | | | | | |
| | 1:30 | 11.21 | | 3.0 gpm | (CJ) | | | |
| | ~~:00~~ | | ~~RJL~~ | | | | | |
| | 2:30 | 11.71 | | | | | | |
| | 3:00 | 12.06 | | | | | | |
| | 3:30 | 12.25 | | | | | | |
| | 4:00 | 12.37 | | 3.45 gpm | (CJ) | | | |
| | 4:30 | 12.54 | 3.622 | | | | | |
| | 5:00 | 12.64 | | | | | | |
| | 5:30 | 12.69 | 3.446 | | | | | |
| JN | 6:00 | 12.75 | | | | | | |
| | 6:30 | 12.82 | | | | | | |
| | 7:00 | 12.88 | | 3.25 gpm | (CJ) | | | |
| | 7:30 | 12.91 | | | | | | |
| | ~~8:00~~ | | ~~RJL~~ | | | | | |
| | 8:30 | 12.98 | | | | | | |
| | ~~9:00~~ | | ~~RJL~~ | | | | | |
| | 9:30 | 13.03 | | 3 gpm | (CJ) | | | |
| | 10:00 | 13.05 | 3.053 | | | | | |
| | 11:00 | 13.10 | | | | | | |
| | 12:00 | — | — | 3.5 gpm | (2gal/34s) | | | |
| | 13:30 | 13.21 | | | | | | |
| | 18:00 | 13.40 | | | | | | |
| | 19:30 | 13.43 | 2.648 | | | | | |
| | 20:00 | — | — | 3.5 gpm | (2gal/34s) | | | |
| | 25:00 | 13.61 | 2.509 | | | | | |
| | 30:00 | 13.77 | 2.362 | 3.5 gpm | (2gal/34s) | | | |
| | 40:00 | 14.0 | 2.177 | 3.6 gpm | (2gal/33s) | | | |
| | 50:00 | 14.28 | 1.841 | 3.6 gpm | (2gal/33s) | | | |
| | 60:00 | 14.55 | 1.581 | 3.6 gpm | (2gal/33s) | | | |

REMARKS pump started 6 seconds after log started. elapsed time is time since pumping began.

CJ - measured by chris Johnson

# AQUIFER TEST DATA (Cont.)

Project Yale Oil Personnel RJL

Well Tested YMW-19 Test Date 7-26-2013 Well Observed

Test Start Time: (see pg 4) Test Stop Time:

| Time (elapsed) | Date | Time | SWL | LT-700 | Q(gpm) | | Notes | | |
|---|---|---|---|---|---|---|---|---|---|
| | 7-26-2013 | 70:00 | 14.72 | 1.406 | 3.5 | (2gal/34s) | | | |
| | | 80:00 | 14.95 | 1.168 | 3.15 | (2gal/38s) | | | |
| | | 90:00 | 15.20 | 0.915 | 3.42 | (2gal/35s) | | | |
| | | 100:00 | 15.46 | 0.673 | 3.5 | (2gal/34s) | | | |
| ~~1130~~ | | 108 | 15.61 | 0.470 | | | ~~restart log~~ | | |
| ~~1130.05~~ | | | | | | | ~~stop pump~~ | | |
| 1132 | | | | | | | restart log | | |
| | | 108 | 12.60 | | | | | | |
| | | 108:15 | 11.40 | | | | | | |
| | | 108:45 | 10.4 | | | | | | |
| | | 109 | 10.0 | | | | | | |
| | | 109:30 | 9.35 | | | | | | |
| | | 110:00 | 8.98 | | | | | | |
| | | 110:30 | 8.64 | | | | | | |
| | | 111:00 | 8.40 | | | | | | |
| | | 112:30 | 8.01 | | | | | | |
| | | 115:00 | 7.80 | | | | | | |
| 1525 | | | 7.53 | | download | | + stop | log | |

REMARKS elapsed time from start of pumping

# STANDARD OPERATING PROCEDURE FORM

## AQUIFER TEST DATA FORM©

## HF-FORM-400

Project Yale Oil Personnel RJL

Well Tested YMW-11 Test Date 7-26-2013 Wells Observed N/A

### Test Description

Test Type: (circle)

1. Pumping Well (PW) Step Test 2. PW Drawdown 3. PW Recovery 4. Other _____

Pump hp. & type _____ Pump Depth(ft) 16 + feet (TD)

Pump Installation Date/Time 7-26-2013 Pump Removal Date _____

Avg. Discharge(gpm)____ Test Duration(min)_____ Max WL Change(ft)_____

Water Quality Sample Taken? yes no Sample # _____ Date/time _____

Specific Conductance(umhos/cm @25 C)_____ Temp( C)_____

### Test Well Description

**(See Diagram Next Page & Include in Field Book)**

Borehole Dia.(in)_____ Well Dia.(in) 4.5" Well Depth (ft) 16.15 ft BMP

Perforated Zone(s) (ft)_____ Desc. of MP top PVC

GS Elev.(ft) _____ Stick-up Elev.(ft)_____ Stilling Tube Elev.(ft)_____

SWL below MP(ft) 10.91 SWL below GS(ft)_____ Date/Time _____

### Observation Well Description

Obs. Well ID _____Dist. From Pumping Well (ft)_____ Direction_____

Desc. of MP_____

Grnd Surface Elev.(ft)_____ Stick-up Elev.(ft)_____

SWL below MP(ft) _____ SWL below Grnd Surface(ft)_____

**(see sheet three for additional observation wells)**

### Flow Meter Description

Flow Meter Type: (circle)

1. Omega Paddle Wheel 1" 2" 4" 6" 8" 2. Totalizer 3. Other calibrated bucket

Paddle Wheel Data Logger:

Unit: gpm K-Factor: _____ Output: 4 MA (low) = _____ 20 MA (high) = _____

Totalizer start reading _____ date/time _____

Totalizer Final reading _____ date/time _____

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Distance to Discharge Point _____

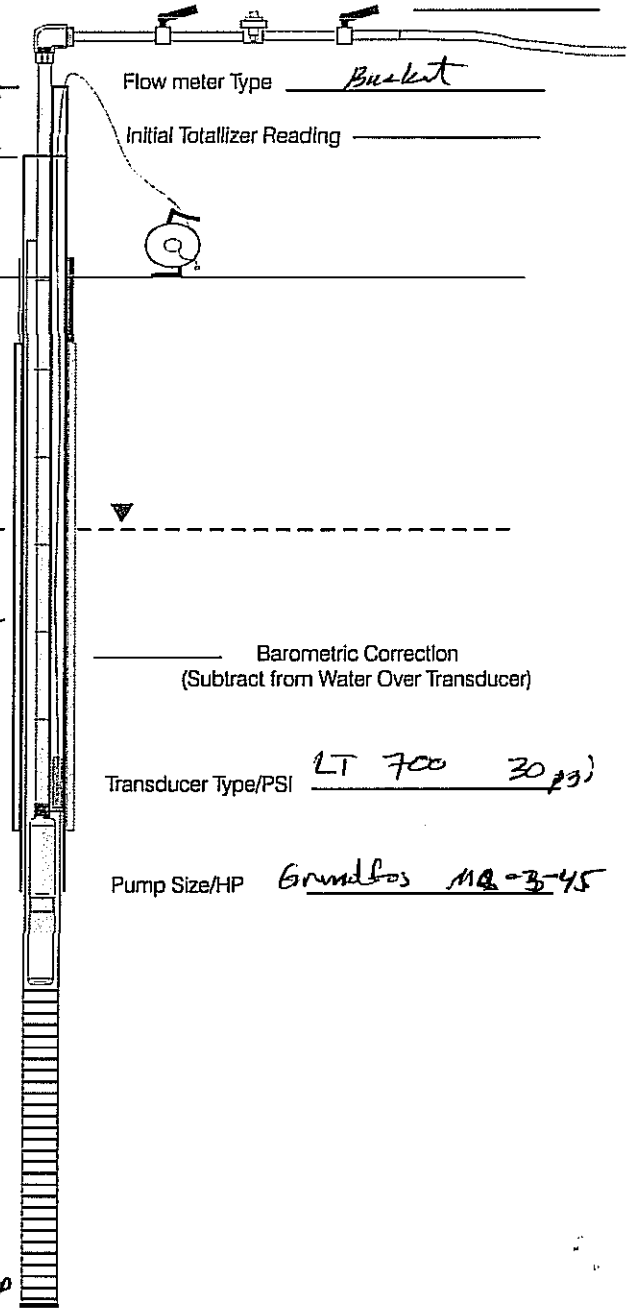
Flow meter Type Bucket

Initial Totallizer Reading _____

Stilling Tube Stick-up above top of casing N/A

Casing Stick-up above ground surface (ags) 27" Ags

Ground Surface



Static Water Level (SWL) Depth 10.91

New log = 5.558

Water Over Transducer (Transducer Depth - SWL) 5.57 ~~5.570~~

Barometric Correction (Subtract from Water Over Transducer) _____

Transducer Depth 16.40 ~~16.48 DTL~~

Transducer Type/PSI LT 700 30 psi

rutabe @ TD Pump Depth _____

Pump Size/HP Grundfos MQ-3-45

Screened interval 6.4-16.4

Total Well Depth 16.40 ' pump

**AQUIFER TEST WELL SCHEMATIC DIAGRAM**

| | | | |
|---|---|---|---|
| PROJECT: | Vale 071 | DATE: | 7-26-2013 |
| WELL NAME: | YMW-11 | RECORDED BY: | KJL |

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LT-700 SN 153078

Suction type pump. schematic does not apply

# AQUIFER TEST DATA (Cont.)

## Transducer Setup / Calibration

Test Name YMW-11 PUMP Data Logger Type (Test Well) LT-700 PSI/FT 30/68
Depth of Transducer _____ Initial Level Reading ~~5.570~~ (feet) 5.57
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

Test Name _____ Data Logger Type (Obs. Well) _____ PSI/FT _____
Depth of Transducer _____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____
**(see below for additional observation wells)**
Time: Computer _____ Transducer 1 _____ Transducer 2 _____ Watch 1 _____
NA Watch 2 _____ Other _____

## Additional Observation Well/Transducer Descriptions

Obs. Well ID _____ Dist. From Pumping Well (ft) _____ Direction _____
Desc. of MP _____
Grnd Surface Elev.(ft) _____ Stick-up Elev.(ft) _____
SWL below MP(ft) _____ SWL below Grnd Surface(ft) _____

Test Name _____ Data Logger Type (Obs. Well) _____ PSI/FT _____
Depth of Transducer _____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

Obs. Well ID _____ Dist. From Pumping Well (ft) _____ Direction _____
Desc. of MP _____
Grnd Surface Elev.(ft) _____ Stick-up Elev.(ft) _____
SWL below MP(ft) _____ SWL below Grnd Surface(ft) _____

Test Name _____ Data Logger Type (Obs. Well) _____ PSI/FT _____
Depth of Transducer _____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

Obs. Well ID _____ Dist. From Pumping Well (ft) _____ Direction _____
Desc. of MP _____
Grnd Surface Elev.(ft) _____ Stick-up Elev.(ft) _____
SWL below MP(ft) _____ SWL below Grnd Surface(ft) _____

Test Name _____ Data Logger Type (Obs. Well) _____ PSI/FT _____
Depth of Transducer _____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

# AQUIFER TEST DATA (Cont.)

Project Yale O:1 Personnel KSL

Well Tested YMW-11 Test Date 7-26-2013 Well Observed

Test Start Time: Test Stop Time:

| Date | Time | SWL | ~~FF~~ TOC | Q gpm | Notes | | |
|---|---|---|---|---|---|---|---|
| 7-26-2013 | 1220 | | | | started log, started pump to prime, stop | | |
| | 1230 | | | | attempted to prime for 10 min. not primed | | |
| | 1250-1253 | | | | pump run 1250 to 1253, turned off transducer | | |
| 1325 | elapsed 0 | New Log | | YMW-11 pump | start new test; pump started 5 seconds after log | | |
| | :30 | 11.41 | | | | | |
| | 1:00 | 11.65 | ~~1.25~~ | 1.25 gpm | | | |
| | :30 | 11.92 | | | | | |
| | 2:00 | 12.30 | | 1.0 gpm | | | |
| | 3:00 | 12.80 | | 1.0 gpm | | | |
| | 3:30 | 13.05 | | 1.0 gpm | | | |
| | 4:00 | 13.18 | | | | | |
| | 4:30 | 13.37 | 3.076 | 1.25 gpm | | | |
| | 5:00 | ~~[illegible]~~ | | 1.25 gpm | | | |
| | 5:30 | 13.6 | | | | | |
| | 6:30 | 13.75 | 2.70 | | | | |
| | 7:00 | 13.82 | | | | | |
| | 8:00 | 13.95 | | 1 gpm | | | |
| | 9:00 | 14.05 | | 1 gpm | | | |
| | 10:00 | 14.11 | 2.35 | | | | |
| | 15:00 | ~~[illegible]~~ | | 0.75 gpm | | | |
| | 16:30 | 14.30 | | | | | |
| | 20:00 | 14.35 | 2.125 | (0.5 gal/40) 0.75 gpm | | | |
| | 30:00 | 14.44 | 2.029 | (0.5 gal 45s) 0.66 gpm | | | |
| | 40:00 | 14.49 | 1.983 | (0.5 gal/35s) 0.85 gpm | | | |
| | 50:00 | 14.18 | | 0.55 gpm (0.5 gal/55s) | | | |
| | 53 | | | pump off "alarm" condition off ≈ 10 seconds | | | |
| | 54:56 | | | restarted log scale | | | |
| | 57:00 | 13.71 | | | | | |
| | 59:00 | 13.68 | | | | | |
| | 60 | 13.57 | | (0.25 gal/32s) 0.46 gpm | | | |

REMARKS

63 open valve to 0.75 gpm

# AQUIFER TEST DATA (Cont.)

Project Yale Oil Personnel

Well Tested YMW-11 Test Date 7-26-13 Well Observed

Test Start Time: elapsed Test Stop Time:

| Time | Date | Time | SWL | LT 7000 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 65:00 | | | draw to intake | | | | |
| | | 66 | | | close valve | Q=0.75 gpm | | | |
| | | 69 | 15.34 | | WL rising | pump dropped | | | |
| | | 70 | | | pump back on | | | | |
| | | 73 | dry | 0.330 | dry | - pump surging | | | |
| 14:40 | | | | | start recovery | ; stop pump | | | |
| | | 75 | 14.25 | | | | | | |
| | | 75:30 | 14.12 | | | | | | |
| | | 76 | 13.60 | | | | | | |
| | | 76:30 | 13.19 | | | | | | |
| | | 77:00 | 12.75 | | | | | | |
| | | 78:30 | 11.91 | | | | | | |
| | | 80:00 | 11.51 | | | | | | |
| | | 83:00 | 11.27 | | | | | | |
| 1455 | | | 10.91 | | pulled troll | ; stopped log | | | |

REMARKS

# STANDARD OPERATING PROCEDURE FORM

## AQUIFER TEST DATA FORM©

## HF-FORM-400

Project Yale Personnel JB, TS

Well Tested YMW-11 Test Date 10-4-13 Wells Observed YMW-11

### Test Description

Test Type: (circle)

1. Pumping Well (PW) Step Test 2. PW Drawdown 3. PW Recovery 4. Other Slug

Pump hp. & type _____ Pump Depth(ft) _____

Pump Installation Date/Time _____ Pump Removal Date _____

Avg. Discharge(gpm)____ Test Duration(min)_____ Max WL Change(ft)_____

Water Quality Sample Taken? yes (no) Sample # _____ Date/time _____

Specific Conductance(umhos/cm @25 C)_____ Temp( C)_____

### Test Well Description

(See Diagram Next Page & Include in Field Book)

Borehole Dia.(in) 8 Well Dia.(in) 4 Well Depth (ft) ~15

Perforated Zone(s) (ft) ~5-15 Desc. of MP PVC

GS Elev.(ft) _____ Stick-up Elev.(ft)_____ Stilling Tube Elev.(ft)_____

SWL below MP(ft) 9.78 SWL below GS(ft)_____ Date/Time _____

### Observation Well Description

Obs. Well ID _____ Dist. From Pumping Well (ft)_____ Direction_____

Desc. of MP_____

Grnd Surface Elev.(ft)_____ Stick-up Elev.(ft)_____

SWL below MP(ft) _____ SWL below Grnd Surface(ft)_____

(see sheet three for additional observation wells)

### Flow Meter Description

Flow Meter Type: (circle)

1. Omega Paddle Wheel 1" 2" 4" 6" 8" 2. Totalizer 3. Other_____

Paddle Wheel Data Logger:

Unit: gpm K-Factor: _____ Output: 4 MA (low) = _____ 20 MA (high) = _____

Totalizer start reading _____ date/time _____

Totalizer Final reading _____ date/time _____

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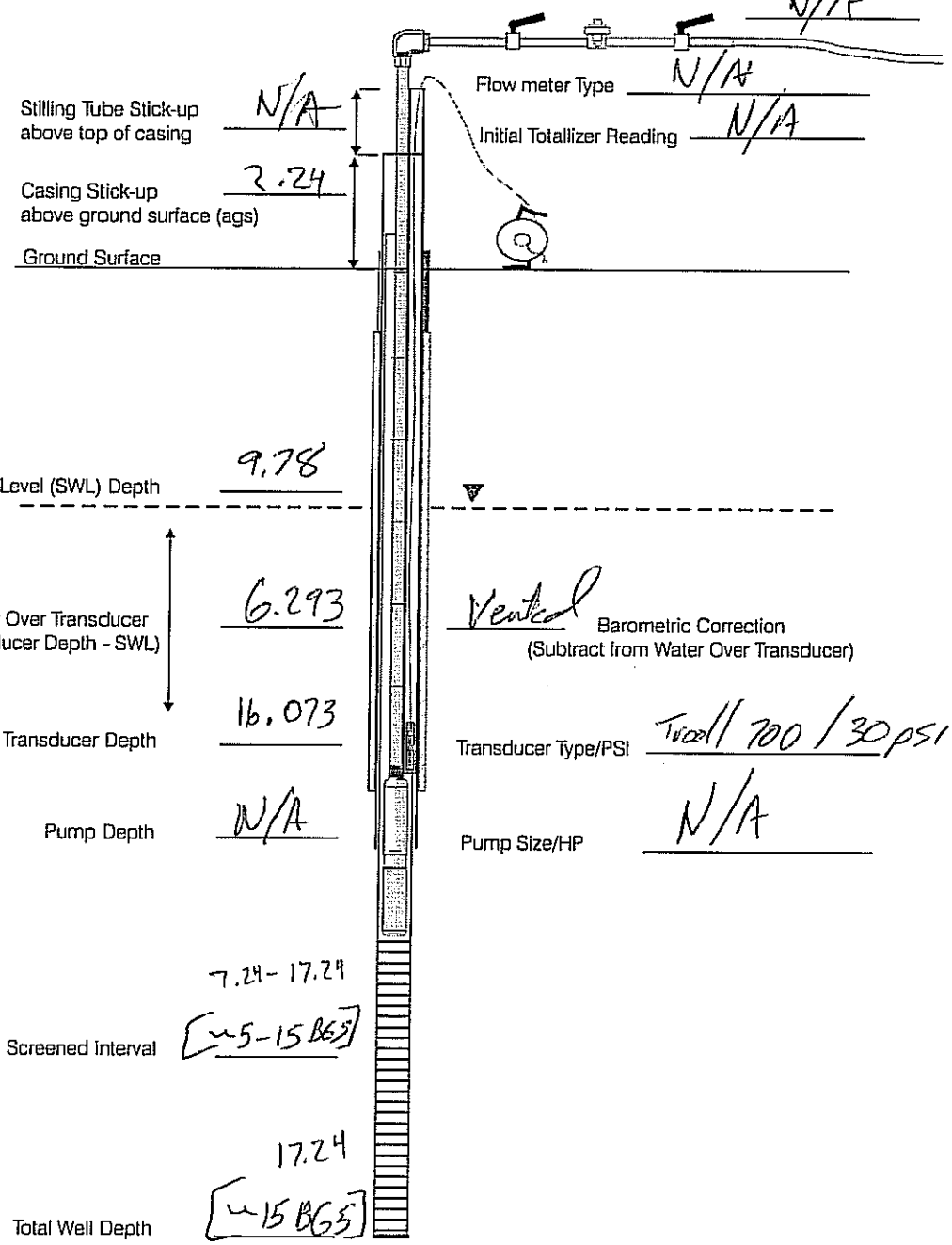


**AQUIFER TEST WELL SCHEMATIC DIAGRAM**

| | | | |
|---|---|---|---|
| PROJECT: | Yule | DATE: | 10-4-13 |
| WELL NAME: | YMW-11 | RECORDED BY: | JB |

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# AQUIFER TEST DATA (Cont.)

## Transducer Setup / Calibration

Test Name YMW-11 Stage Data Logger Type (Test Well) YMW-11 PSI/FT 30
Depth of Transducer _____ Initial Level Reading _____ (_____)
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

Test Name _____ Data Logger Type (Obs. Well) _____ PSI/FT _____
Depth of Transducer _____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____
(see below for additional observation wells)
Time: Computer _____ Transducer 1 _____ Transducer 2 _____ Watch 1 ____
Watch 2 ____ Other _____

## Additional Observation Well/Transducer Descriptions

Obs. Well ID _____ Dist. From Pumping Well (ft) _____ Direction _____
Desc. of MP _____
Grnd Surface Elev.(ft) _____ Stick-up Elev.(ft) _____
SWL below MP(ft) _____ SWL below Grnd Surface(ft) _____

Test Name _____ Data Logger Type (Obs. Well) _____ PSI/FT _____
Depth of Transducer _____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

Obs. Well ID _____ Dist. From Pumping Well (ft) _____ Direction _____
Desc. of MP _____
Grnd Surface Elev.(ft) _____ Stick-up Elev.(ft) _____
SWL below MP(ft) _____ SWL below Grnd Surface(ft) _____

Test Name _____ Data Logger Type (Obs. Well) _____ PSI/FT _____
Depth of Transducer _____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

Obs. Well ID _____ Dist. From Pumping Well (ft) _____ Direction _____
Desc. of MP _____
Grnd Surface Elev.(ft) _____ Stick-up Elev.(ft) _____
SWL below MP(ft) _____ SWL below Grnd Surface(ft) _____

Test Name _____ Data Logger Type (Obs. Well) _____ PSI/FT _____
Depth of Transducer _____ Initial Level Reading _____
Raise 1' Reading _____ Raise 2' Reading _____ Date/Time _____

# AQUIFER TEST DATA (Cont.)

Project Yale Personnel JB T,S

Well Tested YMW-11 Test Date 12-14-13 Well Observed YMW-11

Test Start Time: 1331 Test Stop Time: 1410

| Date | Time | SWL | Comments | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10-4-13 | 1322 | 9.78 | Removed | Adjusted | Tubing | | | |
| | | | Install Troll 700 | depth | : | | 6.293' | |
| | 1328 | 9.79 | | | | | 6.315 | |
| | 1331 | — | Slug In | | | | | |
| | 1332:30 | 9.51 | | | | | | |
| | 1333 | 9.57 | | | | | | |
| | 1335 | 9.66 | | | | | | |
| | 1336 | 9.68 | | | | | | |
| | 1337 | 9.70 | | | | | | |
| | 1338 | 9.72 | | | | | | |
| | 1340 | 9.75 | | | | | | 6.369 |
| | 1341 | 9.76 | | | | | | 6.356 |
| | 1345 | — | slug Out | | | | | |
| | 1349 | 10.02 | | | | | | 6.097 |
| | 1351 | 9.97 | | | | | | 6.167 |
| | 1356 | 9.88 | | | | | | 6.245 |
| | 1359 | 9.85 | | | | | | 6.280 |
| | 1402 | 9.82 | | | | | | 6.300 |
| | 1405 | 9.82 | | | | | | 6.305 |
| | 1410 | 9.80 | — Stop Test | | | | | |

REMARKS

# APPENDIX F

# RI PHOTOS

Remedial Investigation Report
Yale Oil Refinery

# SHALLOW SOIL SAMPLING PHOTOS

IMGP0309.Grid 102C.JPG

IMGP0310.Grid 102NE.JPG

IMGP0311.Grid 102NW.JPG

IMGP0312.Grid 102NW.JPG

GP0313.Grid 103NW stake.JF

IMGP0314.Grid 103C.JPG

IGP0315.Grid 103NE area.JP

GP0316.Grid 103NE offset.JF

IMGP0317.Grid 87C_1.JPG

IMGP0318.Grid 87C_2.JPG

IMGP0319.Grid 87C_3.JPG

IMGP0320.Grid 87C_4.JPG

IMGP0321.Grid 87NE.JPG

IMGP0322.Grid 87SW.JPG

IMGP0323.Grid 87SE.JPG

IMGP0324.Grid 87NE.JPG

IMGP0325.Grid 66NW.JPG

IMGP0326.Grid 66SE.JPG

IMGP0327.Grid 66SW.JPG

IMGP0328.Grid 66C.JPG

IMGP0796.Grid 8C.JPG

IMGP0797.Grid 8NE.JPG

IMGP0798.Grid 8NW.JPG

IMGP0799.Grid 8SE.JPG

IMGP0800.Grid 8SW.JPG

IMGP0801.Grid 7C.JPG

IMGP0802.Grid 7NW.JPG

IMGP0803.Grid 7SW.JPG

IMGP0805.Grid 7SE.JPG

IMGP0806.Grid 6C.JPG

IMGP0807.Grid 6NE.JPG

IMGP0808.Grid 6NW.JPG

IMGP0810.Grid 6SW.JPG

IMGP0812.Grid 6SE.JPG

IMGP0813.Grid 5C.JPG

IMGP0814.Grid 5NE.JPG

IMGP0815.Grid 5NW.JPG

IMGP0817.Grid 5SW.JPG

IMGP0819.Grid 5SE.JPG

IMGP0821.Grid C.JPG

IMGP0822.Grid.JPG

IMGP0823.Grid 4NW.JPG

IMGP0825.Grid 4SW.JPG

IMGP0826.Grid 4SE.JPG

IMGP0827.Grid 11C.JPG

IMGP0829.Grid 11SW.JPG

IMGP0830.Grid 11SE.JPG

IMGP0831.Grid ___ area.JPG

833.Grid 12 areawide Southea

IMGP0834.Grid 12NE.JPG

GP0835,Grid 12NW__ area.JI

IMGP0836.Grid 12SW.JPG

IMGP0837.Grid 12SE.JPG

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IMGP0929.Grid 36NW.JPG

IMGP0930.Grid 36NE.JPG

IMGP0932.Grid 36SE.JPG

IMGP0933.Grid 36SW.JPG

IMGP0331.Grid 65SE.JPG

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IMGP0333.Grid 65NW.JPG

IMGP0334.Grid 65NE.JPG

IMGP0337.Grid 65C.JPG

IMGP0338.Grid 64C.JPG

IMGP0339.Grid 64SW.JPG

IMGP0340.Grid 64SE.JPG

IMGP0342.Grid 64NE.JPG

IMGP0345.Grid 64NW.JPG

IMGP0348.Grid 76NW.JPG

IMGP0349.Grid 76C.JPG

IMGP0350.Grid76SE.JPG

IMGP0352.Grid 76SW.JPG

IMGP0353.Grid 76SE.JPG

IMGP0354.Grid 76NE.JPG

IMGP0838.Grid 13C.JPG

IMGP0839.Grid 13NE.JPG

IMGP0840.Grid 13NW.JPG

IMGP0841.Grid 13SW.JPG

IMGP0845Grid 13SE.JPG

IMGP0850.Grid 14C.JPG

IMGP0851.Grid 14NE.JPG

IMGP0852.Grid 14NW.JPG

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IMGP0856.Grid 15NE.JPG

IMGP0857.Grid 15NW.JPG

IMGP0858.Grid 15SW.JPG

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IMGP0860.Grid 16C.JPG

IMGP0861.Grid 16NE.JPG

IMGP0862.Grid 16NW.JPG

IMGP0863.Grid 16SW.JPG

IMGP0864.Grid 16SE.JPG

IMGP0865.Grid 17C.JPG

IMGP0866.Grid 17SW.JPG

IMGP0867.Grid 17SE.JPG

IMGP0868.Grid 17NW.JPG

IMGP0869.Grid 17NE.JPG

IMGP0870.Grid 18C.JPG

IMGP0871.Grid 18NE.JPG

IMGP0873.Grid 18NW.JPG

IMGP0874.Grid 18SW.JPG

IMGP0875.Grid 18SE.JPG

IMGP0876.Grid 25C.JPG

IMGP0877.Grid 25NW.JPG

IMGP0878.Grid 25SW.JPG

IMGP0879.Grid 25NE.JPG

IMGP0880.Grid 25SE.JPG

IMGP0934.Grid 23C.JPG

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IMGP0936.Grid 23NW.JPG

IMGP0937.Grid 23SW.JPG

IMGP0938.Grid 23SE.JPG

IMGP0939.Grid 38C.JPG

IMGP0940.Grid 38NE.JPG

IMGP0941.Grid 38NW.JPG

IMGP0942.Grid 38SW.JPG

IMGP0943.Grid 38SE.JPG

IMGP0945.Grid 9C.JPG

IMGP0947.Grid 9NW.JPG

IMGP0948.Grid 9NE.JPG

IMGP0949.Grid 9SE.JPG

IMGP0950.Grid 9SW.JPG

IMGP0951.Grid 39C.JPG

IMGP0952.Grid 39NE.JPG

IMGP0953.Grid 39NW.JPG

IMGP0955.Grid 39SW.JPG

IMGP0956.Grid 39SE.JPG

IMGP0957.Grid 2C.JPG

IMGP0958.Grid 2NW.JPG

IMGP0959.Grid 2NE.JPG

IMGP0960.Grid 2SE.JPG

IMGP0961.Grid 2SW.JPG

IMGP0962.Grid 1C.JPG

IMGP0963.Grid 1NW.JPG

IMGP0964.Grid 1NE.JPG

IMGP0965.Grid 1SE.JPG

IMGP0966Grid 1SW.JPG

IMGP0967Grid 3C.JPG

IMGP0968.Grid 3NW.JPG

IMGP0969.Grid 3NE.JPG

IMGP0970.Grid 3SE.JPG

IMGP0971.Grid 3SW.JPG

IMGP0358.Grid 108NW.JPG

IMGP0359.Grid 108NE.JPG

IMGP0362.Grid 109C.JPG

IMGP0364.Grid 109NE.JPG

MGP0366.Grid 109NW_2.JPG

IMGP0368.Grid 101NW.JPG

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IMGP0370.Grid 101SW.JPG

IMGP0372.Grid 102NE.JPG

IMGP0374.Grid 86C.JPG

IMGP0375.Grid 86NW.JPG

IMGP0377.Grid 86SW.JPG

IMGP0380.Grid 86SE.JPG

IMGP0384.Grid 85C.JPG

IGP0385.Grid 85NW area.JP

IMGP0387.Grid 85NE.JPG

IGP0389.Grid 85SE area.JP

IGP0397.Grid 85SW area.JP

IMGP0398.Grid 98C.JPG

IMGP0401.Grid 98SE.JPG

IMGP0402.Grid 98SW.JPG

IMGP0404.Grid 98NW.JPG

IMGP0407.Grid 98NE.JPG

IMGP0409.Grid 81C.JPG

IMGP0410.Grid 81NW.JPG

IMGP0415.Grid 81NE.JPG

IMGP0421.Grid 81SE.JPG

IMGP0423.Grid 81SW.JPG

IMGP0881.Grid 30NE.JPG

IMGP0882.Grid 30NW.JPG

IMGP0883.Grid 30C.JPG

IMGP0884.Grid 30SW.JPG

IMGP0885.Grid 30SE.JPG

IMGP0886.Grid 29C.JPG

IMGP0887.Grid 29SW.JPG

IMGP0888.Grid 29SE.JPG

IMGP0889.Grid 29NW.JPG

IMGP0890.Grid 29NE.JPG

MGP0893.Grid 45C stake.JPC

/GP0894.Grid 45NE stake.JP

IMGP0895.Grid 45NW.JPG

IMGP0896. Grid 45SW.JPG

IMGP0897.Grid 45SE.JPG

IMGP0898.Grid 44C.JPG

/GP0900.Grid 44NE stake.JP

1GP0901.Grid 44NW stake.JP

02.Grid 44SW outside TEL fer

)04.Grid 44SE outside TEL fer

IMGP0972.Grid 40C.JPG

IMGP0973.Grid 40NW.JPG

IMGP0974.Grid 40NE.JPG

IMGP0975.Grid 40SE.JPG

IMGP0976.Grid 40SW.JPG

IMGP0977.Grid 26C.JPG

IMGP0978.Grid 26SW.JPG

IMGP0979.Grid 26SE.JPG

IMGP0980.Grid 26NW.JPG

IMGP0981.Grid 26NE.JPG

IMGP0982.Grid 27C.JPG

IMGP0983.Grid 27NW.JPG

IMGP0984.Grid 27NE.JPG

IGP0985.Grid 27SW stake.JP

IGP0986.Grid 27SE stake.JP

IMGP0987.Grid 28C.JPG

IMGP0988.Grid 28NE.JPG

IMGP0989.Grid 28NW.JPG

IMGP0990.Grid 28SE.JPG

IMGP0991.Grid 28SW.JPG

IMGP0992.Grid 41C.JPG

IMGP0993.Grid 41NW.JPG

IMGP0994.Grid 41NE.JPG

IMGP0995.Grid 41SE.JPG

IMGP0996.Grid 41SW.JPG

IMGP0997.Grid 42C.JPG

IMGP0998.Grid 42NW.JPG

IMGP0999.Grid 42NE.JPG

IMGP1000.Grid 42SE.JPG

IMGP1001.Grid 42SW.JPG

IMGP0424.Grid 100SE.JPG

IMGP0427.Grid 100SW.JPG

IMGP0430.Grid 100NW.JPG

IMGP0432.Grid 100C.JPG

MGP0435.Grid 100NE_2.JPG

IMGP0436.Grid 99C.JPG

IMGP0439.Grid 99NE.JPG

IMGP0442.Grid 99NW.JPG

IMGP0445.Grid 99SW.JPG

IMGP0448.Grid 99SE.JPG

IMGP0450.Grid 97C.JPG

IMGP0452.Grid 97NE.JPG

IMGP0454.Grid 97NW.JPG

IMGP0457.Grid 97SW.JPG

IMGP0459.Grid 84C_2.JPG

IMGP0461.Grid 84SE.JPG

IMGP0463.Grid 84SW.JPG

IMGP0468.Grid 84NW.JPG

IMGP0470.Grid 84NE.JPG

IMGP0473.Grid 83C_1.JPG

IMGP0476.Grid 83NE.JPG

IMGP0478.Grid 83NW.JPG

IMGP0481.Grid 83SW.JPG

IMGP0483.Grid 83SE.JPG

IMGP0485.Grid 67NW_1.JPG

IMGP0487.Grid 67NE_1.JPG

IMGP0489.Grid 67SE_1.JPG

IMGP0491.Grid 67SW_1.JPG

IGP0494.Grid 67C stake_2.JP

IMGP0497.Grid 68NW_1.JPG

MGP0499.Grid 68C stake.JPC

IMGP0503.Grid 68NE.JPG

IMGP0506.Grid 68SE_2.JPG

IMGP0509.Grid 68SW.JPG

GP0511.Grid 69SE stake_2.JI

IMGP0516.Grid 69NE.JPG

IMGP0518.Grid 69C.JPG

IMGP0520.Grid 69NW.JPG

IMGP0524.Grid 69SW_2.JPG

IMGP0526.Grid 70SW.JPG

IMGP0528.Grid 70C.JPG

IMGP0530.Grid 70SE.JPG

IMGP0532.Grid 70C.JPG

IMGP0534.Grid 70NW_2.JPG

IMGP0537.Grid 70NE.JPG

IMGP0540.Grid 35NW.JPG

IMGP0541.Grid 35SW.JPG

IMGP0542.Grid 35SE.JPG

IMGP0545.Grid 35NE.JPG

IMGP0546.Grid 35SW.JPG

IMGP0547.Grid 34NE_2.JPG

IMGP0552.Grid 34NW_2.JPG

IMGP0554.Grid 34C_1.JPG

IMGP0556.Grid 34SW_1.JPG

IMGP0561.Grid 34SE_2.JPG

IMGP0573.Grid 48C_1.JPG

IMGP0575.Grid 48NE_1.JPG

IMGP0577.Grid 48NW_2.JPG

GP0580.Grid 48SW Stake_2.J

IMGP0582.Grid 48SE.JPG

IMGP0583.Grid 47C_2.JPG

IMGP0587.Grid 47NE_1.JPG

IMGP0590.Grid 47NW_1.JPG

IMGP0593.Grid 47SW.JPG

IGP0594.Grid 47SE stake.JP

IMGP0597.Grid 32C.JPG

IMGP0598.Grid 32NW_2.JPG

IMGP0601.Grid 32SW.JPG

IMGP0603Grid 32SE.JPG

IMGP0605.Grid 32NE.JPG

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IMGP0612.Grid 58C.JPG

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IMGP0619.Grid 10SW.JPG

IMGP0621.Grid 57NE.JPG

IMGP0623.Grid 57C.JPG

IMGP0624.Grid 57SW.JPG

IMGP0626.Grid 57NW.JPG

IMGP0628.Grid 57SE.JPG

IMGP0629.Grid 56C_1.JPG

IMGP0633.Grid 56SW.JPG

IMGP0634_B.Grid 56NE.JPG

IMGP0639.Grid 56SE.JPG

IMGP0640.Grid 55C.JPG

IMGP0645.Grid 55NW.JPG

IMGP0647.Grid 55SW.JPG

IMGP0649.Grid 55SE.JPG

IGP0651.Grid 54NW stake.JP

IMGP0653.Grid 54SW.JPG

IMGP0656.Grid 54SE_2.JPG

IGP0658.Grid 54NE stake.JP

IMGP0660.Grid 54C.JPG

IMGP0661.Grid 53C.JPG

IGP0663.Grid 53NE stake.JP

IGP0665.Grid 53NW stake.JP

IMGP0667.Grid 53SW_1.JPG

IMGP0669.Grid 53SE_1.JPG

IMGP0671.Grid 59NW.JPG

IMGP0672.Grid 59NE.JPG

IMGP0673.Grid 59SE.JPG

IMGP0676.Grid 59SW.JPG

IMGP0677.Grid 59C.JPG

IMGP0679.Grid 60SW.JPG

IMGP0680.Grid 60NW.JPG

IMGP0683.Grid 60NE_2.JPG

IMGP0685.Grid 60C_2.JPG

IMGP0689.Grid 72C.JPG

IMGP0690.Grid 72NW.JPG

IMGP0691.Grid 72SW.JPG

IMGP0692.Grid 72SE.JPG

IMGP0693.Grid 72NE.JPG

IMGP0694.Grid 63C.JPG

IMGP0695.Grid 63NE.JPG

IMGP0696.Grid 63NW.JPG

IMGP0699.Grid 63SW.JPG

IMGP0702.Grid 63SE.JPG

IMGP0704.Grid 62C_2.JPG

IMGP0706.Grid 62NE.JPG

IMGP0707.Grid 62NW.JPG

IMGP0708.Grid 62SE_1.JPG

IMGP0711.Grid 62SW_1.JPG

IMGP0719.Grid 61C_2.JPG

IMGP0720.Grid 61NW.JPG

IMGP0726.Grid 61NE.JPG

IMGP0727.Grid 73C.JPG

IMGP0730.Grid 73SE.JPG

IMGP0731.Grid 73NE.JPG

IMGP0732.Grid 73NW.JPG

IMGP0737.Grid 73SW.JPG

)739.Grid 33C_orig planned lo

IMGP0741.Grid 33NW.JPG

IMGP0742.Grid 33SW.JPG

)744Grid 33NE orig planned lo

IMGP0745.Grid 33SE.JPG

IMGP0747Grid 49C flag.JPG

IMGP0748.Grid 49SW.JPG

IMGP0750.Grid 49SE.JPG

IMGP0752.Grid 49NE.JPG

IMGP0754Grid 49NW.JPG

IMGP0758.Grid 50NW.JPG

IMGP0760.Grid 50SW.JPG

IMGP0761.Grid 50SE_1.JPG

IMGP0763.Grid 50NE.JPG

IMGP0766.Grid 50C.JPG

IMGP0767.Grid 51C.JPG

IMGP0769.Grid 51NW.JPG

IMGP0771.Grid 51NE.JPG

IMGP0773.Grid 51SE.JPG

IMGP0775.Grid 51SW.JPG

IMGP0778.Grid 19NW.JPG

IMGP0780.Grid 19SW.JPG

IMGP0784.Grid 31C.JPG

IMGP0785.Grid 31SE.JPG

IMGP0786.Grid 31SW.JPG

IMGP0787.Grid 31NW.JPG

IMGP0788.Grid 31NE.JPG

IMGP0790.Grid 46NE.JPG

IMGP0791.Grid 46NW.JPG

IMGP0792.Grid 46C.JPG

IMGP0793.Grid 46SE.JPG

IMGP0794.Grid 46SW.JPG

IMGP0228.Grid 93C.JPG

IMGP0229.Grid 93NE.JPG

IMGP0230.Grid 93NW.JPG

IMGP0232.Grid 93SW.JPG

IMGP0233.Grid 93SE.JPG

IMGP0234.Grid 94C.JPG

IMGP0235.Grid 94NE.JPG

IMGP0237.Grid 94NW.JPG

IMGP0238.Grid 94SW.JPG

IMGP0239.Grid 94SE.JPG

IMGP0240.Grid 95C.JPG

IMGP0241.Grid 95NE.JPG

IMGP0242.Grid 95NW.JPG

IMGP0244.Grid 95SW.JPG

IMGP0245.Grid 95SE.JPG

IMGP0246.Grid 96C.JPG

IMGP0247.Grid 96NE.JPG

IMGP0249.Grid 96NW.JPG

IMGP0250.Grid 96SW.JPG

IMGP0252.Grid 96SE.JPG

IMGP0253.Grid 107C.JPG

IMGP0254.Grid 107NE.JPG

IMGP0256.Grid 107SE.JPG

IMGP0257.Grid 107SW.JPG

IMGP0259.Grid 107NW.JPG

IMGP0260.Grid 106C.JPG

IMGP0261.Grid 106NE.JPG

IMGP0263.Grid 106NW.JPG

IMGP0264.Grid 106SW.JPG

IMGP0265.Grid 106SE.JPG

IMGP0266.Grid 105C.JPG

IMGP0267.Grid 105NE.JPG

IMGP0269.Grid 105NW.JPG

IMGP0270.Grid 105SW.JPG

IMGP0271.Grid 105SE.JPG

IMGP0272.Grid 104C.JPG

IMGP0273.Grid 104NE.JPG

IMGP0275.Grid 104NW.JPG

IMGP0276.Grid 104SW.JPG

IMGP0278.Grid 104SE.JPG

IMGP0279.Grid 88C.JPG

IMGP0280Grid 88NE.JPG

IMGP0282Grid 88NW.JPG

IMGP0283Grid 88SW.JPG

IMGP0284.Grid 88SE.JPG

IMGP0285.Grid 71C.JPG

IMGP0286.Grid 71NE.JPG

IMGP0288.Grid 71NW.JPG

IMGP0289.Grid 71SW.JPG

IMGP0290.Grid 71SE.JPG

IMGP0307.Grid 75SE.JPG

IMGP0306.Grid 75SW.JPG

IMGP0304.Grid 75NW.JPG

IMGP0303.Grid 75NE.JPG

IMGP0302.Grid 75C.JPG

IMGP0301.Grid 74SE.JPG

IMGP0300.Grid 74SW.JPG

IMGP0299.Grid 74NW.JPG

IMGP0297.Grid 74NE.JPG

IMGP0296Grid 74C.JPG

IMGP0295.Grid 52SE.JPG

IMGP0294.Grid 52SW.JPG

IMGP0293.Grid 52NW.JPG

IMGP0291.Grid 52NE.JPG

IMGP0290.Grid 52C.JPG

Grid 82SW.JPG

Grid 82SE.JPG

Grid 82NW.JPG

Grid 82NE.JPG

Grid 82C.JPG

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# SOIL BORINGS PHOTOS

Grid 10 Soil Boring.JPG

Grid 20 Soil Boring.JPG

Grid 50 Soil Boring.JPG

Grid 51 Soil Boring.JPG

IMGP1346.GRID 35.JPG

IMGP1347.GRID 8.JPG

IMGP1303.Grid 50.JPG

IMGP1305.Grid 49.JPG

IMGP1307.Grid 48.JPG

IMGP1309.Grid 47.JPG

IMGP1310.Grid 20.JPG

IMGP1350.GRID 5.JPG

IMGP1352.GRID 52.JPG

IMGP1315.GRID 106C.JPG

IMGP1317.GRID 107.JPG

IMGP1320.Grid 39.JPG

IMGP1328.GRID 25.JPG

IMGP1329.GRID 40.JPG

IMGP1331.GRID 27.JPG

IMGP1333.GRID 42.JPG

IMGP1334.GRID 22.JPG

IMGP1335.GRID 43.JPG

IMGP1339.GRID 47.JPG

IMGP1341.GRID 31.JPG

IMGP1343.GRID 33.JPG

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Yale Oil Refinery

# FOCUSED SAMPLING PHOTOS

|2.East fence of TEL area in s

.IMGP1002.pt720.TEL4.JPG

.IMGP1010.pt738.TEL24.JPG

IMGP1003.pt721.TEL5.JPG

IMGP1004.pt725.TEL9.JPG

IMGP1005.pt726.TEL10.JPG

IMGP1006.pt728.TEL14.JPG

IMGP1007.pt732.TEL16.JPG

IMGP1008.pt735.TEL19.JPG

IMGP1009.pt736.TEL20.JPG

IMGP1011.pt737.TEL25.JPG

IMGP1029.pt7_ _.TEL__.JPG

IMGP1030.pt739.TEL23.JPG

1031.West fenced area lt snov

.IMGP1023.pt729.TEL13.JPG

IMGP1013.pt___.TEL__.JPG

1014.West fenced area & snov

IMGP1015.pt718.TEL2.JPG

IMGP1016.pt719.TEL3.JPG

IMGP1017.pt722.TEL6.JPG

IMGP1018.pt723.TEL7.JPG

IMGP1019.pt____.TEL_.JPG

1020.West fenced area & snov

IMGP1021.pt731.TEL11.JPG

IMGP1022.pt730.TEL12.JPG

IMGP1025.pt733.TEL17.JPG

IMGP1026.pt732.TEL16.JPG

IMGP1027.pt7_ _.TEL__.JPG

IMGP1028.pt741.TEL21.JPG

IMGP1038.pt690.PS9.JPG

IMGP1038.pt692.PS11.JPG

IMGP1039.pt691.PS10.JPG

IMGP1041.pt682.PS1.JPG

IMGP1042.pt___.PS__.JPG

GP1043.NW side Office 360.JI

IGP1044.W side Office 360.JF

GP1045.SW side Office 360.JI

GP1046.WSW of Office 360.JI

IMGP1048.pt693.PS12.JPG

IMGP1049.pt694.PS13.JPG

IMGP1050.pt695.PS14.JPG

IMGP1051.pt696.PS15.JPG

IMGP1052.pt697.PS16.JPG

IMGP1053.pt698.PS17.JPG

IMGP1054.PT699.PS18.JPG

IMGP1055.pt700.PS19.JPG

IMGP1056.pt704.PS20.JPG

IMGP1057.pt703.PS21.JPG

IMGP1059.pt701.PS23.JPG

IMGP105.pt702.PS22.JPG

IMGP1032.pt683.PS2.JPG

IMGP1033.pt684.PS3.JPG

IMGP1035.pt685.PS4.JPG

IMGP1036.pt687.PS7.JPG

IMGP1037.pt686.PS8.JPG

IMGP1068.pt713.PS32.JPG

IMGP1069.pt714.PS33.JPG

IMGP1070.pt715.PS34.JPG

IMGP1071.pt716.PS35.JPG

IMGP1060.pt705.PS24.JPG

IMGP1061.pt706.PS25.JPG

IMGP1062.pt707.PS26.JPG

IMGP1063.pt708.PS27.JPG

IMGP1064.pt712.PS28.JPG

IMGP1065.pt711.PS29.JPG

IMGP1066.pt710.PS30.JPG

IMGP1067.pt709.PS31.JPG

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# AIR VAC FOR MONITORING WELLS - PHOTOS

IMGP1091.YMW19.JPG

IMGP1092.YMW18.JPG

IMGP1088.YMW19.JPG

IMGP1089.YMW19.JPG

IMGP1090.YMW19.JPG

IMGP1095.YMW15.JPG

IMGP1096_random.JPG

IMGP1097.YMW15.JPG

IMGP1098.YMW18.JPG

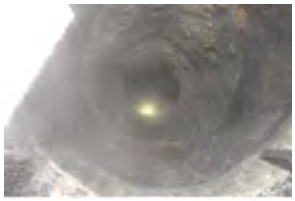
IMGP1099.YMW18.JPG

IMGP1100.YMW18.JPG

IMGP1102.YMW12.JPG

IMGP1103.YMW12.JPG

IMGP1104.YMW12.JPG


IMGP1105.YMW12.JPG

IMGP1094.YMW15.JPG

136.YMW23c air vac in-progre

SP1138.YMW23c downhole1.J

SP1139.YMW23c downhole2.J

MGP1114.YMW22 surface.JP

GP1115.YMW22 downhole1.J

GP1116.YMW22 downhole2.J

MGP1117.YMW23 surface.JP

IMGP1118.YMW23 flag.JPG

1119.YMW23 flag & fiberoptic

P1120.YMW23 P66 ppl flags1.

P1121.YMW23 P66 ppl flags2.

122.YMW23 P66 ppl flags Eas

24.YMW23 P66 ppl flags Wes

YMW23 stake-ppl flag -fiberop

1127.YMW23 fiberoptic closeu

1128.YMW23a at pile pin flags

GP1129.YMW23a pin flags.JP

P1130.YMW23 fiberoptic East.

P1131.YMW23 fiberoptic West

SP1132.YMW23a downhole1.

33.YMW23 downhole asphalt

134.YMW23b downhole1 pipi

135.YMW23b downhole2 pipi

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Yale Oil Refinery

# BORING FOR MONITORING WELLS - PHOTOS

MW14 SURFACE COVER.JP

MW14 LOOKING SOUTH.JP

YMW17.JPG

IMGP1273.JPG

IMGP1274.YMW17.JPG

YMW13 HAND AUGER.JPG

IMGP1262.JPG

MW13 EXPANDED HOLE.JP

IW13 HAND AUGER HOLE.JI

CLEARANCE HOLE BACKFIL

IMGP1275.YM22.JPG

IMGP1277.YM23.JPG

CLEARANCE HOLE BACKFIL

CLEARANCE HOLE BACKFI

IMGP1270.YMW 16.JPG

CLEARANCE HOLE BACKFI

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IMGP1280.YMW10.JPG

IMGP1282.YMW10.JPG

IMGP1285.YMW15.JPG

IMGP1286.YMW15.JPG

)IL BORING NEAR YMW10.JF

CLEARANCE HOLE BACKFI

IMGP1288.YMW21.JPG

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# SURFACE WATER PHOTOS

0716131525.YD1.jpg

16131525a.YD1 Downstream.

)716131528.YD1 Upstream.jp

0716130946a.YD5.jpg

716130946bYD5 Upstream.jp

0716130946d.YD5.jpg

0716131044.YD4.jpg

'16131258.YD4 Downstream.j

0716131258a.YD4.jpg

716131258b.YD4 Upstream.jp

0716131320.YD4.jpg

0716131320a.YD4.jpg

16131422.YD3 Downstream.j

0716131422a.YD3.jpg

0716131422b.YD3.jpg

0716131422c.YD3.jpg

)716131423.YD3 Upstream.jp

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# APPENDIX G

# DATA SUMMARY TABLES

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| ale il o out a ota ur ace oil am ling I I | | | | I . | | | H I | | | I | | | I | | | I | | | H I | | | | | | ie ed | | | | | | H | | | I | | | I | | | H | | |
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| ac ground ur ace oil alues† | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-SS-A | 0-6 | 11/7/2012 | 16:27 | 5.0 | | | 8.7 | | | 2 | | | 128 | | | < 1 | | | 16 | J | | | | | 101 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 1.8 | | |
| 2-SS-A | 0-6 | 11/7/2012 | 14:33 | 4.7 | | | 8.5 | | | 4 | | | 173 | | | < 1 | | | 21 | J | | | | | 132 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 1.8 | | |
| 2-SS-B | 6-12 | 11/7/2012 | 15:13 | 6.2 | | | 8.5 | | | 4 | | | 222 | | | < 1 | | | 22 | J | | | | | 127 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 1.8 | | |
| 2-SS-C | 12-24 | 11/7/2012 | 15:41 | 12 | | | 8.3 | | | 6 | | | 222 | | | < 1 | | | 22 | J | | | | | 40 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 1.9 | | |
| 3-SS-A | 0-6 | 11/7/2012 | 16:09 | 7.6 | | | 8.3 | | | 4 | | | 161 | | | < 1 | | | 21 | J | | | | | 114 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 1.8 | | |
| 4-SS-A | 0-6 | 10/30/2012 | 12:52 | 13 | | | 8.4 | | | 8 | | | 159 | | | < 1 | | | 28 | | | | | | 114 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 5-SS-A | 0-6 | 10/30/2012 | 11:46 | 7.9 | | | 8.5 | | | 7 | | | 208 | | | < 1 | | | 20 | | | | | | 159 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 6-SS-A | 0-6 | 10/30/2012 | 11:03 | 7.3 | | | 8.5 | | | 5 | | | 117 | | | < 1 | | | 22 | | | | | | 74 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 7-SS-A | 0-6 | 10/30/2012 | 10:29 | 9.8 | | | 8.4 | | | 5 | | | 157 | | | < 1 | | | 20 | | | | | | 62 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 8-SS-A | 0-6 | 10/30/2012 | 9:45 | 8.3 | | | 8.1 | | | 4 | | | 160 | | | < 1 | | | 22 | | | | | | 110 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 9-SS-A | 0-6 | 11/7/2012 | 10:33 | 8.2 | | | 8.1 | | | 4 | | | 186 | | | < 1 | | | 20 | J | | | | | 42 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 0.91 | | |
| 9-SS-B | 6-12 | 11/7/2012 | 11:04 | 6.8 | | | 8.4 | | | 6 | | | 192 | | | < 1 | | | 29 | J | | | | | 23 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 0.33 | | |
| 9-SS-C | 12-24 | 11/7/2012 | 12:02 | 7.9 | | | 8.4 | | | 8 | | | 178 | | | < 1 | | | 28 | J | | | | | 15 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 0.91 | | |
| 10-SS-A | 0-6 | 10/19/2012 | 13:36 | 3.8 | | | 7.9 | | | 4 | | | 158 | | | < 1 | | | 12 | | | | | | 43 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 10-SS-B | 6-12 | 10/19/2012 | 14:03 | 7.0 | | | 8.4 | | | 5 | | | 211 | | | < 1 | | | 16 | | | | | | 74 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 10-SS-C | 12-24 | 10/19/2012 | 14:35 | 11 | | | 8.1 | | | 6 | | | 206 | | | < 1 | | | 21 | | | | | | 54 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 11-SS-A | 0-6 | 10/30/2012 | 13:43 | 8.1 | | | 7.9 | | | 4 | | | 203 | | | < 1 | | | 19 | | | | | | 339 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 11-SS-AD | 0-6 | 10/30/2012 | 13:45 | 6.6 | | | 8.0 | | | 4 | | | 170 | | | < 1 | | | 18 | | | | | | 323 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 12-SS-A | 0-6 | 10/30/2012 | 14:11 | 4.7 | | | 8.1 | | | 5 | | | 225 | | | < 1 | | | 24 | | | | | | 695 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 12-SS-B | 6-12 | 10/30/2012 | 15:03 | 4.9 | | | 8.3 | | | 5 | | | 232 | | | < 1 | | | 23 | | | | | | 342 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 12-SS-C | 12-24 | 10/30/2012 | 15:37 | 9.4 | | | 8.2 | | | 5 | | | 171 | | | < 1 | | | 24 | | | | | | 372 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 13-SS-A | 0-6 | 10/31/2012 | 11:25 | 15 | | | 8.3 | | | 6 | | | 178 | | | < 1 | | | 35 | | | | | | 373 | | | | | | 2 | | | < 1 | | | < 1 | | | | | |
| 14-SS-A | 0-6 | 10/31/2012 | 11:57 | 9.8 | | | 8.6 | | | 7 | | | 151 | | | < 1 | | | 25 | | | | | | 220 | | | | | | 1 | | | < 1 | | | < 1 | | | | | |
| 15-SS-A | 0-6 | 10/31/2012 | 12:54 | 3.6 | | | 8.1 | | | 5 | | | 103 | | | < 1 | | | 15 | | | | | | 123 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 16-SS-A | 0-6 | 10/31/2012 | 13:20 | 12 | | | 8.2 | | | 6 | | | 189 | | | < 1 | | | 20 | | | | | | 99 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 17-SS-A | 0-6 | 10/31/2012 | 13:47 | 15 | | | 7.9 | | | 5 | | | 135 | | | < 1 | | | 17 | | | | | | 36 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 18-SS-A | 0-6 | 10/31/2012 | 14:41 | 12 | | | 8.1 | | | 7 | | | 156 | | | < 1 | | | 21 | | | | | | 296 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 19-SS-A | 0-6 | 10/25/2012 | 16:55 | 15 | | | 8.1 | | | 5 | | | 226 | | | < 1 | | | 15 | | | | | | 167 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 20-SS-A | 0-6 | 11/6/2012 | 11:00 | 12 | | | 7.9 | | | 9 | | | 356 | | | < 1 | | | 28 | | | | | | 541 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 1.9 | | |
| 20-SS-B | 6-12 | 11/6/2012 | 11:25 | 17 | | | 8.1 | | | 7 | | | 271 | | | < 1 | | | 22 | | | | | | 198 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 1.0 | | |
| 20-SS-C | 12-24 | 11/6/2012 | 11:50 | 18 | | | 8.5 | | | 6 | | | 195 | | | < 1 | | | 29 | | | | | | 45 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 0.33 | | |
| 21-SS-A | 0-6 | 11/6/2012 | 9:42 | 4.7 | | | 8.1 | | | 5 | | | 557 | | | < 1 | | | 28 | | | | | | 354 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.5 | | |
| 21-SS-B | 6-12 | 11/6/2012 | 10:00 | 10 | | | 8.5 | | | 47 | | | 3390 | | D | 1 | | | 50 | | | | | | 692 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 0.93 | | |
| 21-SS-C | 12-24 | 11/6/2012 | 10:20 | 15 | | | 8.5 | | | 40 | | | 191 | | | < 1 | | | 28 | | | | | | 85 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 0.33 | | |
| 22-SS-A | 0-6 | 11/6/2012 | 13:30 | 5.8 | | | 8.1 | | | 4 | | | 196 | | | < 1 | | | 21 | | | | | | 121 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.5 | | |
| 22-SS-B | 6-12 | 11/6/2012 | 14:10 | 5.8 | | | 8.2 | | | 3 | | | 116 | | | < 1 | | | 17 | | | | | | 60 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.5 | | |
| 22-SS-C | 12-24 | 11/6/2012 | 15:33 | 8.9 | | | 8.3 | | | 4 | | | 170 | | | < 1 | | | 18 | | | | | | 44 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.7 | | |
| 23-SS-A | 0-6 | 11/7/2012 | 9:34 | 7.6 | | | 7.7 | | | 5 | | | 188 | | | 1 | | | 25 | J | | | | | 174 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.6 | | |
| 25-SS-A | 0-6 | 10/31/2012 | 15:22 | 12 | | | 9.4 | | | 5 | | | 149 | | | < 1 | | | 20 | | | | | | 4060 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 25-SS-B | 6-12 | 10/31/2012 | 15:56 | 16 | | | 8.8 | | | 7 | | | 173 | | | < 1 | | | 50 | | | | | | 7340 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 25-SS-C | 12-24 | 10/31/2012 | 16:30 | 9.6 | | | 9.3 | | | 7 | | | 180 | | | < 1 | | | 25 | | | | | | 8870 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 26-SS-A | 0-6 | 11/8/2012 | 9:35 | 6.8 | | | 8.4 | | | 11 | | | 152 | | | < 1 | | | 26 | | | 1270 | | | 1870 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 26-SS-B | 6-12 | 11/8/2012 | 10:05 | 9.0 | | | 8.0 | | | 7 | | | 194 | | | < 1 | | | 23 | | | 2780 | | | 1870 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 26-SS-C | 12-24 | 11/8/2012 | 10:50 | 9.0 | | | 8.0 | | | 8 | | | 143 | | | < 1 | | | 24 | | | 4120 | | | 3080 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 27-SS-A | 0-6 | 11/8/2012 | 15:00 | 7.1 | | | 8.1 | | | 10 | | | 401 | | | < 1 | | | 32 | | | 325 | | | 439 | J | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.6 | | |
| 28-SS-A | 0-6 | 11/8/2012 | 13:30 | 7.9 | | | 8.2 | | | 9 | | | 170 | | | < 1 | | | 27 | | | 297 | | | 258 | J | | | | | < 1 | | | < 1 | | | < 1 | | | < 1.8 | | |
| 28-SS-B | 6-12 | 11/8/2012 | 13:42 | 9.8 | | | 8.5 | | | 8 | | | 203 | | | < 1 | | | 27 | | | 158 | | | 210 | J | | | | | < 1 | | | < 1 | | | < 1 | | | < 1.9 | | |
| 28-SS-C | 12-24 | 11/8/2012 | 14:15 | 12 | | | 8.3 | | | 9 | | | 205 | | | < 1 | | | 29 | | | 248 | | | 303 | J | | | | | < 1 | | | < 1 | | | < 1 | | | < 1.9 | | |
| 29-SS-A | 0-6 | 11/1/2012 | 10:55 | 7.1 | | | 7.7 | | | 10 | | | 191 | | | < 1 | | | 25 | | | 3640 | | | 3020 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 13 | | |
| 29-SS-B | 6-12 | 11/1/2012 | 11:26 | 8.8 | | | 7.6 | | | 11 | | | 259 | | | < 1 | | | 25 | | | 3760 | | | 3200 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 14 | | |
| 29-SS-C | 12-24 | 11/1/2012 | 12:43 | 9.4 | | | 7.7 | | | 8 | | | 191 | | | < 1 | | | 24 | | | 2990 | | | 2820 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 14 | | |
| 30-SS-A | 0-6 | 11/1/2012 | 10:15 | 6.5 | | | 7.8 | | | 5 | | | 119 | | | < 1 | | | 17 | | | 721 | | | 1380 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 2.7 | | |
| 31-SS-A | 0-6 | 10/26/2012 | 11:25 | 10 | | | 7.8 | | | 5 | | | 439 | | | 2 | | | 47 | | | | | | 1670 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 2.8 | | |
| 31-SS-B | 6-12 | 10/26/2012 | 11:45 | 14 | | | 8.1 | | | 4 | | | 193 | | | < 1 | | | 54 | | | | | | 1970 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 0.39 | | |
| 31-SS-C | 12-24 | 10/26/2012 | 12:12 | 12 | | | 7.8 | | | 5 | | | 137 | | | < 1 | | | 20 | | | | | | 1040 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 2.8 | | |
| 32-SS-A | 0-6 | 10/19/2012 | 9:45 | 3.2 | | | 7.7 | | | 2 | | | 135 | | | < 1 | | | 13 | | | | | | 44 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 0.86 | | |
| 33-SS-A | 0-6 | 10/25/2012 | 12:05 | 14 | | | 7.8 | | | 6 | | | 339 | | | < 1 | | | 21 | | | | | | 67 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 34-SS-A | 0-6 | 10/18/2012 | 12:27 | 4.1 | | | 7.5 | | | 2 | | | 177 | J | | < 1 | | | 13 | | | | | | 51 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 35-SS-A | 0-6 | 10/18/2012 | 11:39 | 3.0 | | | 7.8 | | | 2 | | | 151 | J | | < 1 | | | 16 | | | | | | 76 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 36-SS-A | 0-6 | 11/6/2012 | 14:04 | 15 | | | 8.1 | | | 10 | | | 450 | | | < 1 | | | 25 | | | | | | 210 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 59 | | |
| 36-SS-B | 6-12 | 11/6/2012 | 14:37 | 4.3 | | | 7.7 | | | 9 | | | 133 | | | < 1 | | | 9 | | | | | | 111 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 0.87 | | |
| 36-SS-C | 12-24 | 11/6/2012 | 15:35 | 16 | | | 8.3 | | | 11 | | | 175 | | | < 1 | | | 21 | | | | | | 112 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 0.99 | | |

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | | | | s.u. | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| irect ontact esidential | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | . | | | | | | | | | . | | |
| eac ing to round ater creening e el | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | . | | | . | | | . | | |
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| ac ground ur ace oil alues† | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 37-SS-A | 0-6 | 11/7/2012 | 9:37 | 5.2 | | | 8.1 | | | 4 | | | 235 | | | < 1 | | | 13 | J | | | | | 167 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 1.8 | | |
| 38-SS-A | 0-6 | 11/7/2012 | 10:30 | 5.7 | | | 8.1 | | | 5 | | | 172 | | | < 1 | | | 24 | J | | | | | 165 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.5 | | |
| 38-SS-B | 6-12 | 11/7/2012 | 10:50 | 6.0 | | | 8.4 | | | 4 | | | 103 | | | < 1 | | | 13 | J | | | | | 176 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 27 | | |
| 38-SS-C | 12-24 | 11/7/2012 | 12:15 | 6.9 | | | 8.5 | | | 5 | | | 134 | | | < 1 | | | 24 | J | | | | | 129 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.6 | | |
| 39-SS-A | 0-6 | 11/7/2012 | 14:15 | 7.7 | | | 8.5 | | | 3 | | | 121 | | | < 1 | | | 14 | J | | | | | 150 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 27 | | |
| 39-SS-AD | 0-6 | 11/7/2012 | 14:20 | 7.8 | | | 8.2 | | | 4 | | | 121 | | | < 1 | | | 21 | J | | | | | 167 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 27 | | |
| 40-SS-A | 0-6 | 11/8/2012 | 9:34 | 7.0 | | | 7.9 | | | 6 | | | 297 | | | < 1 | | | 34 | | | 347 | | | 490 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 40-SS-B | 6-12 | 11/8/2012 | 10:17 | 7.2 | | | 7.8 | | | 8 | | | 330 | | | < 1 | | | 20 | | | 387 | | | 751 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 40-SS-C | 12-24 | 11/8/2012 | 11:23 | 7.2 | | | 8.1 | | | 5 | | | 192 | | | < 1 | | | 22 | | | 549 | | | 656 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 41-SS-A | 0-6 | 11/8/2012 | 16:16 | 6.7 | | | 7.5 | | | 6 | | | 340 | | | < 1 | | | 24 | | | 1910 | | | 2590 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 42-SS-A | 0-6 | 11/8/2012 | 13:23 | 6.9 | | | 7.4 | | | 8 | | | 427 | | | < 1 | | | 22 | | | 7170 | | | 5770 | J | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.6 | | |
| 42-SS-B | 6-12 | 11/8/2012 | 14:00 | 9.0 | | | 7.2 | | | 8 | | | 600 | | | < 1 | | | 23 | | | 3280 | | | 3930 | J | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.7 | | |
| 42-SS-C | 12-24 | 11/8/2012 | 14:36 | 12 | | | 7.4 | | | 7 | | | 555 | | | < 1 | | | 23 | | | 887 | | | 1280 | J | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.8 | | |
| 42-SS-CD | 12-24 | 11/8/2012 | 14:44 | 12 | | | 7.3 | | | 8 | | | 467 | | | < 1 | | | 24 | | | 713 | | | 2020 | J | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.8 | | |
| 43-SS-A | 0-6 | 11/8/2012 | 15:35 | 5.6 | | | 7.8 | | | 8 | | | 266 | | | < 1 | | | 24 | | | 327 | | | 465 | J | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.5 | | |
| 43-SS-B | 6-12 | 11/8/2012 | 16:15 | 6.4 | | | 7.5 | | | 9 | | | 221 | | | < 1 | | | 26 | | | 803 | | | 805 | J | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.6 | | |
| 43-SS-C | 12-24 | 11/8/2012 | 16:45 | 7.1 | | | 7.7 | | | 6 | | | 146 | | | < 1 | | | 19 | | | 261 | | | 290 | J | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.6 | | |
| 44-SS-A | 0-6 | 11/2/2012 | 11:12 | 12 | | | 9.4 | | | 12 | | | 230 | | | < 1 | | | 21 | | | 10200 | | | 6210 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 14 | | |
| 44-SS-B | 6-12 | 11/2/2012 | 11:35 | 15 | | | 8.6 | | | 8 | | | 202 | | | < 1 | | | 18 | | | 4510 | | | 4360 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 15 | | |
| 44-SS-C | 12-24 | 11/2/2012 | 12:03 | 13 | | | 8.7 | | | 10 | | | 187 | | | < 1 | | | 21 | | | 2560 | | | 2890 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 14 | | |
| 44-SS-CD | 12-24 | 11/2/2012 | 12:08 | 14 | | | 8.4 | | | 8 | | | 174 | | | < 1 | | | 19 | | | 1890 | | | 3030 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 15 | | |
| 45-SS-A | 0-6 | 11/1/2012 | 14:10 | 9.9 | | | 7.7 | | | 12 | | | 278 | | | < 1 | | | 20 | | | 4980 | | | 5090 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 14 | | |
| 45-SS-B | 6-12 | 11/1/2012 | 14:28 | 11 | | | 7.7 | | | 12 | | | 194 | | | < 1 | | | 18 | | | 4800 | | | 5930 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 14 | | |
| 45-SS-C | 12-24 | 11/1/2012 | 14:47 | 19 | | | 8.5 | | | 18 | | | 167 | | | < 1 | | | 20 | | | 9380 | | | 3750 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 15 | | |
| 46-SS-A | 0-6 | 10/26/2012 | 14:00 | 11 | | | 7.8 | | | 8 | | | 1720 | | | < 1 | | | 19 | | | | | | 427 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 2.8 | | |
| 46-SS-B | 6-12 | 10/26/2012 | 14:20 | 8.6 | | | 7.7 | | | 8 | | | 1320 | | | < 1 | | | 26 | | | | | | 839 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 0.37 | | |
| 46-SS-C | 12-24 | 10/26/2012 | 14:40 | 8.1 | | | 7.8 | | | 6 | | | 1450 | | | < 1 | | | 20 | | | | | | 608 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.6 | | |
| 47-SS-A | 0-6 | 10/18/2012 | 14:52 | 12 | | | 7.8 | | | 9 | | | 2940 | J | D | < 1 | | | 19 | | | | | | 338 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 0.38 | | |
| 47-SS-B | 6-12 | 10/18/2012 | 15:13 | 14 | | | 7.7 | | | 9 | | | 2580 | J | | < 1 | | | 28 | | | | | | 615 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 0.39 | | |
| 47-SS-C | 12-24 | 10/18/2012 | 16:14 | 12 | | | 7.7 | | | 8 | | | 1510 | J | | < 1 | | | 21 | | | | | | 1060 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.8 | | |
| 47-SS-CD | 12-24 | 10/18/2012 | 16:18 | 11 | | | 7.8 | | | 9 | | | 883 | J | | < 1 | | | 22 | | | | | | 996 | | | | | | < 1 | | | < 1 | | | < 1 | | | < 3.8 | | |
| 48-SS-A | 0-6 | 10/18/2012 | 14:13 | 10 | | | 7.9 | | | 8 | | | 1410 | J | | < 1 | | | 16 | | | | | | 115 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 49-SS-A | 0-6 | 10/25/2012 | 13:00 | 12 | | | 7.9 | | | 6 | | | 1020 | | | < 1 | | | 16 | | | | | | 1210 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 50-SS-A | 0-6 | 10/25/2012 | 14:20 | 9.3 | | | 7.6 | | | 7 | | | 195 | | | < 1 | | | 35 | | | | | | 3530 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 51-SS-A | 0-6 | 10/25/2012 | 15:45 | 8.4 | | | 8.1 | | | 3 | | | 221 | | | < 1 | | | 17 | | | | | | 65 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 52-SS-A | 0-6 | 10/5/2012 | 9:35 | 4.0 | | | 8.0 | | | 6 | | | | | | | | | | | | | | | 25 | | | | | | | | | < 1 | | | | | | | | |
| 53-SS-A | 0-6 | 10/24/2012 | 9:30 | 8.6 | | | 7.8 | | | 5 | | | 115 | | | < 1 | | | 13 | | | 16 | | | 32 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 54-SS-A | 0-6 | 10/23/2012 | 14:50 | 14 | | | 7.1 | | | 9 | | | 580 | | | < 1 | | | 15 | | | | | | 52 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 54-SS-B | 6-12 | 10/23/2012 | 15:40 | 14 | | | 7.0 | | | 21 | | | 974 | | | < 1 | | | 15 | | | | | | 52 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 54-SS-C | 12-24 | 10/23/2012 | 16:05 | 18 | | | 6.3 | | | 10 | | | 1330 | | | < 1 | | | 15 | | | | | | 125 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 55-SS-A | 0-6 | 10/23/2012 | 14:10 | 18 | | | 7.0 | | | 7 | | | 667 | | | < 1 | | | 13 | | | | | | 90 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 56-SS-A | 0-6 | 10/23/2012 | 11:55 | 11 | | | 6.6 | | | 10 | | | 644 | | | < 1 | | | 15 | | | | | | 736 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 56-SS-B | 6-12 | 10/23/2012 | 12:30 | 11 | | | 6.7 | | | 6 | | | 491 | | | < 1 | | | 18 | | | | | | 85 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 56-SS-C | 12-24 | 10/23/2012 | 13:10 | 11 | | | 7.6 | | | 7 | | | 402 | | | < 1 | | | 20 | | | | | | 51 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 57-SS-A | 0-6 | 10/23/2012 | 10:55 | 13 | | | 6.8 | | | 6 | | | 614 | | | < 1 | | | 17 | | | | | | 81 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 58-SS-A | 0-6 | 10/19/2012 | 10:52 | 16 | | | 7.2 | | | 4 | | | 979 | | | < 1 | | | 9 | | | | | | 92 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 58-SS-B | 6-12 | 10/23/2012 | 10:05 | 17 | | | 7.7 | | | 2 | | | 998 | | | < 1 | | | 7 | | | | | | 74 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 58-SS-C | 12-24 | 10/23/2012 | 10:15 | 15 | | | 7.3 | | | 8 | | | 771 | | | < 1 | | | 17 | | | | | | 141 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 59-SS-A | 0-6 | 10/24/2012 | 11:30 | 7.6 | | | 7.6 | | | 4 | | | 131 | | | < 1 | | | 16 | | | 25 | | | 36 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 60-SS-A | 0-6 | 10/24/2012 | 13:20 | 10 | | | 8.5 | | | 4 | | | 174 | | | < 1 | | | 13 | | | 29 | | | 30 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 61-SS-A | 0-6 | 10/25/2012 | 9:20 | 9.4 | | | 7.9 | | | 5 | | | 587 | | | < 1 | | | 25 | | | | | | 40 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 61-SS-B | 6-12 | 10/25/2012 | 9:50 | 9.0 | | | 8.1 | | | 4 | | | 1320 | | | < 1 | | | 28 | | | | | | 29 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 61-SS-C | 12-24 | 10/25/2012 | 10:20 | 11 | | | 8.1 | | | 6 | | | 262 | | | < 1 | | | 23 | | | | | | 26 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 62-SS-A | 0-6 | 10/24/2012 | 15:30 | 13 | | | 7.9 | | | 6 | | | 187 | | | < 1 | | | 20 | | | 19 | | | 30 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 63-SS-A | 0-6 | 10/24/2012 | 14:50 | 14 | | | 7.7 | | | 6 | | | 162 | | | < 1 | | | 27 | | | 16 | | | 18 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 63-SS-AD | 0-6 | 10/24/2012 | 14:55 | 14 | | | 7.8 | | | 6 | | | 151 | | | < 1 | | | 22 | | | 16 | | | 19 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 64-SS-A | 0-6 | 10/10/2012 | 14:45 | 12 | | | 7.8 | | | 7 | | | 210 | | | < 1 | | | 23 | | | 26 | | | 30 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 65-SS-A | 0-6 | 10/10/2012 | 11:47 | 14 | | | 7.2 | | | 6 | | | 387 | | | < 1 | | | 57 | | | 86 | | | 54 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 65-SS-B | 6-12 | 10/10/2012 | 12:30 | 12 | | | 7.6 | | | 8 | | | 230 | | | < 1 | | | 25 | | | 29 | | | 27 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 65-SS-C | 12-24 | 10/10/2012 | 13:50 | 12 | | | 8.1 | | | 10 | | | 172 | | | < 1 | | | 24 | | | 21 | | | 23 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 66-SS-A | 0-6 | 10/9/2012 | 15:52 | 9.7 | | | 7.9 | | | 6 | | | | | | | | | | | | | | | 29 | | | | | | | | | < 1 | | | | | | | | |
| 67-SS-A | 0-6 | 10/17/2012 | 9:40 | 11 | | | 7.4 | | | 8 | | | 230 | | | < 1 | | | 21 | | | | | | 63 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |

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| ale il o out a ota ur ace oil am ling I I | | | | I . | | | H I | | | I | | | I | | | I | | | H I | | | | | | ie ed | | | | | | H | | | I | | | I | | | H | | |
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| irect ontact ommercial | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | . | | | | | | | | | . | | |
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| eac ing to round ater creening e el | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | . | | | . | | | . | | |
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| ac ground ur ace oil alues† | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 67-SS-B | 6-12 | 10/17/2012 | 10:10 | 9.5 | | | 7.0 | | | 8 | | | 270 | | | < 1 | | | 20 | | | | | | 54 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 67-SS-C | 12-24 | 10/17/2012 | 10:45 | 12 | | | 7.1 | | | 12 | | | 182 | | | < 1 | | | 20 | | | | | | 33 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 68-SS-A | 0-6 | 10/17/2012 | 12:05 | 8.8 | | | 7.4 | | | 7 | | | | | | | | | | | | | | | 118 | | | | | | | | | < 1 | | | | | | | | |
| 69-SS-A | 0-6 | 10/17/2012 | 13:00 | 8.2 | | | 7.6 | | | 7 | | | 230 | | | < 1 | | | 19 | | | | | | 59 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 69-SS-B | 6-12 | 10/17/2012 | 13:25 | 4.6 | | | 7.8 | | | 8 | | | 159 | | | < 1 | | | 19 | | | | | | 39 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 69-SS-C | 12-24 | 10/17/2012 | 13:45 | 4.5 | | | 7.8 | | | 7 | | | 160 | | | < 1 | | | 22 | | | | | | 30 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 70N-SS-A | 0-6 | 10/18/2012 | 10:10 | 8.7 | | | 8.1 | | | 9 | | | | | | | | | | | | 143 | | | 217 | | | | | | | | | < 1 | | | | | | | | |
| 70N-SS-AD | 0-6 | 10/18/2012 | 10:11 | 7.2 | | | 7.5 | | | 7 | | | | | | | | | | | | 122 | | | 209 | | | | | | | | | < 1 | | | | | | | | |
| 70-SS-A | 0-6 | 10/17/2012 | 15:00 | 5.8 | | | 7.9 | | | 6 | | | | | | | | | | | | | | | 41 | | | | | | | | | < 1 | | | | | | | | |
| 71-SS-A | 0-6 | 10/4/2012 | 14:24 | 7.7 | | | 7.8 | | | 7 | | | | | | | | | | | | 26 | | | 33 | | | | | | | | | < 1 | | | | | | | | |
| 71-SS-B | 6-12 | 10/4/2012 | 14:51 | 12 | | | 7.8 | | | 8 | | | | | | | | | | | | 53 | | | 37 | | | | | | | | | < 1 | | | | | | | | |
| 71-SS-C | 12-24 | 10/4/2012 | 15:50 | 12 | | | 8.0 | | | 8 | | | | | | | | | | | | 27 | | | 25 | | | | | | | | | < 1 | | | | | | | | |
| 72-SS-A | 0-6 | 10/24/2012 | 13:50 | 9.7 | | | 8.0 | | | 7 | | | | | | | | | | | | 92 | | | 29 | | | | | | | | | < 1 | | | | | | | | |
| 73-SS-A | 0-6 | 10/25/2012 | 11:00 | 9.0 | | | 7.9 | | | 8 | | | 358 | | | < 1 | | | 21 | | | | | | 35 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 74-SS-A | 0-6 | 10/5/2012 | 9:55 | 8.2 | | | 7.9 | | | 12 | | | 531 | | | < 1 | | | 26 | | | | | | 45 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 75-SS-A | 0-6 | 10/5/2012 | 10:59 | 5.8 | | | 8.1 | | | 9 | | | 220 | | | < 1 | | | 22 | | | | | | 57 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 75-SS-B | 6-12 | 10/5/2012 | 11:17 | 5.1 | | | 8.2 | | | 11 | | | 209 | | | < 1 | | | 22 | | | | | | 48 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 75-SS-C | 12-24 | 10/5/2012 | 11:38 | 4.9 | | | 8.3 | | | 9 | | | 214 | | | < 1 | | | 24 | | | | | | 55 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 76-SS-A | 0-6 | 10/10/2012 | 15:35 | 10 | | | 7.6 | | | 11 | | | 212 | | | < 1 | | | 21 | | | 52 | | | 73 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 77-SS-A | 0-6 | 10/2/2012 | 10:30 | 3.4 | | | 8.0 | | | 11 | | | 187 | | | < 1 | | | 18 | | | | | | 45 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 77-SS-B | 6-12 | 10/2/2012 | 10:47 | 2.5 | | | 8.4 | | | 27 | | | 207 | | | < 1 | | | 20 | | | | | | 46 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 77-SS-C | 12-24 | 10/2/2012 | 11:20 | 5.4 | | | 8.5 | | | 8 | | | 211 | | | < 1 | | | 26 | | | | | | 52 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 78-SS-A | 0-6 | 10/2/2012 | 16:16 | 2.8 | | | 7.6 | | | 12 | | | 175 | | | < 1 | | | 19 | | | | | | 34 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 79-SS-A | 0-6 | 10/2/2012 | 16:00 | 4.4 | | | 7.4 | | | 9 | | | 289 | | | < 1 | | | 20 | | | | | | 54 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 80-SS-A | 0-6 | 10/2/2012 | 15:40 | 4.9 | | | 7.6 | | | 9 | | | 168 | | | < 1 | | | 19 | | | | | | 61 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 81-SS-A | 0-6 | 10/11/2012 | 15:30 | 8.9 | | | 8.3 | | | 7 | | | | | | | | | | | | | | | 71 | | | | | | | | | < 1 | | | | | | | | |
| 82-SS-A | 0-6 | 10/16/2012 | 10:33 | 7.9 | | | 7.9 | | | 6 | | | 284 | | | < 1 | | | 25 | | | | | | 89 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 82-SS-B | 6-12 | 10/16/2012 | 11:00 | 10 | | | 7.9 | | | 6 | | | 168 | | | < 1 | | | 25 | | | | | | 39 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 82-SS-C | 12-24 | 10/16/2012 | 11:40 | 11 | | | 7.7 | | | 7 | | | 166 | | | < 1 | | | 25 | | | | | | 45 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 83-SS-A | 0-6 | 10/16/2012 | 15:30 | 6.3 | | | 8.2 | | | 9 | | | | | | | | | | | | | | | 55 | | | | | | | | | < 1 | | | | | | | | |
| 84-SS-A | 0-6 | 10/16/2012 | 13:35 | 6.0 | | | 8.4 | | | 14 | | | 205 | | | < 1 | | | 25 | | | | | | 24 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 84-SS-B | 6-12 | 10/16/2012 | 14:00 | 6.4 | | | 8.5 | | | 6 | | | 156 | | | < 1 | | | 21 | | | | | | 20 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 84-SS-C | 12-24 | 10/16/2012 | 14:35 | 5.0 | | | 8.5 | | | 6 | | | 123 | | | < 1 | | | 20 | | | | | | 15 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 85-SS-A | 0-6 | 10/11/2012 | 14:00 | 7.2 | | | 8.4 | | | 7 | | | | | | | | | | | | | | | 35 | | | | | | | | | < 1 | | | | | | | | |
| 86-SS-A | 0-6 | 10/11/2012 | 13:10 | 5.3 | | | 8.4 | | | 6 | | | | | | | | | | | | | | | 29 | | | | | | | | | < 1 | | | | | | | | |
| 87-SS-A | 0-6 | 10/9/2012 | 14:00 | 12 | | | 7.2 | | | 4 | | | | | | | | | | | | | | | 24 | | | | | | | | | < 1 | | | | | | | | |
| 88-SS-A | 0-6 | 10/4/2012 | 11:17 | 4.6 | | | 7.8 | | | 6 | | | | | | | | | | | | 21 | | | 25 | | | | | | | | | < 1 | | | | | | | | |
| 89-SS-A | 0-6 | 10/2/2012 | 13:40 | 3.4 | | | 7.6 | | | 5 | | | 154 | | | < 1 | | | 22 | | | | | | 23 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 90-SS-A | 0-6 | 10/2/2012 | 14:00 | 4.2 | | | 7.9 | | | 7 | | | 164 | | | < 1 | | | 22 | | | | | | 27 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 91-SS-A | 0-6 | 10/2/2012 | 14:20 | 5.2 | | | 7.5 | | | 6 | | | 163 | | | < 1 | | | 22 | | | | | | 27 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 91-SS-B | 6-12 | 10/2/2012 | 14:35 | 8.8 | | | 7.6 | | | 8 | | | 158 | | | < 1 | | | 25 | | | | | | 21 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 91-SS-C | 12-24 | 10/2/2012 | 15:00 | 7.4 | | | 8.0 | | | 6 | | | 161 | | | < 1 | | | 22 | | | | | | 16 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 92-SS-A | 0-6 | 10/2/2012 | 15:30 | 3.8 | | | 8.3 | | | 7 | | | 177 | | | < 1 | | | 25 | | | | | | 19 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 93-SS-A | 0-6 | 10/3/2012 | 9:50 | 3.1 | | | 9.0 | | | 8 | | | 151 | | | < 1 | | | 24 | | | | | | 13 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 93-SS-B | 6-12 | 10/3/2012 | 10:05 | 2.1 | | | 9.5 | | | 6 | | | 131 | | | < 1 | | | 22 | | | | | | 10 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 93-SS-C | 12-24 | 10/3/2012 | 10:30 | 3.0 | | | 9.2 | | | 7 | | | 128 | | | < 1 | | | 25 | | | | | | 10 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 94-SS-A | 0-6 | 10/3/2012 | 14:00 | 8.5 | | | 7.9 | | | 7 | | | 185 | | | < 1 | | | 25 | | | | | | 27 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 94-SS-AD | 0-6 | 10/3/2012 | 14:01 | 7.0 | | | 8.0 | | | 7 | | | 187 | | | < 1 | | | 25 | | | | | | 24 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 95-SS-A | 0-6 | 10/3/2012 | 14:23 | 4.5 | | | 8.0 | | | 7 | | | 166 | | | < 1 | | | 25 | | | | | | 31 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 96-SS-A | 0-6 | 10/3/2012 | 14:32 | 3.7 | | | 8.6 | | | 5 | | | 141 | | | < 1 | | | 27 | | | | | | 29 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 97-SS-A | 0-6 | 10/12/2012 | 13:20 | 11 | | | 7.9 | | | 7 | | | 152 | | | < 1 | | | 23 | | | | | | 34 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 97-SS-B | 6-12 | 10/12/2012 | 13:45 | 6.6 | | | 8.3 | | | 6 | | | 148 | | | < 1 | | | 26 | | | | | | 15 | | D | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 97-SS-C | 12-24 | 10/12/2012 | 14:30 | 5.8 | | | 8.0 | | | 6 | | | 137 | | | < 1 | | | 23 | | | | | | 17 | | D | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 98-SS-A | 0-6 | 10/11/2012 | 15:05 | 8.2 | | | 8.3 | | | 8 | | | | | | | | | | | | | | | 78 | | | | | | | | | < 1 | | | | | | | | |
| 99-SS-A | 0-6 | 10/12/2012 | 10:20 | 7.3 | | | 8.0 | | | 10 | | | 280 | | | < 1 | | | 22 | | | | | | 129 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 99-SS-B | 6-12 | 10/12/2012 | 10:40 | 8.8 | | | 8.0 | | | 10 | | | 128 | | | < 1 | | | 33 | | | | | | 171 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 99-SS-C | 12-24 | 10/12/2012 | 11:55 | 11 | | | 8.0 | | | 10 | | | 145 | | | < 1 | | | 24 | | | | | | 27 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 100-SS-A | 0-6 | 10/12/2012 | 9:45 | 6.6 | | | 8.4 | | | 8 | | | | | | | | | | | | | | | 92 | | | | | | | | | < 1 | | | | | | | | |
| 101-SS-A | 0-6 | 10/11/2012 | 12:10 | 6.7 | | | 8.8 | | | 6 | | | | | | | | | | | | | | | 31 | | | | | | | | | < 1 | | | | | | | | |
| 102-SS-A | 0-6 | 10/9/2012 | 11:52 | 14 | | | 7.0 | | | 4 | | | | | | | | | | | | | | | 21 | | | | | | | | | < 1 | | | | | | | | |
| 102-SS-B | 6-12 | 10/9/2012 | 12:15 | 6.3 | | | 8.0 | | | 8 | | | | | | | | | | | | | | | 11 | | | | | | | | | < 1 | | | | | | | | |
| 102-SS-C | 12-24 | 10/9/2012 | 12:48 | 5.3 | | | 8.3 | | | 8 | | | | | | | | | | | | | | | 12 | | | | | | | | | < 1 | | | | | | | | |

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| 102-SS-CD | 12-24 | 10/9/2012 | 12:50 | 5.7 | | | 8.3 | | | 8 | | | | | | | | | | | | | | | 12 | | | | | | | | | < 1 | | | | | | | | |
| 103-SS-A | 0-6 | 10/9/2012 | 13:31 | 10 | | | 7.8 | | | 6 | | | | | | | | | | | | | | | 30 | | | | | | | | | < 1 | | | | | | | | |
| 104-SS-A | 0-6 | 10/4/2012 | 10:32 | 4.9 | | | 7.6 | | | 6 | | | 185 | | | 3 | | | 22 | | | 32 | | | 46 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 105-SS-A | 0-6 | 10/4/2012 | 10:16 | 3.1 | | | 7.9 | | | 7 | | | 186 | | | < 1 | | | 23 | | | 38 | | | 39 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 106-SS-A | 0-6 | 10/3/2012 | 16:00 | 5.8 | | | 7.9 | | | 6 | | | 167 | | | < 1 | | | 23 | | | | | | 23 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 107-SS-A | 0-6 | 10/3/2012 | 15:15 | 6.3 | | | 8.1 | | | 7 | | | 172 | | | < 1 | | | 25 | | | | | | 23 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 108-SS-A | 0-6 | 10/11/2012 | 11:00 | 6.9 | | | 8.0 | | | 10 | | | | | | | | | | | | | | | 65 | | | | | | | | | < 1 | | | | | | | | |
| 109-SS-A | 0-6 | 10/11/2012 | 11:25 | 6.3 | | | 8.4 | | | 7 | | | | | | | | | | | | | | | 407 | | | | | | | | | < 1 | | | | | | | | |
| PS1-SS-A | 0-6 | 11/29/2012 | 12:46 | 4.5 | J | | | | | 3 | | | 199 | | | < 1 | | | 20 | | | 50 | | | 62 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS2-SS-A | 0-6 | 11/29/2012 | 9:30 | 8.5 | J | | | | | 3 | | | 213 | | | < 1 | | | 27 | | | 123 | | | 434 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS2-SS-B | 6-12 | 11/29/2012 | 9:37 | 13 | J | | | | | 6 | | | 284 | | | < 1 | | | 31 | | | 91 | | | 61 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS2-SS-C | 12-24 | 11/29/2012 | 9:45 | 13 | J | | | | | 9 | | | 200 | | | < 1 | | | 29 | | | 23 | | | 24 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS3-SS-A | 0-6 | 11/29/2012 | 9:52 | 5.2 | J | | | | | 3 | | | 166 | | | < 1 | | | 17 | | | 81 | | | 112 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS4-SS-A | 0-6 | 11/29/2012 | 10:01 | 5.4 | J | | | | | 3 | | | 121 | | | < 1 | | | 25 | | | 43 | | | 66 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS5-SS-A | 0-6 | 11/29/2012 | 12:51 | 8.5 | J | | | | | 7 | | | 266 | | | < 1 | | | 28 | | | 134 | | | 113 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS6-SS-A | 0-6 | 11/29/2012 | 10:10 | 11 | J | | | | | 3 | | | 195 | | | < 1 | | | 21 | | | 140 | | | 195 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS7-SS-A | 0-6 | 11/29/2012 | 10:27 | 6.3 | J | | | | | 4 | | | 144 | | | < 1 | | | 13 | | | 579 | | | 135 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS8-SS-A | 0-6 | 11/29/2012 | 10:35 | 7.1 | J | | | | | 5 | | | 280 | | | < 1 | | | 19 | | | 177 | | | 312 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS9-SS-A | 0-6 | 11/29/2012 | 10:48 | 11 | J | | | | | 5 | | | 187 | | | < 1 | | | 21 | | | 147 | | | 298 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS10-SS-A | 0-6 | 11/29/2012 | 10:57 | 7.6 | J | | | | | 5 | | | 230 | | | < 1 | | | 20 | | | 476 | | | 854 | J | | | | | 5 | | | < 1 | | | < 1 | | | | | |
| PS11-SS-A | 0-6 | 11/29/2012 | 11:08 | 5.6 | J | | | | | 4 | | | 187 | | | < 1 | | | 19 | | | 52 | | | 94 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS11-SS-B | 6-12 | 11/29/2012 | 11:16 | 3.7 | J | | | | | 5 | | | 225 | | | < 1 | | | 29 | | | 96 | | | 140 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS11-SS-C | 12-24 | 11/29/2012 | 11:23 | 2.8 | J | | | | | 5 | | | 180 | | | < 1 | | | 26 | | | 46 | | | 33 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS11-SS-CD | 12-24 | 11/29/2012 | 11:24 | 13 | J | | | | | 6 | | | 204 | | | < 1 | | | 30 | | | 43 | | | 72 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS12-SS-A | 0-6 | 11/29/2012 | 13:04 | 13 | J | | | | | 6 | | | 359 | | | < 1 | | | 30 | | | 110 | | | 112 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS13-SS-A | 0-6 | 11/29/2012 | 13:13 | 7.8 | J | | | | | 5 | | | 473 | | | < 1 | | | 21 | | | 441 | | | 227 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS14-SS-A | 0-6 | 11/29/2012 | 13:20 | 3.9 | J | | | | | 4 | | | 302 | | | < 1 | | | 42 | | | 569 | | | 885 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS15-SS-A | 0-6 | 11/29/2012 | 13:29 | 3.6 | J | | | | | 11 | | | 1660 | | | 1 | | | 93 | | | 3560 | | | 4070 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS16-SS-A | 0-6 | 11/29/2012 | 13:57 | 4.6 | J | | | | | 3 | | | 149 | | | < 1 | | | 14 | | | 56 | | | 88 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS17-SS-A | 0-6 | 11/29/2012 | 14:02 | 8.5 | J | | | | | 3 | | | 118 | | | < 1 | | | 15 | | | 16 | | | 45 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS18-SS-A | 0-6 | 11/29/2012 | 14:09 | 10 | J | | | | | 5 | | | 333 | | | < 1 | | | 28 | | | 1290 | | | 1320 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS19-SS-A | 0-6 | 11/29/2012 | 14:17 | 14 | J | | | | | 5 | | | 1620 | | | 2 | | | 30 | | | 667 | | | 1280 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS20-SS-A | 0-6 | 11/29/2012 | 14:25 | 8.0 | J | | | | | 8 | | | 1040 | | | < 1 | | | 43 | | | 374 | | | 519 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS21-SS-A | 0-6 | 11/29/2012 | 14:33 | 8.1 | J | | | | | 3 | | | 264 | | | < 1 | | | 22 | | | 127 | | | 228 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS22-SS-A | 0-6 | 11/29/2012 | 14:41 | 5.6 | J | | | | | 2 | | | 107 | | | < 1 | | | 19 | | | 34 | | | 78 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS22-SS-B | 6-12 | 11/29/2012 | 14:49 | 13 | J | | | | | 64 | | | 290 | | | < 1 | | | 44 | | | 125 | | | 92 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS22-SS-C | 12-24 | 11/29/2012 | 14:58 | 14 | J | | | | | 21 | | | 165 | | | < 1 | | | 29 | | | 20 | | | 21 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS23-SS-A | 0-6 | 11/29/2012 | 15:13 | 10 | J | | | | | 50 | | | 400 | | | 2 | | | 43 | | | 324 | | | 491 | J | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS24-SS-A | 0-6 | 11/30/2012 | 10:10 | 7.3 | | | | | | 33 | J | | 500 | J | | < 1 | | | 37 | J | | 307 | | | 379 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS25-SS-A | 0-6 | 11/30/2012 | 10:13 | 10 | | | | | | 59 | J | | 597 | J | | < 1 | | | 39 | J | | 297 | | | 370 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS26-SS-A | 0-6 | 11/30/2012 | 10:20 | 3.4 | | | | | | 86 | J | | 324 | J | | < 1 | | | 23 | J | | 134 | | | 269 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS27-SS-A | 0-6 | 11/30/2012 | 10:49 | 8.5 | | | | | | 55 | J | | 289 | J | | 2 | | | 23 | J | | 499 | | | 1260 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS28-SS-A | 0-6 | 11/30/2012 | 10:58 | 8.8 | | | | | | 13 | J | | 374 | J | | < 1 | | | 31 | J | | 769 | | | 976 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS29-SS-A | 0-6 | 11/30/2012 | 11:07 | 8.2 | | | | | | 8 | J | | 380 | J | | < 1 | | | 31 | J | | 282 | | | 526 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS29-SS-B | 6-12 | 11/30/2012 | 11:18 | 20 | | | | | | 10 | J | | 277 | J | | < 1 | | | 26 | J | | 61 | | | 109 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS29-SS-C | 12-24 | 11/30/2012 | 11:25 | 16 | | | | | | 9 | J | | 194 | J | | < 1 | | | 31 | J | | 24 | | | 36 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS29-SS-CD | 12-24 | 11/30/2012 | 11:26 | 14 | | | | | | 10 | J | | 201 | J | | < 1 | | | 29 | J | | 31 | | | 47 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS30-SS-A | 0-6 | 11/30/2012 | 11:39 | 8.3 | | | | | | 37 | J | | 376 | J | | < 1 | | | 25 | J | | 93 | | | 113 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS31-SS-A | 0-6 | 11/30/2012 | 11:48 | 16 | | | | | | 46 | J | | 613 | J | | 1 | | | 36 | J | | 302 | | | 329 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS32-SS-A | 0-6 | 11/30/2012 | 11:56 | 9.9 | | | | | | 21 | J | | 308 | J | | < 1 | | | 20 | J | | 225 | | | 363 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS33-SS-A | 0-6 | 11/30/2012 | 12:03 | 15 | | | | | | 90 | J | | 588 | J | | 1 | | | 21 | J | | 279 | | | 292 | | | | | | 2 | | | < 1 | | | < 1 | | | | | |
| PS34-SS-A | 0-6 | 11/30/2012 | 12:12 | 10 | | | | | | 27 | J | | 503 | J | | < 1 | | | 26 | J | | 271 | | | 418 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS35-SS-A | 0-6 | 11/30/2012 | 12:22 | 7.8 | | | | | | 22 | J | | 1220 | J | | 2 | | | 66 | J | | 401 | | | 639 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| PS35-SS-AD | 0-6 | 11/30/2012 | 12:24 | 5.8 | | | | | | 11 | J | | 684 | J | | 2 | | | 32 | J | | 520 | | | 750 | | | | | | < 1 | | | < 1 | | | < 1 | | | | | |
| TEL1-SS-A | 0-6 | 11/28/2012 | 9:34 | 9.0 | | | | | | | | | | | | | | | | | | 368 | | | 379 | | | < 0.2 | | | | | | | | | | | | < 0.92 | | |
| TEL2-SS-A | 0-6 | 11/28/2012 | 9:42 | 9.1 | | | | | | | | | | | | | | | | | | 173 | | | 191 | | | < 0.2 | | | | | | | | | | | | < 3.7 | | |
| TEL3-SSS-A | 0-6 | 11/28/2012 | 9:50 | 11 | | | | | | | | | | | | | | | | | | 206 | | | 183 | | | < 0.2 | | | | | | | | | | | | < 1.9 | | |
| TEL4-SS-A | 0-6 | 11/27/2012 | 10:48 | 14 | | | | | | | | | | | | | | | | | | 84 | | | 90 | | | < 0.2 | | | | | | | | | | | | < 0.33 | | |
| TEL5-SS-A | 0-6 | 11/27/2012 | 10:50 | 3.9 | | | | | | | | | | | | | | | | | | 144 | | | 217 | | | < 0.2 | | | | | | | | | | | | < 0.87 | | |
| TEL6-SS-A | 0-6 | 11/28/2012 | 9:56 | 13 | | | | | | | | | | | | | | | | | | 181 | | | 166 | | | < 0.2 | | | | | | | | | | | | < 3.9 | | |
| TEL6-SS-B | 6-12 | 11/28/2012 | 10:02 | 8.1 | | | | | | | | | | | | | | | | | | 67 | | | 93 | | | < 0.2 | | | | | | | | | | | | < 0.91 | | |
| TEL6-SS-C | 12-24 | 11/28/2012 | 10:11 | 11 | | | | | | | | | | | | | | | | | | 23 | | | 28 | | | < 0.2 | | | | | | | | | | | | < 0.33 | | |

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| eac ing to round ater creening e el | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | . | | | . | | | . | | |
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| ac ground ur ace oil alues† | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| TEL6-SS-CD | 12-24 | 11/28/2012 | 10:13 | 8.7 | | | | | | | | | | | | | | | | | | 20 | | | 26 | | | < 0.2 | | | | | | | | | | | | < 0.33 | | |
| TEL7-SS-A | 0-6 | 11/28/2012 | 10:52 | 1.5 | | | | | | | | | | | | | | | | | | 418 | | | 313 | | | < 0.2 | | | | | | | | | | | | < 3.4 | | |
| TEL8-SS-A | 0-6 | 11/28/2012 | 11:01 | 12 | | | | | | | | | | | | | | | | | | 561 | | | 448 | | | < 0.2 | | | | | | | | | | | | < 3.8 | | |
| TEL9-SS-A | 0-6 | 11/27/2012 | 11:16 | 8.9 | | | | | | | | | | | | | | | | | | 514 | | | 403 | | | < 0.2 | | | | | | | | | | | | < 0.33 | | |
| TEL10-SS-A | 0-6 | 11/27/2012 | 11:22 | 7.7 | | | | | | | | | | | | | | | | | | 304 | | | 284 | | | < 0.2 | | | | | | | | | | | | < 0.90 | | |
| TEL10-SS-B | 6-12 | 11/27/2012 | 11:26 | 7.6 | | | | | | | | | | | | | | | | | | 226 | | | 253 | | | < 0.2 | | | | | | | | | | | | < 1.8 | | |
| TEL10-SS-BD | 6-12 | 11/27/2012 | 11:30 | 7.1 | | | | | | | | | | | | | | | | | | 222 | | | 272 | | | < 0.2 | | | | | | | | | | | | < 0.90 | | |
| TEL10-SS-C | 12-24 | 11/27/2012 | 11:43 | 7.1 | | | | | | | | | | | | | | | | | | 305 | | | 350 | | | < 0.2 | | | | | | | | | | | | < 1.8 | | |
| TEL11-SS-A | 0-6 | 11/28/2012 | 11:14 | 8.2 | | | | | | | | | | | | | | | | | | 886 | | | 761 | | | 0.2 | | | | | | | | | | | | < 3.6 | | |
| TEL12-SS-A | 0-6 | 11/28/2012 | 11:30 | 4.3 | | | | | | | | | | | | | | | | | | 446 | | | 570 | | | < 0.2 | | | | | | | | | | | | < 3.5 | | |
| TEL13-SS-A | 0-6 | 11/28/2012 | 11:48 | 9.3 | | | | | | | | | | | | | | | | | | 484 | | | 589 | | | 0.3 | | | | | | | | | | | | < 3.7 | | |
| TEL14-SS-A | 0-6 | 11/27/2012 | 13:07 | 15 | | | | | | | | | | | | | | | | | | 293 | | | 318 | | | < 0.2 | | | | | | | | | | | | < 2.0 | | |
| TEL15-SS-A | 0-6 | 11/27/2012 | 13:13 | 6.0 | | | | | | | | | | | | | | | | | | 1100 | | | 1320 | | | 0.3 | | | | | | | | | | | | < 3.6 | | |
| TEL16-SS-A | 0-6 | 11/28/2012 | 13:58 | 8.8 | | | | | | | | | | | | | | | | | | 541 | | | 555 | | | < 0.2 | | | | | | | | | | | | < 1.8 | | |
| TEL17-SS-A | 0-6 | 11/28/2012 | 13:46 | 13 | | | | | | | | | | | | | | | | | | 612 | | | 725 | | | < 0.2 | | | | | | | | | | | | < 14 | | |
| TEL18-SS-A | 0-6 | 11/28/2012 | 14:10 | 5.8 | | | | | | | | | | | | | | | | | | 1290 | | | 1480 | | | 0.4 | | | | | | | | | | | | < 27 | | |
| TEL19-SS-A | 0-6 | 11/27/2012 | 13:31 | 15 | | | | | | | | | | | | | | | | | | 380 | | | 453 | | | < 0.2 | | | | | | | | | | | | < 3.9 | | |
| TEL20-SS-A | 0-6 | 11/27/2012 | 13:38 | 12 | | | | | | | | | | | | | | | | | | 3460 | | | 2510 | | | 1.5 | | | | | | | | | | | | < 3.8 | | |
| TEL21-SS-A | 0-6 | 11/28/2012 | 14:24 | 9.8 | | | | | | | | | | | | | | | | | | 272 | | | 360 | | | < 0.2 | | | | | | | | | | | | < 28 | | |
| TEL22-SS-A | 0-6 | 11/28/2012 | 14:37 | 8.9 | | | | | | | | | | | | | | | | | | 188 | | | 178 | | | < 0.2 | | | | | | | | | | | | < 3.7 | | |
| TEL22-SS-B | 6-12 | 11/28/2012 | 14:45 | 11 | | | | | | | | | | | | | | | | | | 206 | | | 268 | | | < 0.2 | | | | | | | | | | | | < 3.7 | | |
| TEL22-SS-C | 12-24 | 11/28/2012 | 14:53 | 14 | | | | | | | | | | | | | | | | | | 160 | | | 177 | | | < 0.2 | | | | | | | | | | | | < 3.9 | | |
| TEL23-SS-A | 0-6 | 11/28/2012 | 15:05 | 6.3 | | | | | | | | | | | | | | | | | | 311 | | | 344 | | | < 0.2 | | | | | | | | | | | | < 7.1 | | |
| TEL24-SS-A | 0-6 | 11/27/2012 | 14:00 | 14 | | | | | | | | | | | | | | | | | | 157 | | | 154 | | | < 0.2 | | | | | | | | | | | | < 3.9 | | |
| TEL25-SS-A | 0-6 | 11/27/2012 | 14:06 | 8.8 | | | | | | | | | | | | | | | | | | 900 | | | 1010 | | | 0.7 | | | | | | | | | | | | < 3.7 | | |

**NOTES:**

| | |
|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |
| 5 | Exceeds Total Characteristic Leaching Procedure |

**(1) - Compared to http://deq.mt.gov/StateSuperfund/background.mcpx**
**(2) - EPA RSL Version used for screening level development: January 2015**
**†- Determined by the January 29, 2014 Background Soils Data Submittal, lowest value of SP-SS-A or NP-SS-A**
**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

. I

| ale il o out a ota ur ace oil am ling H | | | | H H | | | | | | | | | H | | | | | | | | | | | | H H | | | I | | | I H I | | | I H I | | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| et od | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| raction | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| irect ontact esidential | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s ommercial ur ace | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s esidential ur ace | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-SS-A | 0-6 | 11/7/2012 | 16:27 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 2-SS-A | 0-6 | 11/7/2012 | 14:33 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 2-SS-B | 6-12 | 11/7/2012 | 15:13 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 2-SS-C | 12-24 | 11/7/2012 | 15:41 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 3-SS-A | 0-6 | 11/7/2012 | 16:09 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 4-SS-A | 0-6 | 10/30/2012 | 12:52 | < 0.23 | | D | 0.26 | | * | < 0.12 | | D | 0.33 | | | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.23 | | D | < 4.6 | | D | 8.6 | | | 7.9 | | | 14 | | |
| 5-SS-A | 0-6 | 10/30/2012 | 11:46 | < 5.0 | | D | 6.2 | | * | < 2.2 | | D | < 15 | | D | 1.8 | | | 5.4 | | | 7.2 | | | 45 | | * | 2230 | | * | 720 | | * | 3680 | | * | 7900 | | * |
| 6-SS-A | 0-6 | 10/30/2012 | 11:03 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 7-SS-A | 0-6 | 10/30/2012 | 10:29 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 8-SS-A | 0-6 | 10/30/2012 | 9:45 | < 0.11 | | | 0.47 | | * | 0.043 | | | 0.87 | | | 0.97 | | | 0.074 | | | 1.0 | | | < 0.11 | | | 7.7 | | | 12 | | | 12 | | | 27 | | |
| 9-SS-A | 0-6 | 11/7/2012 | 10:33 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 9-SS-B | 6-12 | 11/7/2012 | 11:04 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 9-SS-C | 12-24 | 11/7/2012 | 12:02 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 10-SS-A | 0-6 | 10/19/2012 | 13:36 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 10-SS-B | 6-12 | 10/19/2012 | 14:03 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 10-SS-C | 12-24 | 10/19/2012 | 14:35 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 11-SS-A | 0-6 | 10/30/2012 | 13:43 | < 0.22 | | D | < 0.11 | | D | < 0.11 | | D | < 5.0 | | D | < 0.30 | | D | < 0.50 | | D | < 0.80 | | D | 1.5 | | | 104 | | * | 97 | | * | 152 | | * | 354 | | * |
| 11-SS-AD | 0-6 | 10/30/2012 | 13:45 | < 0.21 | | D | < 0.11 | | D | < 0.11 | | D | < 4.0 | | D | < 0.30 | | D | < 0.11 | | D | < 0.30 | | D | 1.4 | | | 98 | | | 81 | | * | 136 | | * | 316 | | * |
| 12-SS-A | 0-6 | 10/30/2012 | 14:11 | < 0.21 | | D | < 0.10 | | D | < 0.10 | | D | < 3.0 | | D | 0.38 | | | 0.66 | | | 1.0 | | | 0.35 | | | 66 | | | 70 | | * | 110 | | * | 200 | | * |
| 12-SS-B | 6-12 | 10/30/2012 | 15:03 | < 1.1 | | D | 0.68 | | * | < 0.53 | | D | 20 | | * | 3.2 | | | 3.6 | | | 6.7 | | | 4.7 | | * | 504 | | * | 494 | | * | 911 | | * | 1750 | | * |
| 12-SS-C | 12-24 | 10/30/2012 | 15:37 | < 0.22 | | D | 0.45 | | * | < 0.11 | | D | 11 | | * | < 0.60 | | D | 1.8 | | | 1.8 | | | 1.4 | | | 156 | | * | 251 | | * | 307 | | * | 626 | | * |
| 13-SS-A | 0-6 | 10/31/2012 | 11:25 | < 0.24 | | D | 0.51 | | * | 0.11 | | J | 0.58 | | | 0.63 | | | 0.12 | | | 0.75 | | | < 0.24 | | D | 6.3 | | | 17 | | | 12 | | | 31 | | |
| 14-SS-A | 0-6 | 10/31/2012 | 11:57 | < 0.20 | | D | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | 10 | | | < 2.2 | | | 8.9 | | |
| 15-SS-A | 0-6 | 10/31/2012 | 12:54 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 16-SS-A | 0-6 | 10/31/2012 | 13:20 | < 2.3 | | D | < 1.1 | | D | < 1.1 | | D | < 1.0 | | D | < 1.1 | | D | < 1.1 | | D | < 1.1 | | D | < 8.0 | | D | 452 | | * | < 46 | | D | 569 | | * | 1690 | | * |
| 17-SS-A | 0-6 | 10/31/2012 | 13:47 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 18-SS-A | 0-6 | 10/31/2012 | 14:41 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 19-SS-A | 0-6 | 10/25/2012 | 16:55 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 20-SS-A | 0-6 | 11/6/2012 | 11:00 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 20-SS-B | 6-12 | 11/6/2012 | 11:25 | < 0.12 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 20-SS-C | 12-24 | 11/6/2012 | 11:50 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 21-SS-A | 0-6 | 11/6/2012 | 9:42 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | 2.5 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | 3.6 | | |
| 21-SS-B | 6-12 | 11/6/2012 | 10:00 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 21-SS-C | 12-24 | 11/6/2012 | 10:20 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 22-SS-A | 0-6 | 11/6/2012 | 13:30 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | 2.3 | | |
| 22-SS-B | 6-12 | 11/6/2012 | 14:10 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.20 | | D | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | 2.7 | | | 2.5 | | | 2.4 | | | 10 | | |
| 22-SS-C | 12-24 | 11/6/2012 | 15:33 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.20 | | D | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | 3.3 | | | 3.6 | | | 3.9 | | | 12 | | |
| 23-SS-A | 0-6 | 11/7/2012 | 9:34 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 25-SS-A | 0-6 | 10/31/2012 | 15:22 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 25-SS-B | 6-12 | 10/31/2012 | 15:56 | < 0.12 | | | 0.049 | | J* | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.12 | | | 2.0 | | J | 3.8 | | | < 2.4 | | | 11 | | |
| 25-SS-C | 12-24 | 10/31/2012 | 16:30 | < 4.4 | | D | 8.1 | | * | 8.3 | | | < 14 | | D | 13 | | | 10 | | | 24 | | | 15 | | * | 1030 | | * | 453 | | * | 1470 | | * | 3190 | | * |
| 26-SS-A | 0-6 | 11/8/2012 | 9:35 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 26-SS-B | 6-12 | 11/8/2012 | 10:05 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 26-SS-C | 12-24 | 11/8/2012 | 10:50 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 27-SS-A | 0-6 | 11/8/2012 | 15:00 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 28-SS-A | 0-6 | 11/8/2012 | 13:30 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 28-SS-B | 6-12 | 11/8/2012 | 13:42 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 28-SS-C | 12-24 | 11/8/2012 | 14:15 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 29-SS-A | 0-6 | 11/1/2012 | 10:55 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 29-SS-B | 6-12 | 11/1/2012 | 11:26 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 29-SS-C | 12-24 | 11/1/2012 | 12:43 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 30-SS-A | 0-6 | 11/1/2012 | 10:15 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 31-SS-A | 0-6 | 10/26/2012 | 11:25 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 31-SS-B | 6-12 | 10/26/2012 | 11:45 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.12 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 31-SS-C | 12-24 | 10/26/2012 | 12:12 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 32-SS-A | 0-6 | 10/19/2012 | 9:45 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 33-SS-A | 0-6 | 10/25/2012 | 12:05 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.12 | | | < 2.3 | | | < 2.3 | | | 2.8 | | | 13 | | |
| 34-SS-A | 0-6 | 10/18/2012 | 12:27 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | 2.1 | | |
| 35-SS-A | 0-6 | 10/18/2012 | 11:39 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 36-SS-A | 0-6 | 11/6/2012 | 14:04 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 36-SS-B | 6-12 | 11/6/2012 | 14:37 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |

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| ale il o out a ota ur ace oil am ling H | | | | H H | | | | | | H | | | | | | | | | | | | | | | H H | | | I | | | I H I | | | I H I | | | H | | |
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| et od | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| raction | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s ommercial ur ace | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s esidential ur ace | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 36-SS-C | 12-24 | 11/6/2012 | 15:35 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 37-SS-A | 0-6 | 11/7/2012 | 9:37 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | 3.2 | | | < 2.1 | | | 2.0 | | | 9.4 | | |
| 38-SS-A | 0-6 | 11/7/2012 | 10:30 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 38-SS-B | 6-12 | 11/7/2012 | 10:50 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 38-SS-C | 12-24 | 11/7/2012 | 12:15 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 39-SS-A | 0-6 | 11/7/2012 | 14:15 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 39-SS-AD | 0-6 | 11/7/2012 | 14:20 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 40-SS-A | 0-6 | 11/8/2012 | 9:34 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 40-SS-B | 6-12 | 11/8/2012 | 10:17 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | 2.3 | | |
| 40-SS-C | 12-24 | 11/8/2012 | 11:23 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 41-SS-A | 0-6 | 11/8/2012 | 16:16 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 42-SS-A | 0-6 | 11/8/2012 | 13:23 | < 0.11 | | | < 0.054 | | | 0.12 | | | < 0.054 | | | 0.32 | | | 0.14 | | | 0.46 | | | 0.12 | | | 2.2 | | | < 2.1 | | | 1.4 | | | 4.1 | | |
| 42-SS-B | 6-12 | 11/8/2012 | 14:00 | < 0.11 | | | < 0.055 | | | 0.20 | | | 0.062 | | | 0.62 | | | 0.18 | | | 0.80 | | | 0.15 | | | 2.7 | | | < 2.2 | | | 2.8 | | | 7.2 | | |
| 42-SS-C | 12-24 | 11/8/2012 | 14:36 | < 0.11 | | | < 0.057 | | | 0.14 | | | 0.077 | | | 0.54 | | | 0.16 | | | 0.70 | | | 0.16 | | | 2.7 | | | < 2.3 | | | 2.3 | | | 7.0 | | |
| 42-SS-CD | 12-24 | 11/8/2012 | 14:44 | < 0.11 | | | < 0.057 | | | 0.11 | | | 0.074 | | | 0.49 | | | 0.14 | | | 0.63 | | | 0.15 | | | 2.8 | | | < 2.3 | | | 1.5 | | | 5.7 | | |
| 43-SS-A | 0-6 | 11/8/2012 | 15:35 | < 0.11 | | | < 0.053 | | | 0.15 | | | < 0.053 | | | 0.25 | | | 0.095 | | | 0.35 | | | 0.18 | | | < 2.1 | | | < 2.1 | | | 2.3 | | | 3.6 | | |
| 43-SS-B | 6-12 | 11/8/2012 | 16:15 | < 0.53 | | D | < 0.27 | | D | 0.26 | | | < 0.60 | | D | 0.56 | | | 0.29 | | | 0.86 | | | < 0.70 | | D | 39 | | | 9.8 | | | 30 | | | 121 | | * |
| 43-SS-C | 12-24 | 11/8/2012 | 16:45 | < 0.11 | | | < 0.054 | | | < 0.054 | | | 0.041 | | | 0.12 | | | < 0.054 | | | 0.12 | | | < 0.11 | | | < 2.2 | | | 2.0 | | | 3.2 | | | 6.1 | | |
| 44-SS-A | 0-6 | 11/2/2012 | 11:12 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | J | | < 0.057 | J | | < 0.057 | J | | < 0.11 | | | < 2.3 | J | | < 2.3 | | | < 2.3 | J | | 1.9 | | |
| 44-SS-B | 6-12 | 11/2/2012 | 11:35 | < 2.0 | | D | < 1.0 | | D | 2.4 | | | < 10 | | D | 20 | J | | 13 | J | | 33 | J | | 9.5 | | * | 862 | J | * | 669 | | * | 1060 | J | * | 2240 | | * |
| 44-SS-C | 12-24 | 11/2/2012 | 12:03 | < 4.6 | | D | < 2.3 | | D | 2.1 | | | < 10 | | D | 15 | J | | 14 | J | | 28 | J | | 12 | | * | 1430 | J | * | 930 | | * | 1940 | J | * | 3890 | | * |
| 44-SS-CD | 12-24 | 11/2/2012 | 12:08 | < 2.0 | | D | < 1.0 | | D | 1.6 | | | < 10 | | D | 6.8 | J | | 8.0 | J | | 15 | J | | 10 | | * | 670 | J | * | 964 | | * | 887 | J | * | 2330 | | * |
| 45-SS-A | 0-6 | 11/1/2012 | 14:10 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | 3.1 | | | < 2.2 | | | 1.3 | | | 15 | | |
| 45-SS-B | 6-12 | 11/1/2012 | 14:28 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | 4.5 | | | < 2.2 | | | 2.0 | | | 19 | | |
| 45-SS-C | 12-24 | 11/1/2012 | 14:47 | < 1.2 | | D | < 0.62 | | D | < 0.62 | | D | < 5.0 | | D | 2.0 | | | 4.0 | | | 6.0 | | | 13 | | * | 902 | | * | 459 | | * | 1550 | | * | 3140 | | * |
| 46-SS-A | 0-6 | 10/26/2012 | 14:00 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 46-SS-B | 6-12 | 10/26/2012 | 14:20 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 46-SS-C | 12-24 | 10/26/2012 | 14:40 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 47-SS-A | 0-6 | 10/18/2012 | 14:52 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 47-SS-B | 6-12 | 10/18/2012 | 15:13 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.12 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 47-SS-C | 12-24 | 10/18/2012 | 16:14 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 47-SS-CD | 12-24 | 10/18/2012 | 16:18 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 48-SS-A | 0-6 | 10/18/2012 | 14:13 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 49-SS-A | 0-6 | 10/25/2012 | 13:00 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | 2.2 | | |
| 50-SS-A | 0-6 | 10/25/2012 | 14:20 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.40 | | D | < 0.055 | | | 0.099 | | | 0.099 | | | < 0.11 | | | 9.0 | | | 5.3 | | | 12 | | | 32 | | |
| 51-SS-A | 0-6 | 10/25/2012 | 15:45 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | 1.9 | | | 3.4 | | |
| 52-SS-A | 0-6 | 10/5/2012 | 9:35 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 53-SS-A | 0-6 | 10/24/2012 | 9:30 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 54-SS-A | 0-6 | 10/23/2012 | 14:50 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.12 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 54-SS-B | 6-12 | 10/23/2012 | 15:40 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.12 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 54-SS-C | 12-24 | 10/23/2012 | 16:05 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | 2.7 | | | 3.6 | | |
| 55-SS-A | 0-6 | 10/23/2012 | 14:10 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 56-SS-A | 0-6 | 10/23/2012 | 11:55 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | 0.050 | | J | < 0.056 | | | 0.050 | | J | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 56-SS-B | 6-12 | 10/23/2012 | 12:30 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 56-SS-C | 12-24 | 10/23/2012 | 13:10 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | 3.9 | | | < 2.2 | | | < 2.2 | | | 6.3 | | |
| 57-SS-A | 0-6 | 10/23/2012 | 10:55 | < 0.12 | | | < 0.058 | | | < 0.058 | | | 0.050 | | J | 0.31 | | | 0.14 | | | 0.44 | | | 0.15 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | 2.0 | | J |
| 58-SS-A | 0-6 | 10/19/2012 | 10:52 | < 0.12 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 58-SS-B | 6-12 | 10/23/2012 | 10:05 | < 0.12 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 58-SS-C | 12-24 | 10/23/2012 | 10:15 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 59-SS-A | 0-6 | 10/24/2012 | 11:30 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 60-SS-A | 0-6 | 10/24/2012 | 13:20 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 61-SS-A | 0-6 | 10/25/2012 | 9:20 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.20 | | D | < 0.055 | | | 0.053 | | | 0.053 | | | 4.0 | | * | 84 | | | 2.8 | | | 106 | | * | 365 | | * |
| 61-SS-B | 6-12 | 10/25/2012 | 9:50 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.20 | | D | < 0.055 | | | 0.067 | | | 0.067 | | | 3.2 | | | 66 | | | 4.6 | | | 89 | | | 314 | | * |
| 61-SS-C | 12-24 | 10/25/2012 | 10:20 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.20 | | D | < 0.056 | | | 0.083 | | | 0.083 | | | 0.80 | | | 32 | | | 4.2 | | | 41 | | | 114 | | * |
| 62-SS-A | 0-6 | 10/24/2012 | 15:30 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.12 | | | 5.0 | | | < 2.3 | | | 2.1 | | J | 9.6 | | |
| 63-SS-A | 0-6 | 10/24/2012 | 14:50 | < 2.3 | | D | < 1.2 | | D | < 1.2 | | D | 17 | | * | 0.92 | | J | 4.2 | | | 5.1 | | | 22 | | * | 1190 | | * | 331 | | * | 2380 | | * | 3840 | | * |
| 63-SS-AD | 0-6 | 10/24/2012 | 14:55 | < 2.3 | | D | < 1.2 | | D | < 1.2 | | D | 21 | | * | 1.0 | | J | 5.2 | | | 6.3 | | | 25 | | * | 1400 | | * | 397 | | * | 2730 | | * | 4400 | | * |
| 64-SS-A | 0-6 | 10/10/2012 | 14:45 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | 0.060 | | | 0.060 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 65-SS-A | 0-6 | 10/10/2012 | 11:47 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | 0.061 | | J | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 65-SS-B | 6-12 | 10/10/2012 | 12:30 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | 0.072 | | J | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 65-SS-C | 12-24 | 10/10/2012 | 13:50 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |

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| ale il o out a ota ur ace oil am ling H | | | | H H | | | | | | H | | | | | | | | | | | | | | | H H | | | I | | | I H I | | | I H I | | | H | | |
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| et od | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
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| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| s ommercial ur ace | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s esidential ur ace | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 66-SS-A | 0-6 | 10/9/2012 | 15:52 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 67-SS-A | 0-6 | 10/17/2012 | 9:40 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 67-SS-B | 6-12 | 10/17/2012 | 10:10 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 67-SS-C | 12-24 | 10/17/2012 | 10:45 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 68-SS-A | 0-6 | 10/17/2012 | 12:05 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | 0.054 | | J | 0.067 | | | 0.12 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 69-SS-A | 0-6 | 10/17/2012 | 13:00 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 69-SS-B | 6-12 | 10/17/2012 | 13:25 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 69-SS-C | 12-24 | 10/17/2012 | 13:45 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 70N-SS-A | 0-6 | 10/18/2012 | 10:10 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 70N-SS-AD | 0-6 | 10/18/2012 | 10:11 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 70-SS-A | 0-6 | 10/17/2012 | 15:00 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 71-SS-A | 0-6 | 10/4/2012 | 14:24 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 71-SS-B | 6-12 | 10/4/2012 | 14:51 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 71-SS-C | 12-24 | 10/4/2012 | 15:50 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 72-SS-A | 0-6 | 10/24/2012 | 13:50 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 73-SS-A | 0-6 | 10/25/2012 | 11:00 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | 0.14 | | | < 2.2 | | | < 2.2 | | | 2.2 | | | 3.9 | | |
| 74-SS-A | 0-6 | 10/5/2012 | 9:55 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 75-SS-A | 0-6 | 10/5/2012 | 10:59 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 75-SS-B | 6-12 | 10/5/2012 | 11:17 | < 0.11 | | | < 0.053 | | | < 0.053 | | | 0.071 | | | 0.19 | | | < 0.10 | | D | 0.19 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | 1.8 | | |
| 75-SS-C | 12-24 | 10/5/2012 | 11:38 | < 0.11 | | | < 0.053 | | | < 0.053 | | | 0.056 | | | 0.14 | | | < 0.20 | | D | 0.14 | | | 0.053 | | J | < 2.1 | | | < 2.1 | | | < 2.1 | | | 2.4 | | |
| 76-SS-A | 0-6 | 10/10/2012 | 15:35 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | 0.045 | | J | 0.061 | | | 0.11 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 77-SS-A | 0-6 | 10/2/2012 | 10:30 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | 0.11 | | | < 0.052 | | | 0.11 | | | 0.21 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 77-SS-B | 6-12 | 10/2/2012 | 10:47 | < 0.10 | | | < 0.051 | | | < 0.051 | | | < 0.051 | | | < 0.051 | | | < 0.051 | | | < 0.051 | | | 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 77-SS-C | 12-24 | 10/2/2012 | 11:20 | < 0.11 | | | < 0.053 | | | < 0.053 | | | 0.058 | | | 0.16 | | | < 0.40 | | D | 0.50 | | | 0.20 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 78-SS-A | 0-6 | 10/2/2012 | 16:16 | < 0.10 | | | < 0.051 | | | < 0.051 | | | < 0.051 | | | < 0.051 | | | < 0.051 | | | < 0.051 | | | 0.053 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 79-SS-A | 0-6 | 10/2/2012 | 16:00 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 80-SS-A | 0-6 | 10/2/2012 | 15:40 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 81-SS-A | 0-6 | 10/11/2012 | 15:30 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 82-SS-A | 0-6 | 10/16/2012 | 10:33 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 82-SS-B | 6-12 | 10/16/2012 | 11:00 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 82-SS-C | 12-24 | 10/16/2012 | 11:40 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 83-SS-A | 0-6 | 10/16/2012 | 15:30 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 84-SS-A | 0-6 | 10/16/2012 | 13:35 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 84-SS-B | 6-12 | 10/16/2012 | 14:00 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | 0.050 | | J | 0.041 | | J | 0.092 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 84-SS-C | 12-24 | 10/16/2012 | 14:35 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 85-SS-A | 0-6 | 10/11/2012 | 14:00 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | 0.36 | | | 11 | | | < 2.2 | | | 8.3 | | | 41 | | |
| 86-SS-A | 0-6 | 10/11/2012 | 13:10 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 87-SS-A | 0-6 | 10/9/2012 | 14:00 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 88-SS-A | 0-6 | 10/4/2012 | 11:17 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 89-SS-A | 0-6 | 10/2/2012 | 13:40 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 90-SS-A | 0-6 | 10/2/2012 | 14:00 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 91-SS-A | 0-6 | 10/2/2012 | 14:20 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 91-SS-B | 6-12 | 10/2/2012 | 14:35 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 91-SS-C | 12-24 | 10/2/2012 | 15:00 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 92-SS-A | 0-6 | 10/2/2012 | 15:30 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 93-SS-A | 0-6 | 10/3/2012 | 9:50 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 93-SS-B | 6-12 | 10/3/2012 | 10:05 | < 0.10 | | | < 0.051 | | | < 0.051 | | | < 0.051 | | | < 0.051 | | | < 0.051 | | | < 0.051 | | | < 0.10 | | | < 2.0 | | | < 2.0 | | | < 2.0 | | | < 2.0 | | |
| 93-SS-C | 12-24 | 10/3/2012 | 10:30 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 94-SS-A | 0-6 | 10/3/2012 | 14:00 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 94-SS-AD | 0-6 | 10/3/2012 | 14:01 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 95-SS-A | 0-6 | 10/3/2012 | 14:23 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 96-SS-A | 0-6 | 10/3/2012 | 14:32 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 97-SS-A | 0-6 | 10/12/2012 | 13:20 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 97-SS-B | 6-12 | 10/12/2012 | 13:45 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 97-SS-C | 12-24 | 10/12/2012 | 14:30 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 98-SS-A | 0-6 | 10/11/2012 | 15:05 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 99-SS-A | 0-6 | 10/12/2012 | 10:20 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 99-SS-B | 6-12 | 10/12/2012 | 10:40 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 99-SS-C | 12-24 | 10/12/2012 | 11:55 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 100-SS-A | 0-6 | 10/12/2012 | 9:45 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | 0.083 | | | 2.4 | | | < 2.1 | | | 1.7 | | | 17 | | |
| 101-SS-A | 0-6 | 10/11/2012 | 12:10 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |

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| ale il o out a ota ur ace oil am ling H | | | | H H | | | | | | | | | H | | | | | | | | | | | | H H | | | I | | | I H I | | | I H I | | | H | | |
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| et od | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| raction | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| s ommercial ur ace | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 102-SS-A | 0-6 | 10/9/2012 | 11:52 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.12 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 102-SS-B | 6-12 | 10/9/2012 | 12:15 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 102-SS-C | 12-24 | 10/9/2012 | 12:48 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 102-SS-CD | 12-24 | 10/9/2012 | 12:50 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 103-SS-A | 0-6 | 10/9/2012 | 13:31 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 104-SS-A | 0-6 | 10/4/2012 | 10:32 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 105-SS-A | 0-6 | 10/4/2012 | 10:16 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 106-SS-A | 0-6 | 10/3/2012 | 16:00 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 107-SS-A | 0-6 | 10/3/2012 | 15:15 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 108-SS-A | 0-6 | 10/11/2012 | 11:00 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | 3.8 | | | 6.6 | | |
| 109-SS-A | 0-6 | 10/11/2012 | 11:25 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |

**NOTES:**

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|---|---|
| 2.5 | **Exceeds Direct Contact Commercial RSL** |
| 1360 | **Exceeds Direct Contact Residential RSL** |
| 3.1 | **Exceeds MDEQ Leaching to Groundwater Screening Level** |
| 22 | **Exceeds MDEQ - RBSLs Commercial Surface** |
| 1.79 | **Exceeds MDEQ - RBSLs Residential Surface** |
| <0.53 | **Non-Detect Result that Exceeds an Associated Screening Level** |

**(1) - EPA RSL Version used for screening level development: January 2015**
**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| am le ode | H I | ate | I | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s |
| 1-SS-A | 0-6 | 11/7/2012 | 16:27 | 128 | | | | | < 0.035 | < 0.035 | < 0.035 | < 0.035 | < 0.035 | 0.091 * | 0.084 | 0.047 | 0.037 | < 0.035 | < 0.035 | 0.056 | < 0.035 | 0.17 | < 0.035 | < 0.035 | 0.055 |
| 2-SS-A | 0-6 | 11/7/2012 | 14:33 | 219 * | < 10 | 57 | 25 | 120 | < 0.035 | < 0.035 | < 0.035 | < 0.035 | < 0.035 | 0.094 * | 0.075 | 0.045 | < 0.035 | 0.051 | < 0.035 | 0.052 | < 0.035 | 0.16 | < 0.035 | < 0.035 | 0.055 |
| 2-SS-B | 6-12 | 11/7/2012 | 15:13 | 488 * | 10 | 146 | 90 | 383 | < 0.036 | < 0.036 | < 0.036 | < 0.036 | < 0.036 | 0.092 * | < 0.036 | 0.046 | < 0.036 | < 0.036 | < 0.036 | < 0.036 | < 0.036 | < 0.036 | < 0.036 | < 0.036 | 0.052 |
| 2-SS-C | 12-24 | 11/7/2012 | 15:41 | 501 * | 12 | 117 | 104 | 342 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 |
| 3-SS-A | 0-6 | 11/7/2012 | 16:09 | 266 * | < 11 | 65 | 49 | 169 | < 0.036 | < 0.036 | < 0.036 | < 0.036 | 0.043 | 0.13 * | 0.11 | 0.074 | 0.073 | 0.11 | < 0.036 | 0.11 | < 0.036 | 0.19 | < 0.036 | 0.040 | 0.12 |
| 4-SS-A | 0-6 | 10/30/2012 | 12:52 | 387 * | < 23 J | 88 J | 78 J | 244 J | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | 0.087 * | 0.069 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | 0.15 | < 0.038 | < 0.038 | < 0.038 |
| 5-SS-A | 0-6 | 10/30/2012 | 11:46 | 3230 * | 1230 J * | 345 J | 565 J * | 2520 J | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | 1.6 U | < 0.54 | < 0.54 |
| 6-SS-A | 0-6 | 10/30/2012 | 11:03 | 116 | | | | | < 0.0036 | 0.013 | < 0.0036 | 0.098 | 0.22 * | 0.25 * | 0.19 | 0.086 | 0.18 | 0.24 | < 0.0036 | 0.54 | 0.015 | 0.16 | < 0.0036 | 0.20 | 0.50 |
| 7-SS-A | 0-6 | 10/30/2012 | 10:29 | 330 * | < 22 J | 120 J | 57 J | 245 J | < 0.037 | < 0.037 | < 0.037 | < 0.037 | < 0.037 | 0.083 * | < 0.037 | < 0.037 | < 0.037 | < 0.037 | < 0.037 | < 0.037 | < 0.037 | < 0.037 | < 0.037 | < 0.037 | < 0.037 |
| 8-SS-A | 0-6 | 10/30/2012 | 9:45 | 501 * | < 22 J | 116 J | 95 J | 304 J | < 0.0036 | < 0.0036 | < 0.0036 | < 0.0036 | < 0.0036 | 0.011 | 0.011 | 0.0095 | 0.0058 | 0.0073 | < 0.0036 | 0.011 | < 0.0036 | 0.018 | 0.0098 U | 0.0065 | 0.011 |
| 9-SS-A | 0-6 | 11/7/2012 | 10:33 | 148 | | | | | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | 0.056 * | 0.060 | 0.036 | 0.034 | < 0.018 | < 0.018 | 0.042 | < 0.018 | 0.097 | < 0.018 | < 0.018 | 0.047 |
| 9-SS-B | 6-12 | 11/7/2012 | 11:04 | 60 | | | | | < 0.0036 | < 0.0036 | < 0.0036 | < 0.0036 | < 0.0036 | 0.012 | 0.010 | 0.0079 | 0.0039 | 0.0072 | < 0.0036 | 0.0089 | < 0.0036 | 0.018 | < 0.0036 | 0.0038 | 0.0084 |
| 9-SS-C | 12-24 | 11/7/2012 | 12:02 | < 11 | | | | | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 |
| 10-SS-A | 0-6 | 10/19/2012 | 13:36 | 136 | | | | | 0.0055 | 0.074 | 0.011 | 0.16 | 0.28 * | 0.41 * | 0.26 * | 0.28 | 0.19 | 0.31 | 0.098 * | 0.76 | 0.044 | 0.37 * | 0.012 U | 0.48 | 0.70 |
| 10-SS-B | 6-12 | 10/19/2012 | 14:03 | 163 | | | | | 0.021 | 0.19 | 0.020 | 0.35 | 0.58 * | 0.74 * | 0.46 * | 0.55 | 0.55 | 0.62 | 0.19 * | 1.5 | 0.14 | 0.64 * | 0.051 | 1.1 | 1.3 |
| 10-SS-C | 12-24 | 10/19/2012 | 14:35 | 34 | | | | | < 0.0037 | 0.011 | < 0.0037 | 0.026 | 0.038 | 0.072 * | 0.054 | 0.034 | 0.029 | 0.038 | 0.013 | 0.10 | 0.0089 | 0.063 | 0.0052 U | 0.064 | 0.084 |
| 11-SS-A | 0-6 | 10/30/2012 | 13:43 | 8690 * | 583 J * | 1680 J | 2620 J * | 6030 J | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 |
| 11-SS-AD | 0-6 | 10/30/2012 | 13:45 | 4550 * | 170 J | 880 J | 1180 J * | 2850 J | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 |
| 12-SS-A | 0-6 | 10/30/2012 | 14:11 | 861 * | < 126 J | 313 J | 186 J | 716 J | < 0.52 | < 0.52 | < 0.52 | < 0.52 | < 0.52 | < 0.52 | < 0.52 | < 0.52 | < 0.52 | < 0.52 | < 0.52 | < 0.52 | < 0.52 | < 0.52 | < 0.52 | < 0.52 | < 0.52 |
| 12-SS-B | 6-12 | 10/30/2012 | 15:03 | 1700 * | < 126 J | 381 J | 341 J | 1110 J | 2.0 | < 0.053 | < 0.053 | 0.069 | < 0.053 | < 0.053 | < 0.053 | < 0.053 | < 0.053 | < 0.053 | < 0.053 | < 0.053 | 0.34 | < 0.053 | 0.69 | 0.33 | 0.079 |
| 12-SS-C | 12-24 | 10/30/2012 | 15:37 | 3330 * | 161 J | 700 J | 717 J * | 2180 J | < 0.55 | < 0.55 | < 0.55 | < 0.55 | < 0.55 | < 0.55 | < 0.55 | < 0.55 | < 0.55 | < 0.55 | < 0.55 | < 0.55 | < 0.55 | < 0.55 | < 0.55 | < 0.55 | < 0.55 |
| 13-SS-A | 0-6 | 10/31/2012 | 11:25 | 5850 * | 1070 * | 1730 | 1300 * | 4740 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 |
| 14-SS-A | 0-6 | 10/31/2012 | 11:57 | 3210 * | 620 * | 955 | 850 * | 2840 | < 0.074 | < 0.074 | < 0.074 | 0.27 | 0.26 * | 0.40 * | 0.37 * | 0.14 | 0.20 | 0.26 | < 0.074 | 0.87 | < 0.074 | 0.39 * | < 0.074 | 0.69 | 0.72 |
| 15-SS-A | 0-6 | 10/31/2012 | 12:54 | 326 * | 16 | 91 | 61 | 211 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 | < 0.0035 |
| 16-SS-A | 0-6 | 10/31/2012 | 13:20 | 1560 * | 635 * | 202 | 310 | 1240 | < 0.0038 | 0.71 | < 0.0038 | 0.10 | 0.026 | 0.044 * | 0.054 | 0.040 | 0.029 | 0.042 | < 0.0038 | 0.090 | 1.5 | 0.060 | < 0.0038 | 1.6 | 0.11 |
| 17-SS-A | 0-6 | 10/31/2012 | 13:47 | 113 | | | | | < 0.0039 | < 0.0039 | < 0.0039 | < 0.0039 | 0.0074 | 0.020 | 0.017 | 0.0093 | 0.0083 | 0.011 | < 0.0039 | 0.021 | < 0.0039 | 0.023 | < 0.0039 | 0.0082 | 0.020 |
| 18-SS-A | 0-6 | 10/31/2012 | 14:41 | 462 * | < 23 | 128 | 80 | 293 | 0.15 | 0.58 | < 0.078 | 1.5 | 2.3 * | 2.6 * | 2.2 * | 1.4 | 1.3 | 2.0 | 0.68 * | 6.6 | 0.49 | 2.2 * | 0.27 U | 4.3 | 5.0 |
| 19-SS-A | 0-6 | 10/25/2012 | 16:55 | 717 * | < 12 | 189 | 191 | 608 | < 0.079 | < 0.079 | < 0.079 | < 0.079 | 0.20 * | 0.50 * | 0.33 * | 0.28 | 0.27 | 0.35 | < 0.079 | 0.40 | < 0.079 | 0.50 * | < 0.079 | 0.10 | 0.55 |
| 20-SS-A | 0-6 | 11/6/2012 | 11:00 | 459 * | < 23 | 133 | 65 | 313 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | 0.089 * | 0.073 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | 0.042 | < 0.038 | 0.15 | < 0.038 | < 0.038 | 0.039 |
| 20-SS-B | 6-12 | 11/6/2012 | 11:25 | 234 * | < 24 | 50 | < 24 | 157 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | 0.052 * | 0.046 | 0.021 | < 0.020 | < 0.020 | < 0.020 | 0.026 | < 0.020 | 0.082 | < 0.020 | < 0.020 | 0.025 |
| 20-SS-C | 12-24 | 11/6/2012 | 11:50 | 53 | | | | | < 0.0041 | < 0.0041 | < 0.0041 | < 0.0041 | < 0.0041 | 0.0097 | 0.0081 | < 0.0041 | < 0.0041 | < 0.0041 | < 0.0041 | 0.0048 | < 0.0041 | 0.016 | < 0.0041 | < 0.0041 | < 0.0041 |
| 21-SS-A | 0-6 | 11/6/2012 | 9:42 | 1230 * | < 31 | 315 | 211 | 848 | 0.25 | 1.4 | 0.35 | 2.1 | 2.5 * | 3.4 * | 2.7 * | 3.0 | 1.6 | 2.2 | 1.0 * | 6.7 | 1.0 | 3.4 * | 0.65 | 5.7 | 5.8 |
| 21-SS-B | 6-12 | 11/6/2012 | 10:00 | 899 * | < 33 | 198 | 106 | 517 | < 0.019 | < 0.019 | < 0.019 | 0.033 | 0.070 | 0.14 * | 0.12 | 0.11 | 0.080 | 0.074 | < 0.019 | 0.19 | < 0.019 | 0.17 | < 0.019 | 0.10 | 0.15 |
| 21-SS-C | 12-24 | 11/6/2012 | 10:20 | 36 | | | | | < 0.0039 | < 0.0039 | < 0.0039 | < 0.0039 | < 0.0039 | 0.011 | 0.011 | 0.0050 | 0.0044 | < 0.0039 | < 0.0039 | 0.010 | < 0.0039 | 0.020 | < 0.0039 | 0.0061 | 0.0091 |
| 22-SS-A | 0-6 | 11/6/2012 | 13:30 | 1920 * | 35 | 460 | 412 * | 1540 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | 0.13 | < 0.071 | < 0.071 | < 0.071 | 0.11 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | 0.12 |
| 22-SS-B | 6-12 | 11/6/2012 | 14:10 | 3850 * | 98 | 735 | 1000 * | 2670 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 |
| 22-SS-C | 12-24 | 11/6/2012 | 15:33 | 4270 * | 135 | 883 | 1180 * | 3370 | < 0.073 | < 0.073 | < 0.073 | < 0.073 | < 0.073 | < 0.073 | < 0.073 | < 0.073 | < 0.073 | < 0.073 | < 0.073 | < 0.073 | < 0.073 | < 0.073 | < 0.073 | < 0.073 | < 0.073 |
| 23-SS-A | 0-6 | 11/7/2012 | 9:34 | 645 * | < 32 | 131 | 90 | 424 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | 0.23 * | 0.17 | 0.18 | 0.079 | 0.089 | < 0.072 | 0.13 | < 0.072 | 0.38 * | < 0.072 | < 0.072 | 0.15 |
| 25-SS-A | 0-6 | 10/31/2012 | 15:22 | 1850 * | 206 * | 134 | 574 * | 1170 | 25 | 0.48 | < 0.078 | 0.22 | 1.0 * | 1.0 * | 0.97 * | 0.32 | 0.51 | 0.85 | < 0.078 | 2.0 | 0.43 | 0.74 * | 0.97 | 0.78 | 1.6 |
| 25-SS-B | 6-12 | 10/31/2012 | 15:56 | 6880 * | 1740 * | 1120 | 1840 * | 5350 | 8.0 | 0.18 | < 0.082 | < 0.082 | 0.24 * | 0.47 * | 0.48 * | 0.20 | 0.30 | 0.34 | < 0.082 | 0.43 | 0.24 | 0.54 * | 0.84 | 0.24 | 0.56 |
| 25-SS-C | 12-24 | 10/31/2012 | 16:30 | 13400 * | 5660 * | 1350 | 2610 * | 10300 | 8.7 | < 0.076 | < 0.076 | < 0.076 | 0.18 | 0.32 * | 0.33 * | 0.15 | 0.19 | 0.31 | < 0.076 | 0.34 | 0.55 | 0.43 * | 3.3 | 0.51 | 0.48 |
| 26-SS-A | 0-6 | 11/8/2012 | 9:35 | 1320 * | 194 | 241 | 233 | 912 | < 0.071 | 0.13 | < 0.071 | 0.46 | 0.71 * | 0.84 * | 0.79 * | 0.68 | 0.50 | 0.70 | < 0.071 | 1.7 | 0.15 | 0.92 * | < 0.071 | 0.89 | 1.6 |
| 26-SS-B | 6-12 | 11/8/2012 | 10:05 | 4710 * | 1530 * | 576 | 1660 * | 4340 | 4.3 | 13 | < 0.073 | 26 | 24 * | 32 * | 19 * | 9.9 | 15 * | 40 * | 5.9 * | 73 | 11 | 11 * | 2.8 | 74 | 66 |
| 26-SS-C | 12-24 | 11/8/2012 | 10:50 | 27100 * | 5210 * | 6560 | 8920 * | 26000 | 7.0 | 10 | < 0.55 | 32 | 32 * | 51 * | 29 * | 14 | 13 * | 39 * | < 0.55 | 86 | 14 | 19 * | 3.7 | 81 | 88 |
| 27-SS-A | 0-6 | 11/8/2012 | 15:00 | 1210 * | 112 | 304 | 159 | 771 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | 0.18 | 1.0 * | 0.32 * | 0.41 | 0.27 | 0.33 | 0.23 * | 0.36 | < 0.072 | 0.54 * | < 0.072 | 0.17 | 0.44 |
| 28-SS-A | 0-6 | 11/8/2012 | 13:30 | 527 * | 20 | 218 | 74 | 493 | < 0.036 | < 0.036 | < 0.036 | < 0.036 | 0.057 | 0.28 * | 0.10 | 0.089 | 0.071 | 0.078 | < 0.036 | 0.13 | < 0.036 | 0.21 * | < 0.036 | 0.048 | 0.14 |
| 28-SS-B | 6-12 | 11/8/2012 | 13:42 | 586 * | 24 | 145 | 86 | 407 | < 0.037 | < 0.037 | < 0.037 | 0.057 | < 0.037 | 0.24 * | 0.11 | 0.052 | 0.049 | 0.075 | < 0.037 | 0.11 | < 0.037 | 0.17 | < 0.037 | 0.10 | 0.11 |
| 28-SS-C | 12-24 | 11/8/2012 | 14:15 | 1400 * | 38 | 226 | 289 | 948 | 0.042 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | 0.20 * | 0.12 | 0.087 | 0.069 | 0.039 | < 0.038 | < 0.038 | < 0.038 | 0.17 | < 0.038 | < 0.038 | < 0.038 |
| 29-SS-A | 0-6 | 11/1/2012 | 10:55 | 2730 * | 80 | 402 | 1300 * | 2330 | < 0.27 | < 0.27 | < 0.27 | 1.5 | 6.4 * | 7.1 * | 6.6 * | 2.7 | 3.1 * | 5.5 | 1.6 * | 12 | 0.28 | 5.3 * | < 0.27 | 2.4 | 12 |
| 29-SS-B | 6-12 | 11/1/2012 | 11:26 | 1460 * | 67 | 313 | 417 * | 1170 | < 0.27 | < 0.27 | < 0.27 | 0.54 | 0.61 * | 0.98 * | 0.90 * | 0.34 | 0.32 | 0.67 | < 0.27 | 1.6 | < 0.27 | 1.3 * | < 0.27 | 0.96 | 1.5 |
| 29-SS-C | 12-24 | 11/1/2012 | 12:43 | 1730 * | 117 | 478 | 430 * | 1380 | < 0.28 | < 0.28 | < 0.28 | 0.42 | 0.30 * | < 0.28 | < 0.28 | < 0.28 | < 0.28 | 0.61 | < 0.28 | 0.94 | < 0.28 | < 0.28 | < 0.28 | 0.54 | 0.94 |
| 30-SS-A | 0-6 | 11/1/2012 | 10:15 | 849 * | < 21 | 188 | 183 | 643 | < 0.053 | < 0.053 | < 0.053 | < 0.053 | 0.15 | 0.29 * | 0.30 * | 0.16 | 0.12 | 0.19 | < 0.053 | 0.36 | < 0.053 | 0.40 * | < 0.053 | 0.087 | 0.37 |
| 31-SS-A | 0-6 | 10/26/2012 | 11:25 | 1270 * | < 33 | 260 | 192 | 584 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | 0.069 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | 0.062 |
| 31-SS-B | 6-12 | 10/26/2012 | 11:45 | 1780 * | 21 | 256 | 383 | 867 | 0.0080 | < 0.0078 | < 0.0078 | < 0.0078 | 0.069 | 0.054 * | 0.065 | 0.035 | 0.044 | 0.064 | < 0.0078 | 0.13 | < 0.0078 | 0.073 | 0.013 U | 0.044 | 0.13 |
| 31-SS-C | 12-24 | 10/26/2012 | 12:12 | 1750 * | 22 | 333 | 251 | 810 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | 0.20 | 0.31 * | 0.28 * | 0.17 | 0.17 | 0.28 | < 0.057 | 0.51 | < 0.057 | 0.34 * | < 0.057 | 0.13 | 0.48 |
| 32-SS-A | 0-6 | 10/19/2012 | 9:45 | 222 * | < 10 | 36 | 35 | 96 | 0.0070 | < 0.0069 | < 0.0069 | < 0.0069 | 0.0083 | 0.023 * | 0.018 | 0.0079 | 0.0085 | 0.034 | < 0.0069 | 0.014 | < 0.0069 | 0.027 | 0.012 U B | 0.010 | 0.024 |
| 33-SS-A | 0-6 | 10/25/2012 | 12:05 | 72 | | | | | | | | | | | | | | | | | | | | | |
| 34-SS-A | 0-6 | 10/18/2012 | 12:27 | 67 | | | | | | | | | | | | | | | | | | | | | |
| 35-SS-A | 0-6 | 10/18/2012 | 11:39 | 61 | | | | | | | | | | | | | | | | | | | | | |
| 36-SS-A | 0-6 | 11/6/2012 | 14:04 | 1880 * | 25 J | 369 | 502 * | 1340 | 4.6 | 46 | < 1.2 | 137 | 187 * | 147 * | 127 * | 74 | 91 * | 164 * | 49 * | 407 * | 50 | 102 * | 4.4 * | 392 | 320 * |
| 36-SS-B | 6-12 | 11/6/2012 | 14:37 | 208 * | < 21 | 35 | < 21 | 89 | 0.021 | < 0.017 | 0.034 | 0.048 | 0.038 | 0.11 * | 0.12 | 0.19 | 0.10 | 0.084 | < 0.017 | 0.11 | < 0.017 | 0.22 * | 0.023 | 0.043 | 0.091 |
| 36-SS-C | 12-24 | 11/6/2012 | 15:35 | 224 * | < 24 | 34 | < 24 | 95 | < 0.020 | < 0.020 | < 0.020 | 0.14 | 0.23 * | 0.38 * | 0.26 * | 0.30 | 0.22 | 0.19 | < 0.020 | 0.46 | 0.046 | 0.35 * | < 0.020 | 0.29 | 0.41 |
| 37-SS-A | 0-6 | 11/7/2012 | 9:37 | 1320 * | < 32 | 194 | 255 | 780 | < 0.035 | < 0.035 | 0.055 | 0.098 | 0.049 | 0.14 * | 0.14 | 0.24 | 0.098 | 0.11 | < 0.035 | 0.16 | < 0.035 | 0.35 * | < 0.035 | 0.10 | 0.23 |
| 38-SS-A | 0-6 | 11/7/2012 | 10:30 | 1320 * | < 42 | 316 | 197 | 675 | < 0.071 | < 0.071 | 0.23 | 0.094 | 0.078 | 0.54 * | 0.30 * | 0.95 | 0.23 | 0.18 | < 0.071 | 0.25 | < 0.071 | 1.2 * | < 0.071 | 0.091 | 0.21 |
| 38-SS-B | 6-12 | 11/7/2012 | 10:50 | 3010 * | 91 | 723 | 756 * | 2470 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | 0.81 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 | < 0.53 |
| 38-SS-C | 12-24 | 11/7/2012 | 12:15 | 1490 * | 35 | 381 | 192 | 1030 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 |
| 39-SS-A | 0-6 | 11/7/2012 | 14:15 | 8640 * | 1490 * | 1960 | 3140 * | 8540 | < 0.54 | < 0.54 | < 0.54 | 2.5 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | < 0.54 | 1.1 | < 0.54 | < 0.54 | 1.0 | < 0.54 | < 0.54 | 1.5 | 0.76 |
| 39-SS-AD | 0-6 | 11/7/2012 | 14:20 | 9500 * | 1590 * | 2080 | 3440 * | 9160 | < 0.54 | < 0.54 | < 0.54 | 2.3 | < 0.54 | < 0.54 | 1.1 * | 0.60 | < 0.54 | 0.95 | < 0.54 | < 0.54 | 0.85 | < 0.54 | < 0.54 | 1.2 | 0.69 |
| 40-SS-A | 0-6 | 11/8/2012 | 9:34 | 504 * | < 22 | 134 | 83 | 434 | < 0.036 | < 0.036 | < 0.036 | 0.057 | 0.042 | 0.32 * | 0.15 | 0.10 | 0.15 | 0.078 | 0.14 * | 0.096 | < 0.036 | 0.19 | < 0.036 | 0.036 | 0.094 |
| 40-SS-B | 6-12 | 11/8/2012 | 10:17 | 975 * | 87 | 152 | 188 | 700 | < 0.036 | < 0.036 | < 0.036 | 0.22 | 0.32 * | 0.32 * | 0.30 * | 0.33 | 0.40 | 0.44 | < 0.036 | 0.93 | 0.19 | 0.45 * | < 0.036 | 0.52 | 0.80 |
| 40-SS-C | 12-24 | 11/8/2012 | 11:23 | 6610 * | 1540 * | 1540 | 2150 * | 6550 | 0.27 | < 0.072 | < 0.072 | 0.16 | < 0.072 | < 0.072 | < 0.072 | 0.24 | < 0.072 | 0.49 | < 0.072 | 0.47 | 0.28 | < 0.072 | 0.14 | 0.41 | 0.57 |
| 41-SS-A | 0-6 | 11/8/2012 | 16:16 | 1640 * | 88 | 312 | 375 | 1230 | 0.072 | < 0.071 | 0.61 | 0.31 | 0.89 * | 1.3 * | 0.96 * | 2.0 | 1.1 | 1.2 | 0.44 * | 1.6 | < 0.071 | 1.8 * | 0.086 | 0.41 | 2.0 |
| 42-SS-A | 0-6 | 11/8/2012 | 13:23 | 1620 * | 78 | 273 | 283 | 983 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | 0.31 | < 0.072 | < 0.072 | < 0.072 | 0.20 | < 0.072 | < 0.072 | 0.095 | 0.096 | 0.24 |
| 42-SS-B | 6-12 | 11/8/2012 | 14:00 | 1780 * | 142 | 298 | 404 * | 1200 | 0.22 | < 0.073 | < 0.073 | < 0.073 | 0.12 | 0.082 * | 0.27 * | 0.15 | < 0.073 | < 0.073 | < 0.073 | 0.13 | < 0.073 | 0.29 * | < 0.073 | 0.12 | 0.092 |
| 42-SS-C | 12-24 | 11/8/2012 | 14:36 | 9420 * | 1970 * | 1320 | 1880 * | 6440 | 3.2 | < 0.076 | < 0.076 | 0.13 | 0.12 | 0.11 * | 0.32 * | 0.18 | 0.088 | 0.17 | < 0.076 | 0.17 | 0.36 | 0.34 * | 0.32 | 0.48 | 0.20 |
| 42-SS-CD | 12-24 | 11/8/2012 | 14:44 | 8830 * | 1670 * | 1420 | 1740 * | 6730 | 2.6 | < 0.076 | < 0.076 | 0.11 | 0.17 | 0.12 * | 0.30 * | 0.20 | 0.10 | 0.13 | < 0.076 | 0.19 | 0.27 | 0.36 * | 0.26 | 0.41 | 0.22 |
| 43-SS-A | 0-6 | 11/8/2012 | 15:35 | 1400 * | 37 | 313 | 204 | 894 | 0.20 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | < 0.071 | 0.16 | < 0.071 | < 0.071 | < 0.071 | 0.093 | < 0.071 | 0.29 * | < 0.071 | 0.095 | < 0.071 |
| 43-SS-B | 6-12 | 11/8/2012 | 16:15 | 2100 * | 106 | 450 | 450 * | 1690 | 0.28 | < 0.071 | < 0.071 | < 0.071 | 0.11 | < 0.071 | 0.24 * | 0.15 | 0.077 | 0.083 | < 0.071 | 0.12 | < 0.071 | 0.26 * | < 0.071 | 0.13 | 0.14 |
| 43-SS-C | 12-24 | 11/8/2012 | 16:45 | 1640 * | 63 | 275 | 271 | 973 | 0.32 | < 0.072 | < 0.072 | 0.098 | 0.11 | < 0.072 | 0.24 * | 0.14 | < 0.072 | 0.30 | < 0.072 | 0.088 | < 0.072 | 0.30 * | 0.11 | 0.10 | < 0.072 |
| 44-SS-A | 0-6 | 11/2/2012 | 11:12 | 19100 * | 1090 * | 5840 | 4590 * | 15600 | < 0.28 J | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 J | < 0.28 | < 0.28 J | < 0.28 J | < 0.28 J |
| 44-SS-B | 6-12 | 11/2/2012 | 11:35 | 1640 * | 266 * | 591 | 415 * | 1660 | 2.6 J | < 0.29 | < 0.29 | < 0.29 | < 0.29 | < 0.29 | < 0.29 | < 0.29 | < 0.29 | 0.34 | < 0.29 | < 0.29 | 0.35 J | < 0.29 | 1.2 J | 0.51 J | 0.36 J |
| 44-SS-C | 12-24 | 11/2/2012 | 12:03 | 12000 * | 2900 * | 3840 | 3370 * | 11800 | 4.2 J | < 0.29 | < 0.29 | < 0.29 | < 0.29 | < 0.29 | < 0.29 | < 0.29 | < 0.29 | 0.53 | < 0.29 | < 0.29 | 0.68 J | < 0.29 | 1.5 J | 0.89 J | 0.46 J |
| 44-SS-CD | 12-24 | 11/2/2012 | 12:08 | 16400 * | 3540 * | 5070 | 4390 * | 15300 | 9.4 J | < 0.29 | < 0.29 | 0.60 | < 0.29 | < 0.29 | < 0.29 | < 0.29 | < 0.29 | < 0.29 | < 0.29 | < 0.29 | 1.6 J | < 0.29 | 3.3 J | 2.5 J | 1.1 J |
| 45-SS-A | 0-6 | 11/1/2012 | 14:10 | 31200 * | 4320 * | 10300 | 8320 * | 27800 | 0.34 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | 0.38 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | 0.51 | 0.46 |
| 45-SS-B | 6-12 | 11/1/2012 | 14:28 | 38500 * | 7650 * | 12500 | 11700 * | 37200 | 1.2 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | < 0.28 | 0.35 | < 0.28 | < 0.28 | 0.37 | < 0.28 | 0.36 U | 0.67 | 0.39 |
| 45-SS-C | 12-24 | 11/1/2012 | 14:47 | 33700 * | 10000 * | 8150 | 10600 * | 32500 | 44 | < 0.31 | < 0.31 | 1.5 | < 0.31 | < 0.31 | < 0.31 | < 0.31 | < 0.31 | < 0.31 | < 0.31 | < 0.31 | 5.0 | < 0.31 | 9.2 * | 8.7 | 2.0 |
| 46-SS-A | 0-6 | 10/26/2012 | 14:00 | 307 * | < 11 | 62 | 36 | 149 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | 0.13 * | < 0.056 | < 0.056 | < 0.056 | 0.079 | < 0.056 | 0.097 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | 0.085 |
| 46-SS-B | 6-12 | 10/26/2012 | 14:20 | 999 * | < 11 | 243 | 204 | 705 | 0.0090 | < 0.0073 | < 0.0073 | 0.0097 | 0.019 | < 0.0073 | 0.044 | < 0.0073 | 0.029 | 0.055 | < 0.0073 | 0.058 | < 0.0073 | 0.060 | 0.010 U | 0.025 | 0.052 |
| 46-SS-C | 12-24 | 10/26/2012 | 14:40 | 370 * | < 11 | 85 | 63 | 208 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | 0.18 * | 0.16 | 0.17 | 0.13 | 0.14 | < 0.072 | 0.12 | < 0.072 | 0.38 * | < 0.072 | < 0.072 | 0.14 |
| 47-SS-A | 0-6 | 10/18/2012 | 14:52 | 91 | | | | | | | | | | | | | | | | | | | | | |
| 47-SS-B | 6-12 | 10/18/2012 | 15:13 | 151 | | | | | | | | | | | | | | | | | | | | | |
| 47-SS-C | 12-24 | 10/18/2012 | 16:14 | 540 * | 15 | 158 | 98 | 353 | < 0.076 | < 0.076 | 0.19 | 0.17 | 0.22 * | 0.52 * | 0.58 * | 0.29 | 0.21 | 0.28 | < 0.076 | 0.44 | < 0.076 | 0.55 * | < 0.076 | 0.13 | 0.55 |
| 47-SS-CD | 12-24 | 10/18/2012 | 16:18 | 575 * | 13 | 168 | 130 | 400 | < 0.075 | < 0.075 | 0.29 | 0.19 | 0.33 * | 0.79 * | 0.91 * | 0.42 | 0.29 | 0.39 | < 0.075 | 0.63 | < 0.075 | 0.71 * | < 0.075 | 0.17 | 0.80 |
| 48-SS-A | 0-6 | 10/18/2012 | 14:13 | 85 | | | | | | | | | | | | | | | | | | | | | |
| 49-SS-A | 0-6 | 10/25/2012 | 13:00 | 9390 * | 391 * | 2220 | 2850 * | 7770 | 0.20 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | < 0.038 | 0.13 | < 0.038 | 0.14 | 0.17 | 0.14 |
| 50-SS-A | 0-6 | 10/25/2012 | 14:20 | 544 * | 21 | 129 | 110 | 385 | 0.039 | < 0.0073 | < 0.0073 | 0.035 | 0.058 | 0.12 * | 0.080 | 0.064 | 0.070 | 0.082 | < 0.0073 | 0.16 | 0.010 | 0.12 | 0.015 | 0.089 | 0.16 |
| 51-SS-A | 0-6 | 10/25/2012 | 15:45 | 1020 * | 21 | 191 | 275 | 716 | 0.10 | 0.14 | < 0.0073 | 0.38 | 0.69 * | 0.99 * | 0.90 * | 0.60 | 0.69 | 1.0 | 0.13 * | 2.0 | 0.13 | 0.71 * | 0.079 | 1.5 | 2.0 |
| 52-SS-A | 0-6 | 10/5/2012 | 9:35 | 64 | | | | | | | | | | | | | | | | | | | | | |
| 53-SS-A | 0-6 | 10/24/2012 | 9:30 | 136 | | | | | < 0.0036 | < 0.0036 | 0.0074 | 0.012 | 0.033 | 0.063 * | 0.038 | 0.032 | 0.050 | 0.052 | < 0.0036 | 0.079 | 0.0041 | 0.057 | < 0.0036 | 0.040 | 0.074 |
| 54-SS-A | 0-6 | 10/23/2012 | 14:50 | 155 | | | | | 0.018 | 0.0065 | 0.018 | 0.053 | 0.18 | 0.20 * | 0.21 * | 0.098 | 0.16 | 0.20 | < 0.0039 | 0.34 | 0.016 | 0.16 | 0.020 | 0.19 | 0.29 |
| 54-SS-B | 6-12 | 10/23/2012 | 15:40 | 129 | | | | | 0.013 | < 0.0039 | 0.013 | 0.015 | 0.033 | 0.050 * | 0.066 | 0.030 | 0.061 | 0.059 | < 0.0039 | 0.079 | 0.0046 | 0.048 | 0.014 | 0.048 | 0.070 |
| 54-SS-C | 12-24 | 10/23/2012 | 16:05 | 106 | | | | | 0.013 | < 0.0040 | 0.018 | 0.022 | 0.082 | 0.057 * | 0.099 | 0.035 | 0.084 | 0.096 | 0.020 | 0.18 | 0.0056 | 0.063 | 0.016 | 0.080 | 0.14 |
| 55-SS-A | 0-6 | 10/23/2012 | 14:10 | 123 | | | | | 0.016 | < 0.0041 | 0.022 | 0.030 | 0.080 | 0.13 * | 0.13 | 0.081 | 0.095 | 0.10 | < 0.0041 | 0.16 | 0.0068 | 0.14 | 0.014 | 0.074 | 0.14 |
| 56-SS-A | 0-6 | 10/23/2012 | 11:55 | 305 * | < 11 | 77 | 61 | 176 | 0.014 | < 0.0038 | 0.029 | 0.045 | 0.16 | 0.21 * | 0.23 * | 0.14 | 0.16 | 0.17 | < 0.0038 | 0.25 | 0.0078 | 0.23 * | 0.014 | 0.091 | 0.22 |
| 56-SS-B | 6-12 | 10/23/2012 | 12:30 | 232 * | 14 | 85 | 56 | 207 | < 0.037 | < 0.037 | 0.061 | 0.050 | 0.11 | 0.26 * | 0.30 * | 0.23 | 0.16 | 0.20 | < 0.037 | 0.26 | < 0.037 | 0.31 * | < 0.037 | 0.089 | 0.20 |
| 56-SS-C | 12-24 | 10/23/2012 | 13:10 | 779 * | 63 | 162 | 123 | 443 | < 0.037 | < 0.037 | 0.039 | < 0.037 | < 0.037 | 0.13 * | 0.14 | 0.095 | 0.082 | 0.085 | < 0.037 | 0.11 | < 0.037 | 0.22 * | < 0.037 | 0.052 | 0.080 |
| 57-SS-A | 0-6 | 10/23/2012 | 10:55 | 225 * | < 12 | 54 | 58 | 155 | 0.12 | 0.11 | 1.3 | 1.0 | 1.0 * | 3.0 * | 2.5 * | 2.2 | 1.5 | 1.3 | 1.0 * | 1.1 | 0.18 | 2.9 * | 0.11 | 0.33 | 1.3 |
| 58-SS-A | 0-6 | 10/19/2012 | 10:52 | 203 * | < 12 | 39 | 24 | 88 | 0.0056 | < 0.0040 | 0.060 | 0.068 | 0.12 | 0.22 * | 0.24 * | 0.12 | 0.17 | 0.19 | 0.031 * | 0.24 | 0.0045 | 0.18 | 0.0081 U | 0.071 | 0.20 |
| 58-SS-B | 6-12 | 10/23/2012 | 10:05 | 128 | | | | | 0.0071 | < 0.0040 | 0.079 | 0.080 | 0.37 * | 0.27 * | 0.47 * | 0.20 | 0.23 | 0.35 | 0.073 * | 0.76 | 0.010 | 0.30 * | 0.0080 | 0.16 | 0.68 |
| 58-SS-C | 12-24 | 10/23/2012 | 10:15 | 236 * | 19 | 45 | 62 | 158 | 0.0073 | < 0.0039 | 0.068 | 0.066 | 0.28 * | 0.26 * | 0.47 * | 0.26 | 0.30 | 0.26 | 0.078 * | 0.46 | 0.0097 | 0.37 * | 0.0076 | 0.11 | 0.44 |
| 59-SS-A | 0-6 | 10/24/2012 | 11:30 | 162 | | | | | < 0.0036 | 0.015 | 0.0066 | 0.038 | 0.12 | 0.18 * | 0.10 | 0.11 | 0.15 | 0.11 | < 0.0036 | 0.24 | 0.012 | 0.16 | < 0.0036 | 0.10 | 0.22 |
| 60-SS-A | 0-6 | 10/24/2012 | 13:20 | 128 | | | | | < 0.019 | < 0.019 | < 0.019 | < 0.019 | 0.048 | 0.16 * | 0.083 | 0.15 | 0.049 | 0.11 | < 0.019 | 0.048 | < 0.019 | 0.14 | < 0.019 | 0.022 | 0.057 |
| 61-SS-A | 0-6 | 10/25/2012 | 9:20 | 589 * | 262 * | 90 | 66 | 453 | < 0.018 | < 0.018 | < 0.018 | 0.028 | 0.038 | 0.10 * | 0.085 | 0.085 | 0.064 | 0.072 | < 0.018 | 0.095 | < 0.018 | 0.13 | < 0.018 | 0.051 | 0.11 |

| ale il o out a ota ur ace oil am ling H, | | | | H Hscr | | | I H I | | | I H I | | | I | | | H H | | | H H H | | | H H | | | H H | | | H | | | H | | | HI | | | H | | | H | | | I ,H H | | | H | | | I , , , H H | | | H H | | |
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| raction | | | | H | | | H | | | H | | | H | | | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| ac ground ur ace oil alues† | | | | | | | | | | | | | | | | . | | | | | | | | | | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 61-SS-B | 6-12 | 10/25/2012 | 9:50 | 535 | | * | 175 | | | 101 | | | 52 | | | 367 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | 0.032 | | | 0.027 | | | 0.077 | | * | 0.067 | | | 0.061 | | | 0.049 | | | 0.055 | | | < 0.018 | | | 0.097 | | | 0.021 | | | 0.11 | | | < 0.018 | | | 0.051 | | | 0.090 | | |
| 61-SS-C | 12-24 | 10/25/2012 | 10:20 | 1070 | | * | 600 | | * | 52 | | | 133 | | | 809 | | | < 0.0075 | | | < 0.0075 | | | < 0.0075 | | | 0.0076 | | | 0.012 | | | 0.038 | | * | 0.037 | | | 0.029 | | | 0.027 | | | 0.022 | | | < 0.0075 | | | 0.036 | | | 0.039 | | | 0.050 | | | 0.054 | | | 0.026 | | | 0.039 | | |
| 62-SS-A | 0-6 | 10/24/2012 | 15:30 | 135 | | | | | | | | | | | | | | | 0.011 | | | 0.017 | | | 0.0093 | | | 0.055 | | | 0.11 | | | 0.10 | | * | 0.11 | | | 0.057 | | | 0.10 | | | 0.14 | | | 0.021 | | * | 0.47 | | | 0.015 | | | 0.082 | | | 0.015 | | | 0.11 | | | 0.35 | | |
| 63-SS-A | 0-6 | 10/24/2012 | 14:50 | 6030 | | * | 3370 | | * | 406 | | | 1270 | | * | 5240 | | | 8.7 | | | 0.16 | | | < 0.0039 | | | 0.085 | | | 0.035 | | | 0.040 | | * | 0.047 | | | 0.024 | | | 0.034 | | | 0.054 | | | 0.014 | | | 0.12 | | | 0.51 | | | 0.051 | | | 3.1 | | | 0.72 | | | 0.11 | | |
| 63-SS-AD | 0-6 | 10/24/2012 | 14:55 | 6220 | | * | 3250 | | * | 381 | | | 1320 | | * | 5140 | | | 7.0 | | | 0.13 | | | < 0.0039 | | | 0.072 | | | 0.018 | | | 0.034 | | * | 0.030 | | | 0.024 | | | 0.030 | | | 0.048 | | | 0.013 | | | 0.10 | | | 0.50 | | | 0.041 | | | 2.5 | | | 0.53 | | | 0.099 | | |
| 64-SS-A | 0-6 | 10/10/2012 | 14:45 | 242 | | * | < 11 | | | 65 | | | 42 | | | 157 | | | 0.0069 | | | 0.014 | | | 0.030 | | | 0.087 | | | 0.25 | | * | 0.32 | | * | 0.31 | | * | 0.15 | | | 0.21 | | | 0.34 | | | 0.042 | | * | 0.56 | | | 0.015 | | | 0.22 | | * | 0.0061 | | | 0.25 | | | 0.47 | | |
| 65-SS-A | 0-6 | 10/10/2012 | 11:47 | 428 | | * | < 12 | | | 61 | | | 146 | | | 255 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | 0.043 | | | 0.31 | | * | 0.49 | | * | < 0.039 | | | 0.36 | | | < 0.039 | | | 0.64 | | | < 0.039 | | | 0.86 | | | 0.053 | | | 0.44 | | * | < 0.039 | | | 0.49 | | | 0.84 | | |
| 65-SS-B | 6-12 | 10/10/2012 | 12:30 | 282 | | * | < 11 | | | 51 | | | 64 | | | 138 | | | 0.014 | | | 0.040 | | | 0.0080 | | | 0.071 | | | 0.29 | | * | 0.37 | | * | 0.24 | | * | 0.21 | | | 0.13 | | | 0.36 | | | 0.076 | | * | 0.78 | | | 0.043 | | | 0.32 | | * | 0.074 | | | 0.57 | | | 0.74 | | |
| 65-SS-C | 12-24 | 10/10/2012 | 13:50 | 180 | | | | | | | | | | | | | | | 0.0052 | | | < 0.0038 | | | 0.0057 | | | < 0.0038 | | | 0.049 | | | 0.083 | | * | 0.080 | | | 0.047 | | | 0.036 | | | 0.074 | | | < 0.0038 | | | 0.12 | | | 0.0043 | | | 0.065 | | | < 0.0038 | | | 0.066 | | | 0.11 | | |
| 66-SS-A | 0-6 | 10/9/2012 | 15:52 | 107 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SS-A | 0-6 | 10/17/2012 | 9:40 | 182 | | | | | | | | | | | | | | | 0.0074 | | | < 0.0037 | | | 0.027 | | | 0.097 | | | 0.060 | | | 0.099 | | * | 0.093 | | | 0.14 | | | 0.11 | | | 0.11 | | | < 0.0037 | | | 0.15 | | | 0.0085 | | | 0.037 | | | 0.0083 | U | | 0.074 | | | 0.14 | | |
| 67-SS-B | 6-12 | 10/17/2012 | 10:10 | 157 | | | | | | | | | | | | | | | 0.0040 | | | < 0.0037 | | | 0.011 | | | 0.013 | | | 0.026 | | | 0.032 | | * | 0.057 | | | 0.047 | | | 0.054 | | | 0.045 | | | < 0.0037 | | | 0.071 | | | < 0.0037 | | | 0.020 | | | < 0.0037 | | | 0.034 | | | 0.058 | | |
| 67-SS-C | 12-24 | 10/17/2012 | 10:45 | 116 | | | | | | | | | | | | | | | 0.0048 | | | < 0.0038 | | | 0.014 | | | 0.014 | | | 0.026 | | | 0.037 | | * | 0.057 | | | 0.048 | | | 0.035 | | | 0.041 | | | < 0.0038 | | | 0.068 | | | < 0.0038 | | | 0.020 | | | < 0.0038 | | | 0.033 | | | 0.062 | | |
| 68-SS-A | 0-6 | 10/17/2012 | 12:05 | 114 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SS-A | 0-6 | 10/17/2012 | 13:00 | 139 | | | | | | | | | | | | | | | 0.0097 | | | < 0.0036 | | | 0.012 | | | 0.023 | | | 0.049 | | | 0.076 | | * | 0.073 | | | 0.068 | | | 0.046 | | | 0.082 | | | < 0.0036 | | | 0.091 | | | 0.0041 | | | 0.018 | | | 0.0093 | U | | 0.031 | | | 0.086 | | |
| 69-SS-B | 6-12 | 10/17/2012 | 13:25 | 68 | | | | | | | | | | | | | | | 0.0091 | | | 0.023 | | | 0.0077 | | | 0.066 | | | 0.11 | | | 0.14 | | * | 0.15 | | | 0.12 | | | 0.11 | | | 0.17 | | | < 0.0035 | | | 0.25 | | | 0.018 | | | 0.023 | | | 0.013 | U | | 0.16 | | | 0.18 | | |
| 69-SS-C | 12-24 | 10/17/2012 | 13:45 | 51 | | | | | | | | | | | | | | | 0.0055 | | | < 0.0035 | | | 0.0050 | | | 0.0061 | | | 0.015 | | | 0.029 | | * | 0.023 | | | 0.020 | | | 0.020 | | | 0.027 | | | < 0.0035 | | | 0.030 | | | < 0.0035 | | | 0.012 | | | 0.0048 | U | | 0.012 | | | 0.026 | | |
| 70N-SS-A | 0-6 | 10/18/2012 | 10:10 | 222 | | * | < 11 | | | 40 | | | 33 | | | 102 | | | 0.024 | | | < 0.018 | | | 0.34 | | | 0.24 | | | 0.28 | | * | 0.59 | | * | 0.68 | | * | 0.63 | | | 0.28 | | | 0.34 | | | 0.16 | | * | 0.52 | | | 0.038 | | | 0.57 | | * | 0.050 | U | | 0.19 | | | 0.51 | | |
| 70N-SS-AD | 0-6 | 10/18/2012 | 10:11 | 193 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SS-A | 0-6 | 10/17/2012 | 15:00 | 60 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SS-A | 0-6 | 10/4/2012 | 14:24 | 131 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SS-B | 6-12 | 10/4/2012 | 14:51 | 149 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SS-C | 12-24 | 10/4/2012 | 15:50 | 107 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SS-A | 0-6 | 10/24/2012 | 13:50 | 129 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SS-A | 0-6 | 10/25/2012 | 11:00 | 442 | | * | < 11 | | | 131 | | | 79 | | | 285 | | | 0.054 | | | 0.094 | | | < 0.0073 | | | 0.26 | | | 0.23 | | * | 0.38 | | * | 0.27 | | * | 0.21 | | | 0.17 | | | 0.26 | | | 0.081 | | * | 0.66 | | | 0.13 | | | 0.30 | | * | 0.20 | | | 0.54 | | | 0.61 | | |
| 74-SS-A | 0-6 | 10/5/2012 | 9:55 | 299 | | * | 26 | | | 109 | | | 39 | | | 232 | | | 0.020 | | | 0.016 | | | 0.0069 | J | | 0.088 | | | 0.19 | | | 0.21 | | * | 0.23 | | * | 0.11 | | | 0.13 | | | 0.18 | | | 0.071 | | * | 0.38 | | | 0.024 | | | 0.11 | | | 0.025 | | | 0.25 | | | 0.33 | | |
| 75-SS-A | 0-6 | 10/5/2012 | 10:59 | 642 | | * | < 11 | | | 250 | | | 98 | | | 461 | | | 0.033 | | | 0.17 | | | 0.034 | | | 0.44 | | | 0.74 | | * | 0.92 | | * | 0.90 | | * | 0.46 | | | 0.40 | | | 0.62 | | | 0.13 | | * | 1.6 | | | 0.16 | | | 0.58 | | * | 0.10 | | | 1.4 | | | 1.2 | | |
| 75-SS-B | 6-12 | 10/5/2012 | 11:17 | 699 | | * | 13 | | | 277 | | | 116 | | | 518 | | | 0.042 | | | 0.21 | | | 0.052 | | | 0.48 | | | 0.99 | | * | 1.1 | | * | 0.99 | | * | 0.56 | | | 0.43 | | | 0.78 | | | 0.18 | | * | 2.1 | | | 0.23 | | | 1.0 | | * | 0.13 | | | 1.7 | | | 1.4 | | |
| 75-SS-C | 12-24 | 10/5/2012 | 11:38 | 998 | | * | 38 | | | 266 | | | 124 | | | 538 | | | 0.018 | | | 0.087 | | | 0.026 | | | 0.21 | | | 0.49 | | * | 0.58 | | * | 0.55 | | * | 0.30 | | | 0.24 | | | 0.36 | | | 0.096 | | * | 0.87 | | | 0.089 | | | 0.55 | | * | 0.040 | | | 0.75 | | | 0.71 | | |
| 76-SS-A | 0-6 | 10/10/2012 | 15:35 | 255 | | * | < 11 | | | 64 | | | 40 | | | 142 | | | 0.052 | | | 1.4 | | | 0.082 | | | 0.43 | | | 0.80 | | * | 1.4 | | * | 0.52 | | * | 0.52 | | | 0.78 | | | 1.2 | | | 0.14 | | * | 2.2 | | | 0.11 | | | 0.84 | | * | 0.040 | | | 1.3 | | | 1.6 | | |
| 77-SS-A | 0-6 | 10/2/2012 | 10:30 | 289 | | * | < 10 | | | 81 | | | 41 | | | 187 | | | 0.012 | | | 0.11 | | | 0.015 | | | 0.45 | | | 0.68 | | * | 1.1 | | * | 1.0 | | * | 0.42 | | | 0.34 | | | 0.69 | | | 0.16 | | * | 1.8 | | | 0.11 | | | 0.66 | | * | 0.023 | | | 0.98 | | | 1.4 | | |
| 77-SS-B | 6-12 | 10/2/2012 | 10:47 | 428 | | * | < 10 | | | 136 | | | 83 | | | 323 | | | 0.16 | | | 0.59 | | | 0.041 | | | 1.5 | | | 1.6 | | * | 2.7 | | * | 2.2 | | * | 1.1 | | | 1.1 | | | 1.7 | | | 0.44 | | * | 4.4 | | | 0.64 | | | 2.1 | | * | 0.49 | | | 3.4 | | | 3.7 | | |
| 77-SS-C | 12-24 | 10/2/2012 | 11:20 | 715 | | * | < 11 | | | 202 | | | 106 | | | 432 | | | 0.099 | | | 0.53 | | | 0.021 | | | 1.3 | | | 1.6 | | * | 2.4 | | * | 2.0 | | * | 0.91 | | | 0.81 | | | 1.5 | | | 0.39 | | * | 4.5 | | | 0.51 | | | 1.9 | | * | 0.21 | | | 3.3 | | | 3.7 | | |
| 78-SS-A | 0-6 | 10/2/2012 | 16:16 | 91 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79-SS-A | 0-6 | 10/2/2012 | 16:00 | 162 | | | | | | | | | | | | | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | 0.015 | | | 0.026 | | * | 0.037 | | | < 0.0035 | | | 0.015 | | | 0.010 | | | < 0.0035 | | | 0.023 | | | < 0.0035 | | | < 0.0035 | | | 0.0086 | | | 0.021 | | |
| 80-SS-A | 0-6 | 10/2/2012 | 15:40 | 252 | | * | < 11 | | | 119 | | | < 11 | | | 124 | | | 0.0065 | | | < 0.0035 | | | 0.039 | | | 0.039 | | | 0.14 | | | 0.23 | | * | 0.16 | | | 0.21 | | | 0.18 | | | 0.21 | | | < 0.0035 | | | 0.28 | | | 0.0044 | | | 0.28 | | * | < 0.0035 | | | 0.12 | | | 0.26 | | |
| 81-SS-A | 0-6 | 10/11/2012 | 15:30 | 597 | | * | 34 | | | 119 | | | 140 | | | 393 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | 0.19 | | |
| 82-SS-A | 0-6 | 10/16/2012 | 10:33 | 252 | | * | < 11 | | | 43 | | | 37 | | | 137 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | |
| 82-SS-B | 6-12 | 10/16/2012 | 11:00 | 80 | | | | | | | | | | | | | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 82-SS-C | 12-24 | 10/16/2012 | 11:40 | 51 | | | | | | | | | | | | | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 83-SS-A | 0-6 | 10/16/2012 | 15:30 | 84 | | | | | | | | | | | | | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | 0.014 | | | 0.011 | | | < 0.0036 | | | 0.0047 | | | < 0.0036 | | | < 0.0036 | | | 0.0081 | | | < 0.0036 | | | 0.015 | | | < 0.0036 | | | < 0.0036 | | | 0.0059 | | |
| 84-SS-A | 0-6 | 10/16/2012 | 13:35 | 100 | | | | | | | | | | | | | | | 0.0059 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | 0.0050 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | 0.0084 | | | < 0.0035 | | | 0.014 | | | < 0.0035 | | | < 0.0035 | | | 0.0079 | | |
| 84-SS-B | 6-12 | 10/16/2012 | 14:00 | 243 | | * | 48 | | | 46 | | | 34 | | | 162 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | |
| 84-SS-C | 12-24 | 10/16/2012 | 14:35 | 132 | | | | | | | | | | | | | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | |
| 85-SS-A | 0-6 | 10/11/2012 | 14:00 | 516 | | * | 87 | | | 96 | | | 75 | | | 315 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | 0.039 | | | < 0.036 | | | < 0.036 | | | 0.044 | | | < 0.036 | | | 0.061 | | | < 0.036 | | | 0.11 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | 0.087 | | |
| 86-SS-A | 0-6 | 10/11/2012 | 13:10 | 45 | | | | | | | | | | | | | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | 0.0062 | | | 0.030 | | | 0.036 | | * | 0.033 | | | 0.012 | | | 0.028 | | | 0.040 | | | < 0.0035 | | | 0.078 | | | < 0.0035 | | | 0.035 | | | < 0.0035 | | | 0.021 | | | 0.064 | | |
| 87-SS-A | 0-6 | 10/9/2012 | 14:00 | 137 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SS-A | 0-6 | 10/4/2012 | 11:17 | 127 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SS-A | 0-6 | 10/2/2012 | 13:40 | 95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SS-A | 0-6 | 10/2/2012 | 14:00 | 260 | | * | < 10 | | | 178 | | | < 10 | | | 196 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | | 0.011 | | | 0.027 | | * | 0.024 | | | 0.0093 | | | 0.0088 | | | 0.0097 | | | < 0.0069 | | | 0.025 | | | < 0.0069 | | | 0.033 | | | < 0.0069 | | | < 0.0069 | | | 0.019 | | |
| 91-SS-A | 0-6 | 10/2/2012 | 14:20 | 315 | | * | < 11 | | | 201 | | | < 11 | | | 207 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | 0.024 | | | 0.042 | | * | 0.050 | | | < 0.0035 | | | 0.028 | | | 0.017 | | | < 0.0035 | | | 0.029 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | 0.0090 | | | 0.024 | | |
| 91-SS-B | 6-12 | 10/2/2012 | 14:35 | 197 | | | | | | | | | | | | | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | 0.025 | | | 0.046 | | * | 0.037 | | | < 0.0037 | | | 0.030 | | | 0.025 | | | < 0.0037 | | | 0.036 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | 0.012 | | | 0.031 | | |
| 91-SS-C | 12-24 | 10/2/2012 | 15:00 | 217 | | * | < 11 | | | 129 | | | < 11 | | | 135 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | 0.033 | | * | 0.031 | | | < 0.0036 | | | 0.021 | | | < 0.0036 | | | < 0.0036 | | | 0.033 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | 0.013 | | | 0.029 | | |
| 92-SS-A | 0-6 | 10/2/2012 | 15:30 | 107 | | | | | | | | | | | | | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | |
| 93-SS-A | 0-6 | 10/3/2012 | 9:50 | 28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SS-B | 6-12 | 10/3/2012 | 10:05 | < 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SS-C | 12-24 | 10/3/2012 | 10:30 | < 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SS-A | 0-6 | 10/3/2012 | 14:00 | 164 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SS-AD | 0-6 | 10/3/2012 | 14:01 | 47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95-SS-A | 0-6 | 10/3/2012 | 14:23 | 110 | | | | | | | | | | | | | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | 0.0093 | | | 0.022 | | * | 0.023 | | | 0.015 | | | 0.0056 | | | 0.0070 | | | < 0.0033 | | | 0.019 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | 0.0078 | | | 0.016 | | |
| 96-SS-A | 0-6 | 10/3/2012 | 14:32 | 93 | | | | | | | | | | | | | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | 0.027 | | | 0.039 | | * | 0.047 | | | 0.029 | | | 0.012 | | | 0.023 | | | < 0.0033 | | | 0.060 | | | < 0.0033 | | | 0.066 | | | < 0.0033 | | | 0.035 | | | 0.047 | | |
| 97-SS-A | 0-6 | 10/12/2012 | 13:20 | 62 | | | | | | | | | | | | | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0096 | | | 0.019 | | | 0.018 | | | 0.0056 | | | 0.0088 | | | 0.0086 | | | < 0.0038 | | | 0.020 | | | < 0.0038 | | | 0.020 | | | < 0.0038 | | | 0.0048 | | | 0.017 | | |
| 97-SS-B | 6-12 | 10/12/2012 | 13:45 | 26 | | | | | | | | | | | | | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | |
| 97-SS-C | 12-24 | 10/12/2012 | 14:30 | 21 | | | | | | | | | | | | | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | |
| 98-SS-A | 0-6 | 10/11/2012 | 15:05 | 110 | | | | | | | | | | | | | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | 0.010 | | | 0.017 | | | 0.019 | | | 0.018 | | | 0.015 | | | 0.021 | | | < 0.0036 | | | 0.030 | | | < 0.0036 | | | 0.029 | | | < 0.0036 | | | 0.0090 | | | 0.026 | | |
| 99-SS-A | 0-6 | 10/12/2012 | 10:20 | 69 | | | | | | | | | | | | | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | 0.042 | | | 0.14 | | | 0.15 | | * | 0.17 | | | 0.051 | | | 0.11 | | | 0.18 | | | 0.028 | | * | 0.36 | | | < 0.0036 | | | 0.094 | | | < 0.0036 | | | 0.088 | | | 0.29 | | |
| 99-SS-B | 6-12 | 10/12/2012 | 10:40 | 1220 | | * | 732 | | * | 25 | | | 121 | | | 899 | | | 0.30 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | 0.013 | | | 0.012 | | | 0.0038 | | | 0.0043 | | | < 0.0036 | | | < 0.0036 | | | 0.012 | | | 0.017 | | | 0.015 | | | 0.23 | | | 0.011 | | | 0.0086 | | |
| 99-SS-C | 12-24 | 10/12/2012 | 11:55 | 1010 | | * | 620 | | * | 16 | | | 87 | | | 762 | | | 1.4 | | | 0.010 | | | < 0.0037 | | | 0.0047 | | | 0.0081 | | | 0.015 | | | 0.013 | | | < 0.0037 | | | 0.0041 | | | 0.0062 | | | < 0.0037 | | | 0.017 | | | 0.049 | | | 0.016 | | | 0.91 | | | 0.033 | | | 0.014 | | |
| 100-SS-A | 0-6 | 10/12/2012 | 9:45 | 105 | | | | | | | | | | | | | | | < 0.0036 | | | 0.011 | | | < 0.0036 | | | 0.12 | | | 0.30 | | * | 0.29 | | * | 0.21 | | * | 0.082 | | | 0.21 | | | 0.40 | | | 0.041 | | * | 0.88 | | | 0.016 | | | 0.11 | | | < 0.0036 | | | 0.39 | | | 0.75 | | |
| 101-SS-A | 0-6 | 10/11/2012 | 12:10 | 47 | | | | | | | | | | | | | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | 0.0046 | | | 0.028 | | | 0.043 | | * | 0.029 | | | 0.013 | | | 0.027 | | | 0.035 | | | < 0.0036 | | | 0.071 | | | < 0.0036 | | | 0.033 | | | < 0.0036 | | | 0.018 | | | 0.059 | | |
| 102-SS-A | 0-6 | 10/9/2012 | 11:52 | 52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SS-B | 6-12 | 10/9/2012 | 12:15 | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SS-C | 12-24 | 10/9/2012 | 12:48 | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SS-CD | 12-24 | 10/9/2012 | 12:50 | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SS-A | 0-6 | 10/9/2012 | 13:31 | 58 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SS-A | 0-6 | 10/4/2012 | 10:32 | 115 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SS-A | 0-6 | 10/4/2012 | 10:16 | 72 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SS-A | 0-6 | 10/3/2012 | 16:00 | 249 | | * | < 11 | | | 114 | | | 18 | | | 157 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | 0.020 | | | 0.039 | | * | 0.051 | | | 0.030 | | | 0.013 | | | 0.017 | | | < 0.0033 | | | 0.037 | | | < 0.0033 | | | 0.079 | | | < 0.0033 | | | 0.014 | | | 0.032 | | |
| 107-SS-A | 0-6 | 10/3/2012 | 15:15 | 152 | | | | | | | | | | | | | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | 0.024 | | | 0.045 | | * | 0.052 | | | 0.022 | | | 0.021 | | | 0.022 | | | < 0.0033 | | | 0.050 | | | < 0.0033 | | | 0.079 | | | < 0.0033 | | | 0.031 | | | 0.044 | | |
| 108-SS-A | 0-6 | 10/11/2012 | 11:00 | 386 | | * | 55 | | | 96 | | | 42 | | | 223 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | |
| 109-SS-A | 0-6 | 10/11/2012 | 11:25 | 100 | | | | | | | | | | | | | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | 0.022 | | |

**NOTES:**

| | |
|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
| 1.79 | Exceeds MDEQ - RBSLs Residential Surface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

**†- Determined by the January 29, 2014 Background Soils Data Submittal, lowest value of SP-SS-A or NP-SS-A**
**(1) - EPA RSL Version used for screening level development: January 2015**

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | . | | | | | | . | | | | | | | | | . | | | | | | | | | | | | | | | . | | |
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| eac ing to round ater creening e el | | | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | | | | . | | | . | | | . | | | . | | | . | | | . | | |
| s ommercial ur ace | | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s esidential ur ace | | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-SS-A | 0-6 | 11/7/2012 | 16:27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SS-A | 0-6 | 11/7/2012 | 14:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SS-B | 6-12 | 11/7/2012 | 15:13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SS-C | 12-24 | 11/7/2012 | 15:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-SS-A | 0-6 | 11/7/2012 | 16:09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-SS-A | 0-6 | 10/30/2012 | 12:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-SS-A | 0-6 | 10/30/2012 | 11:46 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SS-A | 0-6 | 10/30/2012 | 11:03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-SS-A | 0-6 | 10/30/2012 | 10:29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-SS-A | 0-6 | 10/30/2012 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-SS-A | 0-6 | 11/7/2012 | 10:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-SS-B | 6-12 | 11/7/2012 | 11:04 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 9-SS-C | 12-24 | 11/7/2012 | 12:02 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SS-A | 0-6 | 10/19/2012 | 13:36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-SS-B | 6-12 | 10/19/2012 | 14:03 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SS-C | 12-24 | 10/19/2012 | 14:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 11-SS-A | 0-6 | 10/30/2012 | 13:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-SS-AD | 0-6 | 10/30/2012 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SS-A | 0-6 | 10/30/2012 | 14:11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SS-B | 6-12 | 10/30/2012 | 15:03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SS-C | 12-24 | 10/30/2012 | 15:37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-SS-A | 0-6 | 10/31/2012 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-SS-A | 0-6 | 10/31/2012 | 11:57 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SS-A | 0-6 | 10/31/2012 | 12:54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-SS-A | 0-6 | 10/31/2012 | 13:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-SS-A | 0-6 | 10/31/2012 | 13:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SS-A | 0-6 | 10/31/2012 | 14:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-SS-A | 0-6 | 10/25/2012 | 16:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-SS-A | 0-6 | 11/6/2012 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-SS-B | 6-12 | 11/6/2012 | 11:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | J | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 20-SS-C | 12-24 | 11/6/2012 | 11:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | J | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SS-A | 0-6 | 11/6/2012 | 9:42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21-SS-B | 6-12 | 11/6/2012 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | J | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SS-C | 12-24 | 11/6/2012 | 10:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | J | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 22-SS-A | 0-6 | 11/6/2012 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-SS-B | 6-12 | 11/6/2012 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-SS-C | 12-24 | 11/6/2012 | 15:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-SS-A | 0-6 | 11/7/2012 | 9:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-SS-A | 0-6 | 10/31/2012 | 15:22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-SS-B | 6-12 | 10/31/2012 | 15:56 | 0.036 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 25-SS-C | 12-24 | 10/31/2012 | 16:30 | 4.3 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | |
| 26-SS-A | 0-6 | 11/8/2012 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-SS-B | 6-12 | 11/8/2012 | 10:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 26-SS-C | 12-24 | 11/8/2012 | 10:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 27-SS-A | 0-6 | 11/8/2012 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-SS-A | 0-6 | 11/8/2012 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-SS-B | 6-12 | 11/8/2012 | 13:42 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 28-SS-C | 12-24 | 11/8/2012 | 14:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 29-SS-A | 0-6 | 11/1/2012 | 10:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SS-B | 6-12 | 11/1/2012 | 11:26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SS-C | 12-24 | 11/1/2012 | 12:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SS-A | 0-6 | 11/1/2012 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SS-A | 0-6 | 10/26/2012 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SS-B | 6-12 | 10/26/2012 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SS-C | 12-24 | 10/26/2012 | 12:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SS-A | 0-6 | 10/19/2012 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SS-A | 0-6 | 10/25/2012 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SS-A | 0-6 | 10/18/2012 | 12:27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SS-A | 0-6 | 10/18/2012 | 11:39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36-SS-A | 0-6 | 11/6/2012 | 14:04 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36-SS-B | 6-12 | 11/6/2012 | 14:37 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | J | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 36-SS-C | 12-24 | 11/6/2012 | 15:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | J | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 37-SS-A | 0-6 | 11/7/2012 | 9:37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38-SS-A | 0-6 | 11/7/2012 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38-SS-B | 6-12 | 11/7/2012 | 10:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 38-SS-C | 12-24 | 11/7/2012 | 12:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 39-SS-A | 0-6 | 11/7/2012 | 14:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39-SS-AD | 0-6 | 11/7/2012 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40-SS-A | 0-6 | 11/8/2012 | 9:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40-SS-B | 6-12 | 11/8/2012 | 10:17 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| eac ing to round ater creening e el | | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | |
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| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 40-SS-C | 12-24 | 11/8/2012 | 11:23 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 41-SS-A | 0-6 | 11/8/2012 | 16:16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42-SS-A | 0-6 | 11/8/2012 | 13:23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42-SS-B | 6-12 | 11/8/2012 | 14:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 42-SS-C | 12-24 | 11/8/2012 | 14:36 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 42-SS-CD | 12-24 | 11/8/2012 | 14:44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SS-A | 0-6 | 11/8/2012 | 15:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SS-B | 6-12 | 11/8/2012 | 16:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SS-C | 12-24 | 11/8/2012 | 16:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44-SS-A | 0-6 | 11/2/2012 | 11:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44-SS-B | 6-12 | 11/2/2012 | 11:35 | 0.039 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 44-SS-C | 12-24 | 11/2/2012 | 12:03 | 0.16 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 44-SS-CD | 12-24 | 11/2/2012 | 12:08 | 0.15 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 45-SS-A | 0-6 | 11/1/2012 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45-SS-B | 6-12 | 11/1/2012 | 14:28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45-SS-C | 12-24 | 11/1/2012 | 14:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46-SS-A | 0-6 | 10/26/2012 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46-SS-B | 6-12 | 10/26/2012 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 46-SS-C | 12-24 | 10/26/2012 | 14:40 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 47-SS-A | 0-6 | 10/18/2012 | 14:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SS-B | 6-12 | 10/18/2012 | 15:13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SS-C | 12-24 | 10/18/2012 | 16:14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SS-CD | 12-24 | 10/18/2012 | 16:18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SS-A | 0-6 | 10/18/2012 | 14:13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SS-A | 0-6 | 10/25/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SS-A | 0-6 | 10/25/2012 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SS-A | 0-6 | 10/25/2012 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SS-A | 0-6 | 10/5/2012 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SS-A | 0-6 | 10/24/2012 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SS-A | 0-6 | 10/23/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SS-B | 6-12 | 10/23/2012 | 15:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SS-C | 12-24 | 10/23/2012 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55-SS-A | 0-6 | 10/23/2012 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SS-A | 0-6 | 10/23/2012 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SS-B | 6-12 | 10/23/2012 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SS-C | 12-24 | 10/23/2012 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57-SS-A | 0-6 | 10/23/2012 | 10:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SS-A | 0-6 | 10/19/2012 | 10:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SS-B | 6-12 | 10/23/2012 | 10:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SS-C | 12-24 | 10/23/2012 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59-SS-A | 0-6 | 10/24/2012 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60-SS-A | 0-6 | 10/24/2012 | 13:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SS-A | 0-6 | 10/25/2012 | 9:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SS-B | 6-12 | 10/25/2012 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SS-C | 12-24 | 10/25/2012 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62-SS-A | 0-6 | 10/24/2012 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SS-A | 0-6 | 10/24/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SS-AD | 0-6 | 10/24/2012 | 14:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64-SS-A | 0-6 | 10/10/2012 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SS-A | 0-6 | 10/10/2012 | 11:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SS-B | 6-12 | 10/10/2012 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SS-C | 12-24 | 10/10/2012 | 13:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66-SS-A | 0-6 | 10/9/2012 | 15:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SS-A | 0-6 | 10/17/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SS-B | 6-12 | 10/17/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SS-C | 12-24 | 10/17/2012 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SS-A | 0-6 | 10/17/2012 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SS-A | 0-6 | 10/17/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SS-B | 6-12 | 10/17/2012 | 13:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SS-C | 12-24 | 10/17/2012 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70N-SS-A | 0-6 | 10/18/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70N-SS-AD | 0-6 | 10/18/2012 | 10:11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SS-A | 0-6 | 10/17/2012 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SS-A | 0-6 | 10/4/2012 | 14:24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SS-B | 6-12 | 10/4/2012 | 14:51 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SS-C | 12-24 | 10/4/2012 | 15:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SS-A | 0-6 | 10/24/2012 | 13:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SS-A | 0-6 | 10/25/2012 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SS-A | 0-6 | 10/5/2012 | 9:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SS-A | 0-6 | 10/5/2012 | 10:59 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 75-SS-B | 6-12 | 10/5/2012 | 11:17 | | | | | | | | | | | | | | | |
| 75-SS-C | 12-24 | 10/5/2012 | 11:38 | | | | | | | | | | | | | | | |
| 76-SS-A | 0-6 | 10/10/2012 | 15:35 | | | | | | | | | | | | | | | |
| 77-SS-A | 0-6 | 10/2/2012 | 10:30 | | | | | | | | | | | | | | | |
| 77-SS-B | 6-12 | 10/2/2012 | 10:47 | | | | | | | | | | | | | | | |
| 77-SS-C | 12-24 | 10/2/2012 | 11:20 | | | | | | | | | | | | | | | |
| 78-SS-A | 0-6 | 10/2/2012 | 16:16 | | | | | | | | | | | | | | | |
| 79-SS-A | 0-6 | 10/2/2012 | 16:00 | | | | | | | | | | | | | | | |
| 80-SS-A | 0-6 | 10/2/2012 | 15:40 | | | | | | | | | | | | | | | |
| 81-SS-A | 0-6 | 10/11/2012 | 15:30 | | | | | | | | | | | | | | | |
| 82-SS-A | 0-6 | 10/16/2012 | 10:33 | | | | | | | | | | | | | | | |
| 82-SS-B | 6-12 | 10/16/2012 | 11:00 | | | | | | | | | | | | | | | |
| 82-SS-C | 12-24 | 10/16/2012 | 11:40 | | | | | | | | | | | | | | | |
| 83-SS-A | 0-6 | 10/16/2012 | 15:30 | | | | | | | | | | | | | | | |
| 84-SS-A | 0-6 | 10/16/2012 | 13:35 | | | | | | | | | | | | | | | |
| 84-SS-B | 6-12 | 10/16/2012 | 14:00 | | | | | | | | | | | | | | | |
| 84-SS-C | 12-24 | 10/16/2012 | 14:35 | | | | | | | | | | | | | | | |
| 85-SS-A | 0-6 | 10/11/2012 | 14:00 | | | | | | | | | | | | | | | |
| 86-SS-A | 0-6 | 10/11/2012 | 13:10 | | | | | | | | | | | | | | | |
| 87-SS-A | 0-6 | 10/9/2012 | 14:00 | | | | | | | | | | | | | | | |
| 88-SS-A | 0-6 | 10/4/2012 | 11:17 | | | | | | | | | | | | | | | |
| 89-SS-A | 0-6 | 10/2/2012 | 13:40 | | | | | | | | | | | | | | | |
| 90-SS-A | 0-6 | 10/2/2012 | 14:00 | | | | | | | | | | | | | | | |
| 91-SS-A | 0-6 | 10/2/2012 | 14:20 | | | | | | | | | | | | | | | |
| 91-SS-B | 6-12 | 10/2/2012 | 14:35 | | | | | | | | | | | | | | | |
| 91-SS-C | 12-24 | 10/2/2012 | 15:00 | | | | | | | | | | | | | | | |
| 92-SS-A | 0-6 | 10/2/2012 | 15:30 | | | | | | | | | | | | | | | |
| 93-SS-A | 0-6 | 10/3/2012 | 9:50 | | | | | | | | | | | | | | | |
| 93-SS-B | 6-12 | 10/3/2012 | 10:05 | | | | | | | | | | | | | | | |
| 93-SS-C | 12-24 | 10/3/2012 | 10:30 | | | | | | | | | | | | | | | |
| 94-SS-A | 0-6 | 10/3/2012 | 14:00 | | | | | | | | | | | | | | | |
| 94-SS-AD | 0-6 | 10/3/2012 | 14:01 | | | | | | | | | | | | | | | |
| 95-SS-A | 0-6 | 10/3/2012 | 14:23 | | | | | | | | | | | | | | | |
| 96-SS-A | 0-6 | 10/3/2012 | 14:32 | | | | | | | | | | | | | | | |
| 97-SS-A | 0-6 | 10/12/2012 | 13:20 | | | | | | | | | | | | | | | |
| 97-SS-B | 6-12 | 10/12/2012 | 13:45 | | | | | | | | | | | | | | | |
| 97-SS-C | 12-24 | 10/12/2012 | 14:30 | | | | | | | | | | | | | | | |
| 98-SS-A | 0-6 | 10/11/2012 | 15:05 | | | | | | | | | | | | | | | |
| 99-SS-A | 0-6 | 10/12/2012 | 10:20 | | | | | | | | | | | | | | | |
| 99-SS-B | 6-12 | 10/12/2012 | 10:40 | | | | | | | | | | | | | | | |
| 99-SS-C | 12-24 | 10/12/2012 | 11:55 | | | | | | | | | | | | | | | |
| 100-SS-A | 0-6 | 10/12/2012 | 9:45 | | | | | | | | | | | | | | | |
| 101-SS-A | 0-6 | 10/11/2012 | 12:10 | | | | | | | | | | | | | | | |
| 102-SS-A | 0-6 | 10/9/2012 | 11:52 | | | | | | | | | | | | | | | |
| 102-SS-B | 6-12 | 10/9/2012 | 12:15 | | | | | | | | | | | | | | | |
| 102-SS-C | 12-24 | 10/9/2012 | 12:48 | | | | | | | | | | | | | | | |
| 102-SS-CD | 12-24 | 10/9/2012 | 12:50 | | | | | | | | | | | | | | | |
| 103-SS-A | 0-6 | 10/9/2012 | 13:31 | | | | | | | | | | | | | | | |
| 104-SS-A | 0-6 | 10/4/2012 | 10:32 | | | | | | | | | | | | | | | |
| 105-SS-A | 0-6 | 10/4/2012 | 10:16 | | | | | | | | | | | | | | | |
| 106-SS-A | 0-6 | 10/3/2012 | 16:00 | | | | | | | | | | | | | | | |
| 107-SS-A | 0-6 | 10/3/2012 | 15:15 | | | | | | | | | | | | | | | |
| 108-SS-A | 0-6 | 10/11/2012 | 11:00 | | | | | | | | | | | | | | | |
| 109-SS-A | 0-6 | 10/11/2012 | 11:25 | | | | | | | | | | | | | | | |
| PS1-SS-A | 0-6 | 11/29/2012 | 12:46 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS2-SS-A | 0-6 | 11/29/2012 | 9:30 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS2-SS-B | 6-12 | 11/29/2012 | 9:37 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS2-SS-C | 12-24 | 11/29/2012 | 9:45 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS3-SS-A | 0-6 | 11/29/2012 | 9:52 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS4-SS-A | 0-6 | 11/29/2012 | 10:01 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS5-SS-A | 0-6 | 11/29/2012 | 12:51 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS6-SS-A | 0-6 | 11/29/2012 | 10:10 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS7-SS-A | 0-6 | 11/29/2012 | 10:27 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS8-SS-A | 0-6 | 11/29/2012 | 10:35 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS9-SS-A | 0-6 | 11/29/2012 | 10:48 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS10-SS-A | 0-6 | 11/29/2012 | 10:57 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS11-SS-A | 0-6 | 11/29/2012 | 11:08 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS11-SS-B | 6-12 | 11/29/2012 | 11:16 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS11-SS-C | 12-24 | 11/29/2012 | 11:23 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS11-SS-CD | 12-24 | 11/29/2012 | 11:24 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |

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| eac ing to round ater creening e el | | | | | . | | | . | | | . | | | . | | | . | | | . | | | | | | | | . | | | . | | | . | | | . | | | . | | | . | | |
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| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| PS12-SS-A | 0-6 | 11/29/2012 | 13:04 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS13-SS-A | 0-6 | 11/29/2012 | 13:13 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS14-SS-A | 0-6 | 11/29/2012 | 13:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS15-SS-A | 0-6 | 11/29/2012 | 13:29 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS16-SS-A | 0-6 | 11/29/2012 | 13:57 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS17-SS-A | 0-6 | 11/29/2012 | 14:02 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS18-SS-A | 0-6 | 11/29/2012 | 14:09 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS19-SS-A | 0-6 | 11/29/2012 | 14:17 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS20-SS-A | 0-6 | 11/29/2012 | 14:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS21-SS-A | 0-6 | 11/29/2012 | 14:33 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS22-SS-A | 0-6 | 11/29/2012 | 14:41 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS22-SS-B | 6-12 | 11/29/2012 | 14:49 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS22-SS-C | 12-24 | 11/29/2012 | 14:58 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS23-SS-A | 0-6 | 11/29/2012 | 15:13 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS24-SS-A | 0-6 | 11/30/2012 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS25-SS-A | 0-6 | 11/30/2012 | 10:13 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS26-SS-A | 0-6 | 11/30/2012 | 10:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS27-SS-A | 0-6 | 11/30/2012 | 10:49 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS28-SS-A | 0-6 | 11/30/2012 | 10:58 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS29-SS-A | 0-6 | 11/30/2012 | 11:07 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS29-SS-B | 6-12 | 11/30/2012 | 11:18 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS29-SS-C | 12-24 | 11/30/2012 | 11:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS29-SS-CD | 12-24 | 11/30/2012 | 11:26 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS30-SS-A | 0-6 | 11/30/2012 | 11:39 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS31-SS-A | 0-6 | 11/30/2012 | 11:48 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS32-SS-A | 0-6 | 11/30/2012 | 11:56 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS33-SS-A | 0-6 | 11/30/2012 | 12:03 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS34-SS-A | 0-6 | 11/30/2012 | 12:12 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS35-SS-A | 0-6 | 11/30/2012 | 12:22 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS35-SS-AD | 0-6 | 11/30/2012 | 12:24 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

**NOTES:**

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| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
| 1.79 | Exceeds MDEQ - RBSLs Residential Surface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | | | | . | | | . | | | | | | . | | | | | | . | | | | | | . | | | . | | | . | | | . | | | . | | | | | | | | | |
| s ommercial ur ace | | | | . | | | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | |
| s esidential ur ace | | | | . | | | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-SS-A | 0-6 | 11/7/2012 | 16:27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SS-A | 0-6 | 11/7/2012 | 14:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SS-B | 6-12 | 11/7/2012 | 15:13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SS-C | 12-24 | 11/7/2012 | 15:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-SS-A | 0-6 | 11/7/2012 | 16:09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-SS-A | 0-6 | 10/30/2012 | 12:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-SS-A | 0-6 | 10/30/2012 | 11:46 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SS-A | 0-6 | 10/30/2012 | 11:03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-SS-A | 0-6 | 10/30/2012 | 10:29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-SS-A | 0-6 | 10/30/2012 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-SS-A | 0-6 | 11/7/2012 | 10:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-SS-B | 6-12 | 11/7/2012 | 11:04 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 9-SS-C | 12-24 | 11/7/2012 | 12:02 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SS-A | 0-6 | 10/19/2012 | 13:36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-SS-B | 6-12 | 10/19/2012 | 14:03 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SS-C | 12-24 | 10/19/2012 | 14:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 11-SS-A | 0-6 | 10/30/2012 | 13:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-SS-AD | 0-6 | 10/30/2012 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SS-A | 0-6 | 10/30/2012 | 14:11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SS-B | 6-12 | 10/30/2012 | 15:03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SS-C | 12-24 | 10/30/2012 | 15:37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-SS-A | 0-6 | 10/31/2012 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-SS-A | 0-6 | 10/31/2012 | 11:57 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SS-A | 0-6 | 10/31/2012 | 12:54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-SS-A | 0-6 | 10/31/2012 | 13:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-SS-A | 0-6 | 10/31/2012 | 13:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SS-A | 0-6 | 10/31/2012 | 14:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-SS-A | 0-6 | 10/25/2012 | 16:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-SS-A | 0-6 | 11/6/2012 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-SS-B | 6-12 | 11/6/2012 | 11:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 20-SS-C | 12-24 | 11/6/2012 | 11:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SS-A | 0-6 | 11/6/2012 | 9:42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21-SS-B | 6-12 | 11/6/2012 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SS-C | 12-24 | 11/6/2012 | 10:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 22-SS-A | 0-6 | 11/6/2012 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-SS-B | 6-12 | 11/6/2012 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-SS-C | 12-24 | 11/6/2012 | 15:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-SS-A | 0-6 | 11/7/2012 | 9:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-SS-A | 0-6 | 10/31/2012 | 15:22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-SS-B | 6-12 | 10/31/2012 | 15:56 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 25-SS-C | 12-24 | 10/31/2012 | 16:30 | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | |
| 26-SS-A | 0-6 | 11/8/2012 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-SS-B | 6-12 | 11/8/2012 | 10:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 26-SS-C | 12-24 | 11/8/2012 | 10:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 27-SS-A | 0-6 | 11/8/2012 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-SS-A | 0-6 | 11/8/2012 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-SS-B | 6-12 | 11/8/2012 | 13:42 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 28-SS-C | 12-24 | 11/8/2012 | 14:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 29-SS-A | 0-6 | 11/1/2012 | 10:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SS-B | 6-12 | 11/1/2012 | 11:26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SS-C | 12-24 | 11/1/2012 | 12:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SS-A | 0-6 | 11/1/2012 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SS-A | 0-6 | 10/26/2012 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SS-B | 6-12 | 10/26/2012 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SS-C | 12-24 | 10/26/2012 | 12:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SS-A | 0-6 | 10/19/2012 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SS-A | 0-6 | 10/25/2012 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SS-A | 0-6 | 10/18/2012 | 12:27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SS-A | 0-6 | 10/18/2012 | 11:39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36-SS-A | 0-6 | 11/6/2012 | 14:04 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36-SS-B | 6-12 | 11/6/2012 | 14:37 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 36-SS-C | 12-24 | 11/6/2012 | 15:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 37-SS-A | 0-6 | 11/7/2012 | 9:37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38-SS-A | 0-6 | 11/7/2012 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38-SS-B | 6-12 | 11/7/2012 | 10:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 38-SS-C | 12-24 | 11/7/2012 | 12:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 39-SS-A | 0-6 | 11/7/2012 | 14:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39-SS-AD | 0-6 | 11/7/2012 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40-SS-A | 0-6 | 11/8/2012 | 9:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40-SS-B | 6-12 | 11/8/2012 | 10:17 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

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| ale il o out a ota ur ace oil am ling | | | | I , H | | | I H | | | , I H | | | I H | | | , I H | | | I H I H | | | I H , H | | | I H , H | | | I , I H H | | | I H , H | | | I H , H | | | , I H | | | , I H | | | , I H | | | , I H | | |
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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | | | | . | | | . | | | | | | . | | | | | | . | | | | | | . | | | . | | | . | | | . | | | . | | | | | | | | | | | | | |
| s ommercial ur ace | | | | . | | | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s esidential ur ace | | | | . | | | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 40-SS-C | 12-24 | 11/8/2012 | 11:23 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 41-SS-A | 0-6 | 11/8/2012 | 16:16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42-SS-A | 0-6 | 11/8/2012 | 13:23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42-SS-B | 6-12 | 11/8/2012 | 14:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 42-SS-C | 12-24 | 11/8/2012 | 14:36 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 42-SS-CD | 12-24 | 11/8/2012 | 14:44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SS-A | 0-6 | 11/8/2012 | 15:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SS-B | 6-12 | 11/8/2012 | 16:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SS-C | 12-24 | 11/8/2012 | 16:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44-SS-A | 0-6 | 11/2/2012 | 11:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44-SS-B | 6-12 | 11/2/2012 | 11:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 44-SS-C | 12-24 | 11/2/2012 | 12:03 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 44-SS-CD | 12-24 | 11/2/2012 | 12:08 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 45-SS-A | 0-6 | 11/1/2012 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45-SS-B | 6-12 | 11/1/2012 | 14:28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45-SS-C | 12-24 | 11/1/2012 | 14:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46-SS-A | 0-6 | 10/26/2012 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46-SS-B | 6-12 | 10/26/2012 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 46-SS-C | 12-24 | 10/26/2012 | 14:40 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 47-SS-A | 0-6 | 10/18/2012 | 14:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SS-B | 6-12 | 10/18/2012 | 15:13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SS-C | 12-24 | 10/18/2012 | 16:14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SS-CD | 12-24 | 10/18/2012 | 16:18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SS-A | 0-6 | 10/18/2012 | 14:13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SS-A | 0-6 | 10/25/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SS-A | 0-6 | 10/25/2012 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SS-A | 0-6 | 10/25/2012 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SS-A | 0-6 | 10/5/2012 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SS-A | 0-6 | 10/24/2012 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SS-A | 0-6 | 10/23/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SS-B | 6-12 | 10/23/2012 | 15:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SS-C | 12-24 | 10/23/2012 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55-SS-A | 0-6 | 10/23/2012 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SS-A | 0-6 | 10/23/2012 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SS-B | 6-12 | 10/23/2012 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SS-C | 12-24 | 10/23/2012 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57-SS-A | 0-6 | 10/23/2012 | 10:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SS-A | 0-6 | 10/19/2012 | 10:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SS-B | 6-12 | 10/23/2012 | 10:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SS-C | 12-24 | 10/23/2012 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59-SS-A | 0-6 | 10/24/2012 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60-SS-A | 0-6 | 10/24/2012 | 13:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SS-A | 0-6 | 10/25/2012 | 9:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SS-B | 6-12 | 10/25/2012 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SS-C | 12-24 | 10/25/2012 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62-SS-A | 0-6 | 10/24/2012 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SS-A | 0-6 | 10/24/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SS-AD | 0-6 | 10/24/2012 | 14:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64-SS-A | 0-6 | 10/10/2012 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SS-A | 0-6 | 10/10/2012 | 11:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SS-B | 6-12 | 10/10/2012 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SS-C | 12-24 | 10/10/2012 | 13:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66-SS-A | 0-6 | 10/9/2012 | 15:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SS-A | 0-6 | 10/17/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SS-B | 6-12 | 10/17/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SS-C | 12-24 | 10/17/2012 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SS-A | 0-6 | 10/17/2012 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SS-A | 0-6 | 10/17/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SS-B | 6-12 | 10/17/2012 | 13:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SS-C | 12-24 | 10/17/2012 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70N-SS-A | 0-6 | 10/18/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70N-SS-AD | 0-6 | 10/18/2012 | 10:11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SS-A | 0-6 | 10/17/2012 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SS-A | 0-6 | 10/4/2012 | 14:24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SS-B | 6-12 | 10/4/2012 | 14:51 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SS-C | 12-24 | 10/4/2012 | 15:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SS-A | 0-6 | 10/24/2012 | 13:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SS-A | 0-6 | 10/25/2012 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SS-A | 0-6 | 10/5/2012 | 9:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SS-A | 0-6 | 10/5/2012 | 10:59 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| ale il o out a ota ur ace oil am ling | | | | I , H | I H | , I H | I H , | , I H | I H I H | I H , H | I H , H | I , H | I H , H | I H , H | , I H | , I H | , I H | , I H |
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| 75-SS-B | 6-12 | 10/5/2012 | 11:17 | | | | | | | | | | | | | | | |
| 75-SS-C | 12-24 | 10/5/2012 | 11:38 | | | | | | | | | | | | | | | |
| 76-SS-A | 0-6 | 10/10/2012 | 15:35 | | | | | | | | | | | | | | | |
| 77-SS-A | 0-6 | 10/2/2012 | 10:30 | | | | | | | | | | | | | | | |
| 77-SS-B | 6-12 | 10/2/2012 | 10:47 | | | | | | | | | | | | | | | |
| 77-SS-C | 12-24 | 10/2/2012 | 11:20 | | | | | | | | | | | | | | | |
| 78-SS-A | 0-6 | 10/2/2012 | 16:16 | | | | | | | | | | | | | | | |
| 79-SS-A | 0-6 | 10/2/2012 | 16:00 | | | | | | | | | | | | | | | |
| 80-SS-A | 0-6 | 10/2/2012 | 15:40 | | | | | | | | | | | | | | | |
| 81-SS-A | 0-6 | 10/11/2012 | 15:30 | | | | | | | | | | | | | | | |
| 82-SS-A | 0-6 | 10/16/2012 | 10:33 | | | | | | | | | | | | | | | |
| 82-SS-B | 6-12 | 10/16/2012 | 11:00 | | | | | | | | | | | | | | | |
| 82-SS-C | 12-24 | 10/16/2012 | 11:40 | | | | | | | | | | | | | | | |
| 83-SS-A | 0-6 | 10/16/2012 | 15:30 | | | | | | | | | | | | | | | |
| 84-SS-A | 0-6 | 10/16/2012 | 13:35 | | | | | | | | | | | | | | | |
| 84-SS-B | 6-12 | 10/16/2012 | 14:00 | | | | | | | | | | | | | | | |
| 84-SS-C | 12-24 | 10/16/2012 | 14:35 | | | | | | | | | | | | | | | |
| 85-SS-A | 0-6 | 10/11/2012 | 14:00 | | | | | | | | | | | | | | | |
| 86-SS-A | 0-6 | 10/11/2012 | 13:10 | | | | | | | | | | | | | | | |
| 87-SS-A | 0-6 | 10/9/2012 | 14:00 | | | | | | | | | | | | | | | |
| 88-SS-A | 0-6 | 10/4/2012 | 11:17 | | | | | | | | | | | | | | | |
| 89-SS-A | 0-6 | 10/2/2012 | 13:40 | | | | | | | | | | | | | | | |
| 90-SS-A | 0-6 | 10/2/2012 | 14:00 | | | | | | | | | | | | | | | |
| 91-SS-A | 0-6 | 10/2/2012 | 14:20 | | | | | | | | | | | | | | | |
| 91-SS-B | 6-12 | 10/2/2012 | 14:35 | | | | | | | | | | | | | | | |
| 91-SS-C | 12-24 | 10/2/2012 | 15:00 | | | | | | | | | | | | | | | |
| 92-SS-A | 0-6 | 10/2/2012 | 15:30 | | | | | | | | | | | | | | | |
| 93-SS-A | 0-6 | 10/3/2012 | 9:50 | | | | | | | | | | | | | | | |
| 93-SS-B | 6-12 | 10/3/2012 | 10:05 | | | | | | | | | | | | | | | |
| 93-SS-C | 12-24 | 10/3/2012 | 10:30 | | | | | | | | | | | | | | | |
| 94-SS-A | 0-6 | 10/3/2012 | 14:00 | | | | | | | | | | | | | | | |
| 94-SS-AD | 0-6 | 10/3/2012 | 14:01 | | | | | | | | | | | | | | | |
| 95-SS-A | 0-6 | 10/3/2012 | 14:23 | | | | | | | | | | | | | | | |
| 96-SS-A | 0-6 | 10/3/2012 | 14:32 | | | | | | | | | | | | | | | |
| 97-SS-A | 0-6 | 10/12/2012 | 13:20 | | | | | | | | | | | | | | | |
| 97-SS-B | 6-12 | 10/12/2012 | 13:45 | | | | | | | | | | | | | | | |
| 97-SS-C | 12-24 | 10/12/2012 | 14:30 | | | | | | | | | | | | | | | |
| 98-SS-A | 0-6 | 10/11/2012 | 15:05 | | | | | | | | | | | | | | | |
| 99-SS-A | 0-6 | 10/12/2012 | 10:20 | | | | | | | | | | | | | | | |
| 99-SS-B | 6-12 | 10/12/2012 | 10:40 | | | | | | | | | | | | | | | |
| 99-SS-C | 12-24 | 10/12/2012 | 11:55 | | | | | | | | | | | | | | | |
| 100-SS-A | 0-6 | 10/12/2012 | 9:45 | | | | | | | | | | | | | | | |
| 101-SS-A | 0-6 | 10/11/2012 | 12:10 | | | | | | | | | | | | | | | |
| 102-SS-A | 0-6 | 10/9/2012 | 11:52 | | | | | | | | | | | | | | | |
| 102-SS-B | 6-12 | 10/9/2012 | 12:15 | | | | | | | | | | | | | | | |
| 102-SS-C | 12-24 | 10/9/2012 | 12:48 | | | | | | | | | | | | | | | |
| 102-SS-CD | 12-24 | 10/9/2012 | 12:50 | | | | | | | | | | | | | | | |
| 103-SS-A | 0-6 | 10/9/2012 | 13:31 | | | | | | | | | | | | | | | |
| 104-SS-A | 0-6 | 10/4/2012 | 10:32 | | | | | | | | | | | | | | | |
| 105-SS-A | 0-6 | 10/4/2012 | 10:16 | | | | | | | | | | | | | | | |
| 106-SS-A | 0-6 | 10/3/2012 | 16:00 | | | | | | | | | | | | | | | |
| 107-SS-A | 0-6 | 10/3/2012 | 15:15 | | | | | | | | | | | | | | | |
| 108-SS-A | 0-6 | 10/11/2012 | 11:00 | | | | | | | | | | | | | | | |
| 109-SS-A | 0-6 | 10/11/2012 | 11:25 | | | | | | | | | | | | | | | |
| PS1-SS-A | 0-6 | 11/29/2012 | 12:46 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS2-SS-A | 0-6 | 11/29/2012 | 9:30 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS2-SS-B | 6-12 | 11/29/2012 | 9:37 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS2-SS-C | 12-24 | 11/29/2012 | 9:45 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS3-SS-A | 0-6 | 11/29/2012 | 9:52 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS4-SS-A | 0-6 | 11/29/2012 | 10:01 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS5-SS-A | 0-6 | 11/29/2012 | 12:51 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS6-SS-A | 0-6 | 11/29/2012 | 10:10 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS7-SS-A | 0-6 | 11/29/2012 | 10:27 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS8-SS-A | 0-6 | 11/29/2012 | 10:35 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS9-SS-A | 0-6 | 11/29/2012 | 10:48 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS10-SS-A | 0-6 | 11/29/2012 | 10:57 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS11-SS-A | 0-6 | 11/29/2012 | 11:08 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS11-SS-B | 6-12 | 11/29/2012 | 11:16 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS11-SS-C | 12-24 | 11/29/2012 | 11:23 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS11-SS-CD | 12-24 | 11/29/2012 | 11:24 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |

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| eac ing to round ater creening e el | | | | | . | . | | . | | . | | . | . | . | . | . | | |
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| PS12-SS-A | 0-6 | 11/29/2012 | 13:04 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS13-SS-A | 0-6 | 11/29/2012 | 13:13 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS14-SS-A | 0-6 | 11/29/2012 | 13:20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS15-SS-A | 0-6 | 11/29/2012 | 13:29 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS16-SS-A | 0-6 | 11/29/2012 | 13:57 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS17-SS-A | 0-6 | 11/29/2012 | 14:02 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS18-SS-A | 0-6 | 11/29/2012 | 14:09 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS19-SS-A | 0-6 | 11/29/2012 | 14:17 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS20-SS-A | 0-6 | 11/29/2012 | 14:25 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS21-SS-A | 0-6 | 11/29/2012 | 14:33 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS22-SS-A | 0-6 | 11/29/2012 | 14:41 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS22-SS-B | 6-12 | 11/29/2012 | 14:49 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS22-SS-C | 12-24 | 11/29/2012 | 14:58 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS23-SS-A | 0-6 | 11/29/2012 | 15:13 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS24-SS-A | 0-6 | 11/30/2012 | 10:10 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS25-SS-A | 0-6 | 11/30/2012 | 10:13 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS26-SS-A | 0-6 | 11/30/2012 | 10:20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS27-SS-A | 0-6 | 11/30/2012 | 10:49 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS28-SS-A | 0-6 | 11/30/2012 | 10:58 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS29-SS-A | 0-6 | 11/30/2012 | 11:07 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS29-SS-B | 6-12 | 11/30/2012 | 11:18 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS29-SS-C | 12-24 | 11/30/2012 | 11:25 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS29-SS-CD | 12-24 | 11/30/2012 | 11:26 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS30-SS-A | 0-6 | 11/30/2012 | 11:39 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS31-SS-A | 0-6 | 11/30/2012 | 11:48 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS32-SS-A | 0-6 | 11/30/2012 | 11:56 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS33-SS-A | 0-6 | 11/30/2012 | 12:03 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS34-SS-A | 0-6 | 11/30/2012 | 12:12 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS35-SS-A | 0-6 | 11/30/2012 | 12:22 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| PS35-SS-AD | 0-6 | 11/30/2012 | 12:24 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
| 1.79 | Exceeds MDEQ - RBSLs Residential Surface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | . | | | | | | . | | | . | | | . | | | . | | | | | | . | | | . | | | . | | | . | | |
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| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-SS-A | 0-6 | 11/7/2012 | 16:27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SS-A | 0-6 | 11/7/2012 | 14:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SS-B | 6-12 | 11/7/2012 | 15:13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SS-C | 12-24 | 11/7/2012 | 15:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-SS-A | 0-6 | 11/7/2012 | 16:09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-SS-A | 0-6 | 10/30/2012 | 12:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-SS-A | 0-6 | 10/30/2012 | 11:46 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SS-A | 0-6 | 10/30/2012 | 11:03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-SS-A | 0-6 | 10/30/2012 | 10:29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-SS-A | 0-6 | 10/30/2012 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-SS-A | 0-6 | 11/7/2012 | 10:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-SS-B | 6-12 | 11/7/2012 | 11:04 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 9-SS-C | 12-24 | 11/7/2012 | 12:02 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SS-A | 0-6 | 10/19/2012 | 13:36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-SS-B | 6-12 | 10/19/2012 | 14:03 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SS-C | 12-24 | 10/19/2012 | 14:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 11-SS-A | 0-6 | 10/30/2012 | 13:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-SS-AD | 0-6 | 10/30/2012 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SS-A | 0-6 | 10/30/2012 | 14:11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SS-B | 6-12 | 10/30/2012 | 15:03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SS-C | 12-24 | 10/30/2012 | 15:37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-SS-A | 0-6 | 10/31/2012 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-SS-A | 0-6 | 10/31/2012 | 11:57 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SS-A | 0-6 | 10/31/2012 | 12:54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-SS-A | 0-6 | 10/31/2012 | 13:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-SS-A | 0-6 | 10/31/2012 | 13:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SS-A | 0-6 | 10/31/2012 | 14:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-SS-A | 0-6 | 10/25/2012 | 16:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-SS-A | 0-6 | 11/6/2012 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-SS-B | 6-12 | 11/6/2012 | 11:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 20-SS-C | 12-24 | 11/6/2012 | 11:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SS-A | 0-6 | 11/6/2012 | 9:42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21-SS-B | 6-12 | 11/6/2012 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SS-C | 12-24 | 11/6/2012 | 10:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 22-SS-A | 0-6 | 11/6/2012 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-SS-B | 6-12 | 11/6/2012 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-SS-C | 12-24 | 11/6/2012 | 15:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-SS-A | 0-6 | 11/7/2012 | 9:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-SS-A | 0-6 | 10/31/2012 | 15:22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-SS-B | 6-12 | 10/31/2012 | 15:56 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 25-SS-C | 12-24 | 10/31/2012 | 16:30 | < 1.1 | | | < 1.1 | | | 12 | | | < 1.1 | | | < 1.1 | | | < 22 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | 12 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | | < 1.1 | | |
| 26-SS-A | 0-6 | 11/8/2012 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-SS-B | 6-12 | 11/8/2012 | 10:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 26-SS-C | 12-24 | 11/8/2012 | 10:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 27-SS-A | 0-6 | 11/8/2012 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-SS-A | 0-6 | 11/8/2012 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-SS-B | 6-12 | 11/8/2012 | 13:42 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 28-SS-C | 12-24 | 11/8/2012 | 14:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 29-SS-A | 0-6 | 11/1/2012 | 10:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SS-B | 6-12 | 11/1/2012 | 11:26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SS-C | 12-24 | 11/1/2012 | 12:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SS-A | 0-6 | 11/1/2012 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SS-A | 0-6 | 10/26/2012 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SS-B | 6-12 | 10/26/2012 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SS-C | 12-24 | 10/26/2012 | 12:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SS-A | 0-6 | 10/19/2012 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SS-A | 0-6 | 10/25/2012 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SS-A | 0-6 | 10/18/2012 | 12:27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SS-A | 0-6 | 10/18/2012 | 11:39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36-SS-A | 0-6 | 11/6/2012 | 14:04 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36-SS-B | 6-12 | 11/6/2012 | 14:37 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.031 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 36-SS-C | 12-24 | 11/6/2012 | 15:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 37-SS-A | 0-6 | 11/7/2012 | 9:37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38-SS-A | 0-6 | 11/7/2012 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38-SS-B | 6-12 | 11/7/2012 | 10:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 38-SS-C | 12-24 | 11/7/2012 | 12:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 39-SS-A | 0-6 | 11/7/2012 | 14:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39-SS-AD | 0-6 | 11/7/2012 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40-SS-A | 0-6 | 11/8/2012 | 9:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40-SS-B | 6-12 | 11/8/2012 | 10:17 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

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| ale il o out a ota ur ace oil am ling | | | | I , I H | | | I H , | | | H | | | H H | | | H H I | | | H H | | | | | | , , , H H | | | , , , H H | | | H H | | | | | | , , I H H | | | , , I H H | | | I H H | | | I H H | | |
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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | . | | | | | | . | | | . | | | . | | | . | | | | | | | | | . | | | . | | | . | | | . | | | . | |
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| s esidential ur ace | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 40-SS-C | 12-24 | 11/8/2012 | 11:23 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 41-SS-A | 0-6 | 11/8/2012 | 16:16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42-SS-A | 0-6 | 11/8/2012 | 13:23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42-SS-B | 6-12 | 11/8/2012 | 14:00 | < 0.20 | | | < 0.20 | | | 0.046 | | J | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.17 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 42-SS-C | 12-24 | 11/8/2012 | 14:36 | < 0.20 | | | < 0.20 | | | 0.071 | | J | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.17 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 42-SS-CD | 12-24 | 11/8/2012 | 14:44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SS-A | 0-6 | 11/8/2012 | 15:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SS-B | 6-12 | 11/8/2012 | 16:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SS-C | 12-24 | 11/8/2012 | 16:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44-SS-A | 0-6 | 11/2/2012 | 11:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44-SS-B | 6-12 | 11/2/2012 | 11:35 | < 0.20 | | | < 0.20 | | | 1.5 | | | < 0.20 | | | 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.24 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 44-SS-C | 12-24 | 11/2/2012 | 12:03 | < 0.20 | | | < 0.20 | | | 3.4 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.51 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 44-SS-CD | 12-24 | 11/2/2012 | 12:08 | < 0.20 | | | < 0.20 | | | 3.9 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.52 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 45-SS-A | 0-6 | 11/1/2012 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45-SS-B | 6-12 | 11/1/2012 | 14:28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45-SS-C | 12-24 | 11/1/2012 | 14:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46-SS-A | 0-6 | 10/26/2012 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46-SS-B | 6-12 | 10/26/2012 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 46-SS-C | 12-24 | 10/26/2012 | 14:40 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 47-SS-A | 0-6 | 10/18/2012 | 14:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SS-B | 6-12 | 10/18/2012 | 15:13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SS-C | 12-24 | 10/18/2012 | 16:14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SS-CD | 12-24 | 10/18/2012 | 16:18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SS-A | 0-6 | 10/18/2012 | 14:13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SS-A | 0-6 | 10/25/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SS-A | 0-6 | 10/25/2012 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SS-A | 0-6 | 10/25/2012 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SS-A | 0-6 | 10/5/2012 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SS-A | 0-6 | 10/24/2012 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SS-A | 0-6 | 10/23/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SS-B | 6-12 | 10/23/2012 | 15:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SS-C | 12-24 | 10/23/2012 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55-SS-A | 0-6 | 10/23/2012 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SS-A | 0-6 | 10/23/2012 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SS-B | 6-12 | 10/23/2012 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SS-C | 12-24 | 10/23/2012 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57-SS-A | 0-6 | 10/23/2012 | 10:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SS-A | 0-6 | 10/19/2012 | 10:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SS-B | 6-12 | 10/23/2012 | 10:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SS-C | 12-24 | 10/23/2012 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59-SS-A | 0-6 | 10/24/2012 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60-SS-A | 0-6 | 10/24/2012 | 13:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SS-A | 0-6 | 10/25/2012 | 9:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SS-B | 6-12 | 10/25/2012 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SS-C | 12-24 | 10/25/2012 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62-SS-A | 0-6 | 10/24/2012 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SS-A | 0-6 | 10/24/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SS-AD | 0-6 | 10/24/2012 | 14:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64-SS-A | 0-6 | 10/10/2012 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SS-A | 0-6 | 10/10/2012 | 11:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SS-B | 6-12 | 10/10/2012 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SS-C | 12-24 | 10/10/2012 | 13:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66-SS-A | 0-6 | 10/9/2012 | 15:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SS-A | 0-6 | 10/17/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SS-B | 6-12 | 10/17/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SS-C | 12-24 | 10/17/2012 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SS-A | 0-6 | 10/17/2012 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SS-A | 0-6 | 10/17/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SS-B | 6-12 | 10/17/2012 | 13:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SS-C | 12-24 | 10/17/2012 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70N-SS-A | 0-6 | 10/18/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70N-SS-AD | 0-6 | 10/18/2012 | 10:11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SS-A | 0-6 | 10/17/2012 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SS-A | 0-6 | 10/4/2012 | 14:24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SS-B | 6-12 | 10/4/2012 | 14:51 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SS-C | 12-24 | 10/4/2012 | 15:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SS-A | 0-6 | 10/24/2012 | 13:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SS-A | 0-6 | 10/25/2012 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SS-A | 0-6 | 10/5/2012 | 9:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SS-A | 0-6 | 10/5/2012 | 10:59 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| ale il o out a ota ur ace oil am ling | | | | I , I H | | | I H , | | | H | | | H H | | | H H I | | | H H | | | | | | , , , H H | | | , , , H H | | | H H | | | | | | , , I H H | | | , , I H H | | | I H H | | | I H H | | |
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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | . | | | . | | | . | | | . | | | . | | | | | | | | | . | | | . | | | . | | | | | |
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| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 75-SS-B | 6-12 | 10/5/2012 | 11:17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SS-C | 12-24 | 10/5/2012 | 11:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76-SS-A | 0-6 | 10/10/2012 | 15:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SS-A | 0-6 | 10/2/2012 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SS-B | 6-12 | 10/2/2012 | 10:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SS-C | 12-24 | 10/2/2012 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SS-A | 0-6 | 10/2/2012 | 16:16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79-SS-A | 0-6 | 10/2/2012 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80-SS-A | 0-6 | 10/2/2012 | 15:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81-SS-A | 0-6 | 10/11/2012 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SS-A | 0-6 | 10/16/2012 | 10:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SS-B | 6-12 | 10/16/2012 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SS-C | 12-24 | 10/16/2012 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83-SS-A | 0-6 | 10/16/2012 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SS-A | 0-6 | 10/16/2012 | 13:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SS-B | 6-12 | 10/16/2012 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SS-C | 12-24 | 10/16/2012 | 14:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85-SS-A | 0-6 | 10/11/2012 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86-SS-A | 0-6 | 10/11/2012 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87-SS-A | 0-6 | 10/9/2012 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SS-A | 0-6 | 10/4/2012 | 11:17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SS-A | 0-6 | 10/2/2012 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SS-A | 0-6 | 10/2/2012 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SS-A | 0-6 | 10/2/2012 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SS-B | 6-12 | 10/2/2012 | 14:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SS-C | 12-24 | 10/2/2012 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92-SS-A | 0-6 | 10/2/2012 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SS-A | 0-6 | 10/3/2012 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SS-B | 6-12 | 10/3/2012 | 10:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SS-C | 12-24 | 10/3/2012 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SS-A | 0-6 | 10/3/2012 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SS-AD | 0-6 | 10/3/2012 | 14:01 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95-SS-A | 0-6 | 10/3/2012 | 14:23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96-SS-A | 0-6 | 10/3/2012 | 14:32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SS-A | 0-6 | 10/12/2012 | 13:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SS-B | 6-12 | 10/12/2012 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SS-C | 12-24 | 10/12/2012 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98-SS-A | 0-6 | 10/11/2012 | 15:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99-SS-A | 0-6 | 10/12/2012 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99-SS-B | 6-12 | 10/12/2012 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99-SS-C | 12-24 | 10/12/2012 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SS-A | 0-6 | 10/12/2012 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101-SS-A | 0-6 | 10/11/2012 | 12:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SS-A | 0-6 | 10/9/2012 | 11:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SS-B | 6-12 | 10/9/2012 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SS-C | 12-24 | 10/9/2012 | 12:48 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SS-CD | 12-24 | 10/9/2012 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SS-A | 0-6 | 10/9/2012 | 13:31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SS-A | 0-6 | 10/4/2012 | 10:32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SS-A | 0-6 | 10/4/2012 | 10:16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SS-A | 0-6 | 10/3/2012 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107-SS-A | 0-6 | 10/3/2012 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 108-SS-A | 0-6 | 10/11/2012 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109-SS-A | 0-6 | 10/11/2012 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PS1-SS-A | 0-6 | 11/29/2012 | 12:46 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS2-SS-A | 0-6 | 11/29/2012 | 9:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS2-SS-B | 6-12 | 11/29/2012 | 9:37 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS2-SS-C | 12-24 | 11/29/2012 | 9:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS3-SS-A | 0-6 | 11/29/2012 | 9:52 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS4-SS-A | 0-6 | 11/29/2012 | 10:01 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS5-SS-A | 0-6 | 11/29/2012 | 12:51 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS6-SS-A | 0-6 | 11/29/2012 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS7-SS-A | 0-6 | 11/29/2012 | 10:27 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS8-SS-A | 0-6 | 11/29/2012 | 10:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS9-SS-A | 0-6 | 11/29/2012 | 10:48 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS10-SS-A | 0-6 | 11/29/2012 | 10:57 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS11-SS-A | 0-6 | 11/29/2012 | 11:08 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS11-SS-B | 6-12 | 11/29/2012 | 11:16 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS11-SS-C | 12-24 | 11/29/2012 | 11:23 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS11-SS-CD | 12-24 | 11/29/2012 | 11:24 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | . | | | | | | . | | | . | | | . | | | . | | | . | | | | | | . | | | . | | | . | | | . | | |
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| PS12-SS-A | 0-6 | 11/29/2012 | 13:04 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS13-SS-A | 0-6 | 11/29/2012 | 13:13 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS14-SS-A | 0-6 | 11/29/2012 | 13:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS15-SS-A | 0-6 | 11/29/2012 | 13:29 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS16-SS-A | 0-6 | 11/29/2012 | 13:57 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS17-SS-A | 0-6 | 11/29/2012 | 14:02 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS18-SS-A | 0-6 | 11/29/2012 | 14:09 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS19-SS-A | 0-6 | 11/29/2012 | 14:17 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS20-SS-A | 0-6 | 11/29/2012 | 14:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS21-SS-A | 0-6 | 11/29/2012 | 14:33 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS22-SS-A | 0-6 | 11/29/2012 | 14:41 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS22-SS-B | 6-12 | 11/29/2012 | 14:49 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS22-SS-C | 12-24 | 11/29/2012 | 14:58 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS23-SS-A | 0-6 | 11/29/2012 | 15:13 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS24-SS-A | 0-6 | 11/30/2012 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS25-SS-A | 0-6 | 11/30/2012 | 10:13 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS26-SS-A | 0-6 | 11/30/2012 | 10:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS27-SS-A | 0-6 | 11/30/2012 | 10:49 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS28-SS-A | 0-6 | 11/30/2012 | 10:58 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS29-SS-A | 0-6 | 11/30/2012 | 11:07 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS29-SS-B | 6-12 | 11/30/2012 | 11:18 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS29-SS-C | 12-24 | 11/30/2012 | 11:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS29-SS-CD | 12-24 | 11/30/2012 | 11:26 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS30-SS-A | 0-6 | 11/30/2012 | 11:39 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS31-SS-A | 0-6 | 11/30/2012 | 11:48 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS32-SS-A | 0-6 | 11/30/2012 | 11:56 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS33-SS-A | 0-6 | 11/30/2012 | 12:03 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS34-SS-A | 0-6 | 11/30/2012 | 12:12 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS35-SS-A | 0-6 | 11/30/2012 | 12:22 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS35-SS-AD | 0-6 | 11/30/2012 | 12:24 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

**NOTES:**

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| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
| 1.79 | Exceeds MDEQ - RBSLs Residential Surface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| 1-SS-A | 0-6 | 11/7/2012 | 16:27 | | | | | | | | | | | | | | | |
| 2-SS-A | 0-6 | 11/7/2012 | 14:33 | | | | | | | | | | | | | | | |
| 2-SS-B | 6-12 | 11/7/2012 | 15:13 | | | | | | | | | | | | | | | |
| 2-SS-C | 12-24 | 11/7/2012 | 15:41 | | | | | | | | | | | | | | | |
| 3-SS-A | 0-6 | 11/7/2012 | 16:09 | | | | | | | | | | | | | | | |
| 4-SS-A | 0-6 | 10/30/2012 | 12:52 | | | | | | | | | | | | | | | |
| 5-SS-A | 0-6 | 10/30/2012 | 11:46 | | | | | | | | | | | | | | | |
| 6-SS-A | 0-6 | 10/30/2012 | 11:03 | | | | | | | | | | | | | | | |
| 7-SS-A | 0-6 | 10/30/2012 | 10:29 | | | | | | | | | | | | | | | |
| 8-SS-A | 0-6 | 10/30/2012 | 9:45 | | | | | | | | | | | | | | | |
| 9-SS-A | 0-6 | 11/7/2012 | 10:33 | | | | | | | | | | | | | | | |
| 9-SS-B | 6-12 | 11/7/2012 | 11:04 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 9-SS-C | 12-24 | 11/7/2012 | 12:02 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SS-A | 0-6 | 10/19/2012 | 13:36 | | | | | | | | | | | | | | | |
| 10-SS-B | 6-12 | 10/19/2012 | 14:03 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SS-C | 12-24 | 10/19/2012 | 14:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 11-SS-A | 0-6 | 10/30/2012 | 13:43 | | | | | | | | | | | | | | | |
| 11-SS-AD | 0-6 | 10/30/2012 | 13:45 | | | | | | | | | | | | | | | |
| 12-SS-A | 0-6 | 10/30/2012 | 14:11 | | | | | | | | | | | | | | | |
| 12-SS-B | 6-12 | 10/30/2012 | 15:03 | | | | | | | | | | | | | | | |
| 12-SS-C | 12-24 | 10/30/2012 | 15:37 | | | | | | | | | | | | | | | |
| 13-SS-A | 0-6 | 10/31/2012 | 11:25 | | | | | | | | | | | | | | | |
| 14-SS-A | 0-6 | 10/31/2012 | 11:57 | | | | | | | | | | | | | | | |
| 15-SS-A | 0-6 | 10/31/2012 | 12:54 | | | | | | | | | | | | | | | |
| 16-SS-A | 0-6 | 10/31/2012 | 13:20 | | | | | | | | | | | | | | | |
| 17-SS-A | 0-6 | 10/31/2012 | 13:47 | | | | | | | | | | | | | | | |
| 18-SS-A | 0-6 | 10/31/2012 | 14:41 | | | | | | | | | | | | | | | |
| 19-SS-A | 0-6 | 10/25/2012 | 16:55 | | | | | | | | | | | | | | | |
| 20-SS-A | 0-6 | 11/6/2012 | 11:00 | | | | | | | | | | | | | | | |
| 20-SS-B | 6-12 | 11/6/2012 | 11:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 20-SS-C | 12-24 | 11/6/2012 | 11:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SS-A | 0-6 | 11/6/2012 | 9:42 | | | | | | | | | | | | | | | |
| 21-SS-B | 6-12 | 11/6/2012 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SS-C | 12-24 | 11/6/2012 | 10:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 22-SS-A | 0-6 | 11/6/2012 | 13:30 | | | | | | | | | | | | | | | |
| 22-SS-B | 6-12 | 11/6/2012 | 14:10 | | | | | | | | | | | | | | | |
| 22-SS-C | 12-24 | 11/6/2012 | 15:33 | | | | | | | | | | | | | | | |
| 23-SS-A | 0-6 | 11/7/2012 | 9:34 | | | | | | | | | | | | | | | |
| 25-SS-A | 0-6 | 10/31/2012 | 15:22 | | | | | | | | | | | | | | | |
| 25-SS-B | 6-12 | 10/31/2012 | 15:56 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 25-SS-C | 12-24 | 10/31/2012 | 16:30 | < 1.1 | | | < 1.1 | | | 15 | | | 5.0 | | | 20 | | |
| 26-SS-A | 0-6 | 11/8/2012 | 9:35 | | | | | | | | | | | | | | | |
| 26-SS-B | 6-12 | 11/8/2012 | 10:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 26-SS-C | 12-24 | 11/8/2012 | 10:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 27-SS-A | 0-6 | 11/8/2012 | 15:00 | | | | | | | | | | | | | | | |
| 28-SS-A | 0-6 | 11/8/2012 | 13:30 | | | | | | | | | | | | | | | |
| 28-SS-B | 6-12 | 11/8/2012 | 13:42 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 28-SS-C | 12-24 | 11/8/2012 | 14:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 29-SS-A | 0-6 | 11/1/2012 | 10:55 | | | | | | | | | | | | | | | |
| 29-SS-B | 6-12 | 11/1/2012 | 11:26 | | | | | | | | | | | | | | | |
| 29-SS-C | 12-24 | 11/1/2012 | 12:43 | | | | | | | | | | | | | | | |
| 30-SS-A | 0-6 | 11/1/2012 | 10:15 | | | | | | | | | | | | | | | |
| 31-SS-A | 0-6 | 10/26/2012 | 11:25 | | | | | | | | | | | | | | | |
| 31-SS-B | 6-12 | 10/26/2012 | 11:45 | | | | | | | | | | | | | | | |
| 31-SS-C | 12-24 | 10/26/2012 | 12:12 | | | | | | | | | | | | | | | |
| 32-SS-A | 0-6 | 10/19/2012 | 9:45 | | | | | | | | | | | | | | | |
| 33-SS-A | 0-6 | 10/25/2012 | 12:05 | | | | | | | | | | | | | | | |
| 34-SS-A | 0-6 | 10/18/2012 | 12:27 | | | | | | | | | | | | | | | |
| 35-SS-A | 0-6 | 10/18/2012 | 11:39 | | | | | | | | | | | | | | | |
| 36-SS-A | 0-6 | 11/6/2012 | 14:04 | | | | | | | | | | | | | | | |
| 36-SS-B | 6-12 | 11/6/2012 | 14:37 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 36-SS-C | 12-24 | 11/6/2012 | 15:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 37-SS-A | 0-6 | 11/7/2012 | 9:37 | | | | | | | | | | | | | | | |
| 38-SS-A | 0-6 | 11/7/2012 | 10:30 | | | | | | | | | | | | | | | |
| 38-SS-B | 6-12 | 11/7/2012 | 10:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 38-SS-C | 12-24 | 11/7/2012 | 12:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 39-SS-A | 0-6 | 11/7/2012 | 14:15 | | | | | | | | | | | | | | | |
| 39-SS-AD | 0-6 | 11/7/2012 | 14:20 | | | | | | | | | | | | | | | |
| 40-SS-A | 0-6 | 11/8/2012 | 9:34 | | | | | | | | | | | | | | | |
| 40-SS-B | 6-12 | 11/8/2012 | 10:17 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

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| 40-SS-C | 12-24 | 11/8/2012 | 11:23 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 41-SS-A | 0-6 | 11/8/2012 | 16:16 | | | | | | | | | | | | | | | |
| 42-SS-A | 0-6 | 11/8/2012 | 13:23 | | | | | | | | | | | | | | | |
| 42-SS-B | 6-12 | 11/8/2012 | 14:00 | < 0.20 | | | < 0.20 | | | 0.59 | | | 0.16 | | J | 0.75 | | |
| 42-SS-C | 12-24 | 11/8/2012 | 14:36 | < 0.20 | | | < 0.20 | | | 0.59 | | | 0.16 | | J | 0.75 | | |
| 42-SS-CD | 12-24 | 11/8/2012 | 14:44 | | | | | | | | | | | | | | | |
| 43-SS-A | 0-6 | 11/8/2012 | 15:35 | | | | | | | | | | | | | | | |
| 43-SS-B | 6-12 | 11/8/2012 | 16:15 | | | | | | | | | | | | | | | |
| 43-SS-C | 12-24 | 11/8/2012 | 16:45 | | | | | | | | | | | | | | | |
| 44-SS-A | 0-6 | 11/2/2012 | 11:12 | | | | | | | | | | | | | | | |
| 44-SS-B | 6-12 | 11/2/2012 | 11:35 | < 0.20 | | | < 0.20 | | | 3.9 | | | 1.8 | | | 5.8 | | |
| 44-SS-C | 12-24 | 11/2/2012 | 12:03 | < 0.20 | | | < 0.20 | | | 6.4 | | | 2.8 | | | 9.2 | | |
| 44-SS-CD | 12-24 | 11/2/2012 | 12:08 | < 0.20 | | | < 0.20 | | | 6.7 | | | 3.1 | | | 9.8 | | |
| 45-SS-A | 0-6 | 11/1/2012 | 14:10 | | | | | | | | | | | | | | | |
| 45-SS-B | 6-12 | 11/1/2012 | 14:28 | | | | | | | | | | | | | | | |
| 45-SS-C | 12-24 | 11/1/2012 | 14:47 | | | | | | | | | | | | | | | |
| 46-SS-A | 0-6 | 10/26/2012 | 14:00 | | | | | | | | | | | | | | | |
| 46-SS-B | 6-12 | 10/26/2012 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 46-SS-C | 12-24 | 10/26/2012 | 14:40 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 47-SS-A | 0-6 | 10/18/2012 | 14:52 | | | | | | | | | | | | | | | |
| 47-SS-B | 6-12 | 10/18/2012 | 15:13 | | | | | | | | | | | | | | | |
| 47-SS-C | 12-24 | 10/18/2012 | 16:14 | | | | | | | | | | | | | | | |
| 47-SS-CD | 12-24 | 10/18/2012 | 16:18 | | | | | | | | | | | | | | | |
| 48-SS-A | 0-6 | 10/18/2012 | 14:13 | | | | | | | | | | | | | | | |
| 49-SS-A | 0-6 | 10/25/2012 | 13:00 | | | | | | | | | | | | | | | |
| 50-SS-A | 0-6 | 10/25/2012 | 14:20 | | | | | | | | | | | | | | | |
| 51-SS-A | 0-6 | 10/25/2012 | 15:45 | | | | | | | | | | | | | | | |
| 52-SS-A | 0-6 | 10/5/2012 | 9:35 | | | | | | | | | | | | | | | |
| 53-SS-A | 0-6 | 10/24/2012 | 9:30 | | | | | | | | | | | | | | | |
| 54-SS-A | 0-6 | 10/23/2012 | 14:50 | | | | | | | | | | | | | | | |
| 54-SS-B | 6-12 | 10/23/2012 | 15:40 | | | | | | | | | | | | | | | |
| 54-SS-C | 12-24 | 10/23/2012 | 16:05 | | | | | | | | | | | | | | | |
| 55-SS-A | 0-6 | 10/23/2012 | 14:10 | | | | | | | | | | | | | | | |
| 56-SS-A | 0-6 | 10/23/2012 | 11:55 | | | | | | | | | | | | | | | |
| 56-SS-B | 6-12 | 10/23/2012 | 12:30 | | | | | | | | | | | | | | | |
| 56-SS-C | 12-24 | 10/23/2012 | 13:10 | | | | | | | | | | | | | | | |
| 57-SS-A | 0-6 | 10/23/2012 | 10:55 | | | | | | | | | | | | | | | |
| 58-SS-A | 0-6 | 10/19/2012 | 10:52 | | | | | | | | | | | | | | | |
| 58-SS-B | 6-12 | 10/23/2012 | 10:05 | | | | | | | | | | | | | | | |
| 58-SS-C | 12-24 | 10/23/2012 | 10:15 | | | | | | | | | | | | | | | |
| 59-SS-A | 0-6 | 10/24/2012 | 11:30 | | | | | | | | | | | | | | | |
| 60-SS-A | 0-6 | 10/24/2012 | 13:20 | | | | | | | | | | | | | | | |
| 61-SS-A | 0-6 | 10/25/2012 | 9:20 | | | | | | | | | | | | | | | |
| 61-SS-B | 6-12 | 10/25/2012 | 9:50 | | | | | | | | | | | | | | | |
| 61-SS-C | 12-24 | 10/25/2012 | 10:20 | | | | | | | | | | | | | | | |
| 62-SS-A | 0-6 | 10/24/2012 | 15:30 | | | | | | | | | | | | | | | |
| 63-SS-A | 0-6 | 10/24/2012 | 14:50 | | | | | | | | | | | | | | | |
| 63-SS-AD | 0-6 | 10/24/2012 | 14:55 | | | | | | | | | | | | | | | |
| 64-SS-A | 0-6 | 10/10/2012 | 14:45 | | | | | | | | | | | | | | | |
| 65-SS-A | 0-6 | 10/10/2012 | 11:47 | | | | | | | | | | | | | | | |
| 65-SS-B | 6-12 | 10/10/2012 | 12:30 | | | | | | | | | | | | | | | |
| 65-SS-C | 12-24 | 10/10/2012 | 13:50 | | | | | | | | | | | | | | | |
| 66-SS-A | 0-6 | 10/9/2012 | 15:52 | | | | | | | | | | | | | | | |
| 67-SS-A | 0-6 | 10/17/2012 | 9:40 | | | | | | | | | | | | | | | |
| 67-SS-B | 6-12 | 10/17/2012 | 10:10 | | | | | | | | | | | | | | | |
| 67-SS-C | 12-24 | 10/17/2012 | 10:45 | | | | | | | | | | | | | | | |
| 68-SS-A | 0-6 | 10/17/2012 | 12:05 | | | | | | | | | | | | | | | |
| 69-SS-A | 0-6 | 10/17/2012 | 13:00 | | | | | | | | | | | | | | | |
| 69-SS-B | 6-12 | 10/17/2012 | 13:25 | | | | | | | | | | | | | | | |
| 69-SS-C | 12-24 | 10/17/2012 | 13:45 | | | | | | | | | | | | | | | |
| 70N-SS-A | 0-6 | 10/18/2012 | 10:10 | | | | | | | | | | | | | | | |
| 70N-SS-AD | 0-6 | 10/18/2012 | 10:11 | | | | | | | | | | | | | | | |
| 70-SS-A | 0-6 | 10/17/2012 | 15:00 | | | | | | | | | | | | | | | |
| 71-SS-A | 0-6 | 10/4/2012 | 14:24 | | | | | | | | | | | | | | | |
| 71-SS-B | 6-12 | 10/4/2012 | 14:51 | | | | | | | | | | | | | | | |
| 71-SS-C | 12-24 | 10/4/2012 | 15:50 | | | | | | | | | | | | | | | |
| 72-SS-A | 0-6 | 10/24/2012 | 13:50 | | | | | | | | | | | | | | | |
| 73-SS-A | 0-6 | 10/25/2012 | 11:00 | | | | | | | | | | | | | | | |
| 74-SS-A | 0-6 | 10/5/2012 | 9:55 | | | | | | | | | | | | | | | |
| 75-SS-A | 0-6 | 10/5/2012 | 10:59 | | | | | | | | | | | | | | | |

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| 75-SS-B | 6-12 | 10/5/2012 | 11:17 | | | | | | | | | | | | | | | |
| 75-SS-C | 12-24 | 10/5/2012 | 11:38 | | | | | | | | | | | | | | | |
| 76-SS-A | 0-6 | 10/10/2012 | 15:35 | | | | | | | | | | | | | | | |
| 77-SS-A | 0-6 | 10/2/2012 | 10:30 | | | | | | | | | | | | | | | |
| 77-SS-B | 6-12 | 10/2/2012 | 10:47 | | | | | | | | | | | | | | | |
| 77-SS-C | 12-24 | 10/2/2012 | 11:20 | | | | | | | | | | | | | | | |
| 78-SS-A | 0-6 | 10/2/2012 | 16:16 | | | | | | | | | | | | | | | |
| 79-SS-A | 0-6 | 10/2/2012 | 16:00 | | | | | | | | | | | | | | | |
| 80-SS-A | 0-6 | 10/2/2012 | 15:40 | | | | | | | | | | | | | | | |
| 81-SS-A | 0-6 | 10/11/2012 | 15:30 | | | | | | | | | | | | | | | |
| 82-SS-A | 0-6 | 10/16/2012 | 10:33 | | | | | | | | | | | | | | | |
| 82-SS-B | 6-12 | 10/16/2012 | 11:00 | | | | | | | | | | | | | | | |
| 82-SS-C | 12-24 | 10/16/2012 | 11:40 | | | | | | | | | | | | | | | |
| 83-SS-A | 0-6 | 10/16/2012 | 15:30 | | | | | | | | | | | | | | | |
| 84-SS-A | 0-6 | 10/16/2012 | 13:35 | | | | | | | | | | | | | | | |
| 84-SS-B | 6-12 | 10/16/2012 | 14:00 | | | | | | | | | | | | | | | |
| 84-SS-C | 12-24 | 10/16/2012 | 14:35 | | | | | | | | | | | | | | | |
| 85-SS-A | 0-6 | 10/11/2012 | 14:00 | | | | | | | | | | | | | | | |
| 86-SS-A | 0-6 | 10/11/2012 | 13:10 | | | | | | | | | | | | | | | |
| 87-SS-A | 0-6 | 10/9/2012 | 14:00 | | | | | | | | | | | | | | | |
| 88-SS-A | 0-6 | 10/4/2012 | 11:17 | | | | | | | | | | | | | | | |
| 89-SS-A | 0-6 | 10/2/2012 | 13:40 | | | | | | | | | | | | | | | |
| 90-SS-A | 0-6 | 10/2/2012 | 14:00 | | | | | | | | | | | | | | | |
| 91-SS-A | 0-6 | 10/2/2012 | 14:20 | | | | | | | | | | | | | | | |
| 91-SS-B | 6-12 | 10/2/2012 | 14:35 | | | | | | | | | | | | | | | |
| 91-SS-C | 12-24 | 10/2/2012 | 15:00 | | | | | | | | | | | | | | | |
| 92-SS-A | 0-6 | 10/2/2012 | 15:30 | | | | | | | | | | | | | | | |
| 93-SS-A | 0-6 | 10/3/2012 | 9:50 | | | | | | | | | | | | | | | |
| 93-SS-B | 6-12 | 10/3/2012 | 10:05 | | | | | | | | | | | | | | | |
| 93-SS-C | 12-24 | 10/3/2012 | 10:30 | | | | | | | | | | | | | | | |
| 94-SS-A | 0-6 | 10/3/2012 | 14:00 | | | | | | | | | | | | | | | |
| 94-SS-AD | 0-6 | 10/3/2012 | 14:01 | | | | | | | | | | | | | | | |
| 95-SS-A | 0-6 | 10/3/2012 | 14:23 | | | | | | | | | | | | | | | |
| 96-SS-A | 0-6 | 10/3/2012 | 14:32 | | | | | | | | | | | | | | | |
| 97-SS-A | 0-6 | 10/12/2012 | 13:20 | | | | | | | | | | | | | | | |
| 97-SS-B | 6-12 | 10/12/2012 | 13:45 | | | | | | | | | | | | | | | |
| 97-SS-C | 12-24 | 10/12/2012 | 14:30 | | | | | | | | | | | | | | | |
| 98-SS-A | 0-6 | 10/11/2012 | 15:05 | | | | | | | | | | | | | | | |
| 99-SS-A | 0-6 | 10/12/2012 | 10:20 | | | | | | | | | | | | | | | |
| 99-SS-B | 6-12 | 10/12/2012 | 10:40 | | | | | | | | | | | | | | | |
| 99-SS-C | 12-24 | 10/12/2012 | 11:55 | | | | | | | | | | | | | | | |
| 100-SS-A | 0-6 | 10/12/2012 | 9:45 | | | | | | | | | | | | | | | |
| 101-SS-A | 0-6 | 10/11/2012 | 12:10 | | | | | | | | | | | | | | | |
| 102-SS-A | 0-6 | 10/9/2012 | 11:52 | | | | | | | | | | | | | | | |
| 102-SS-B | 6-12 | 10/9/2012 | 12:15 | | | | | | | | | | | | | | | |
| 102-SS-C | 12-24 | 10/9/2012 | 12:48 | | | | | | | | | | | | | | | |
| 102-SS-CD | 12-24 | 10/9/2012 | 12:50 | | | | | | | | | | | | | | | |
| 103-SS-A | 0-6 | 10/9/2012 | 13:31 | | | | | | | | | | | | | | | |
| 104-SS-A | 0-6 | 10/4/2012 | 10:32 | | | | | | | | | | | | | | | |
| 105-SS-A | 0-6 | 10/4/2012 | 10:16 | | | | | | | | | | | | | | | |
| 106-SS-A | 0-6 | 10/3/2012 | 16:00 | | | | | | | | | | | | | | | |
| 107-SS-A | 0-6 | 10/3/2012 | 15:15 | | | | | | | | | | | | | | | |
| 108-SS-A | 0-6 | 10/11/2012 | 11:00 | | | | | | | | | | | | | | | |
| 109-SS-A | 0-6 | 10/11/2012 | 11:25 | | | | | | | | | | | | | | | |
| PS1-SS-A | 0-6 | 11/29/2012 | 12:46 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS2-SS-A | 0-6 | 11/29/2012 | 9:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS2-SS-B | 6-12 | 11/29/2012 | 9:37 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS2-SS-C | 12-24 | 11/29/2012 | 9:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS3-SS-A | 0-6 | 11/29/2012 | 9:52 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS4-SS-A | 0-6 | 11/29/2012 | 10:01 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS5-SS-A | 0-6 | 11/29/2012 | 12:51 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS6-SS-A | 0-6 | 11/29/2012 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS7-SS-A | 0-6 | 11/29/2012 | 10:27 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS8-SS-A | 0-6 | 11/29/2012 | 10:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS9-SS-A | 0-6 | 11/29/2012 | 10:48 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS10-SS-A | 0-6 | 11/29/2012 | 10:57 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS11-SS-A | 0-6 | 11/29/2012 | 11:08 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS11-SS-B | 6-12 | 11/29/2012 | 11:16 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS11-SS-C | 12-24 | 11/29/2012 | 11:23 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS11-SS-CD | 12-24 | 11/29/2012 | 11:24 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

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| eac ing to round ater creening e el | | | | . | | | . | | | | | | | | | | | |
| s ommercial ur ace | | | | | | | | | | | | | | | | | | |
| s esidential ur ace | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| PS12-SS-A | 0-6 | 11/29/2012 | 13:04 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS13-SS-A | 0-6 | 11/29/2012 | 13:13 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS14-SS-A | 0-6 | 11/29/2012 | 13:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS15-SS-A | 0-6 | 11/29/2012 | 13:29 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS16-SS-A | 0-6 | 11/29/2012 | 13:57 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS17-SS-A | 0-6 | 11/29/2012 | 14:02 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS18-SS-A | 0-6 | 11/29/2012 | 14:09 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS19-SS-A | 0-6 | 11/29/2012 | 14:17 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS20-SS-A | 0-6 | 11/29/2012 | 14:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS21-SS-A | 0-6 | 11/29/2012 | 14:33 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS22-SS-A | 0-6 | 11/29/2012 | 14:41 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS22-SS-B | 6-12 | 11/29/2012 | 14:49 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS22-SS-C | 12-24 | 11/29/2012 | 14:58 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS23-SS-A | 0-6 | 11/29/2012 | 15:13 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS24-SS-A | 0-6 | 11/30/2012 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS25-SS-A | 0-6 | 11/30/2012 | 10:13 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS26-SS-A | 0-6 | 11/30/2012 | 10:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS27-SS-A | 0-6 | 11/30/2012 | 10:49 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS28-SS-A | 0-6 | 11/30/2012 | 10:58 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS29-SS-A | 0-6 | 11/30/2012 | 11:07 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS29-SS-B | 6-12 | 11/30/2012 | 11:18 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS29-SS-C | 12-24 | 11/30/2012 | 11:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS29-SS-CD | 12-24 | 11/30/2012 | 11:26 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS30-SS-A | 0-6 | 11/30/2012 | 11:39 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS31-SS-A | 0-6 | 11/30/2012 | 11:48 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS32-SS-A | 0-6 | 11/30/2012 | 11:56 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS33-SS-A | 0-6 | 11/30/2012 | 12:03 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS34-SS-A | 0-6 | 11/30/2012 | 12:12 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS35-SS-A | 0-6 | 11/30/2012 | 12:22 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| PS35-SS-AD | 0-6 | 11/30/2012 | 12:24 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
| 1.79 | Exceeds MDEQ - RBSLs Residential Surface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| ale il o out a ota ur ace oil am ling I I | | | I . | | | H I | | | I | | | I | | | I | | | H I | | | | | | I | | | | | | H | | | I | | | I | | | H | | |
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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | | | s.u. | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | . | | | | | | | | | . | | |
| irect ontact esidential | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | . | | | | | | | | | . | | |
| eac ing to round ater creening e el | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | . | | | . | | | . | | |
| ac ground ur ace oil alues† | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YMW-10-SS-A | 0-6 | 4/18/2013 | 9:30 | 6.3 | J | | 8.4 | | | 5 | | | 235 | J | | < 1 | | | 21 | | | 78 | J | D | 113 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-10-SS-B | 6-12 | 4/18/2013 | 9:35 | 20 | J | | 8.3 | | | 5 | | | 269 | J | | < 1 | | | 25 | | | 74 | J | D | 120 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-10-SS-C | 12-24 | 4/18/2013 | 9:50 | 6.8 | J | | 8.2 | | | 7 | | | 201 | J | | < 1 | | | 25 | | | 65 | J | D | 62 | | | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-11-SS-A | 0-6 | 4/11/2013 | 9:35 | 15 | | | 8.0 | | | 18 | | | 397 | | | < 1 | | | 30 | | | 600 | J | | 522 | | | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-11-SS-B | 6-12 | 4/11/2013 | 9:45 | 15 | | | 8.2 | | | 19 | | | 281 | | | < 1 | | | 25 | | | 125 | J | | 178 | | | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-11-SS-C | 12-24 | 4/11/2013 | 9:50 | 15 | | | 8.4 | | | 9 | | | 210 | | | < 1 | | | 26 | | | 46 | J | | 46 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-12-SS-A | 0-6 | 4/11/2013 | 11:55 | 9.2 | | | 7.8 | | | 5 | | | 168 | | | < 1 | | | 19 | | | 269 | J | | 290 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-12-SS-B | 6-12 | 4/11/2013 | 12:00 | 8.8 | | | 7.9 | | | 6 | | | 181 | | | < 1 | | | 22 | | | 151 | J | | 171 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-12-SS-C | 12-24 | 4/11/2013 | 12:05 | 10 | | | 8.2 | | | 7 | | | 196 | | | < 1 | | | 26 | | | 104 | J | | 117 | | | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-13-SS-A | 0-6 | 4/10/2013 | 9:30 | 29 | | | 8.2 | | | 6 | | | 157 | | | 2 | | | 29 | | | 31 | J | | 45 | | | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-13-SS-B | 6-12 | 4/10/2013 | 9:45 | 13 | | | 8.8 | | | 7 | | | 189 | | | 1 | | | 26 | | | 181 | J | | 351 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-13-SS-C | 12-24 | 4/10/2013 | 10:10 | 8.4 | | | 8.0 | | | 7 | | | 179 | | | < 1 | | | 18 | | | 37400<br>589 | R<br>J | | 952 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-14-SS-A | 0-6 | 4/9/2013 | 10:50 | 26 | | | 7.7 | | | 5 | | | 175 | | | < 1 | | | 21 | | | 842 | J | | 1490 | | | 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-14-SS-B | 6-12 | 4/9/2013 | 10:59 | 17 | | | 8.1 | | | 5 | | | 190 | | | < 1 | | | 25 | | | 335 | J | | 404 | | D | 3 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-14-SS-C | 12-24 | 4/9/2013 | 11:05 | 16 | | | 8.2 | | | 3 | | | 124 | | | < 1 | | | 12 | | | 85 | J | | 277 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-15-SS-A | 0-6 | 4/18/2013 | 13:00 | 17 | J | | 8.8 | | | 3 | | | 148 | J | | < 1 | | | 17 | | | 11 | J | D | 23 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-15-SS-B | 6-12 | 4/18/2013 | 13:10 | 9.6 | J | | 8.1 | | | 1 | | | 127 | J | | < 1 | | | 43 | | | 80 | J | D | 72 | | | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-15-SS-C | 12-24 | 4/18/2013 | 13:35 | 17 | J | | 7.9 | | | 2 | | | 154 | J | | < 1 | | | 48 | | | 68 | J | D | 69 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-16-SS-A | 0-6 | 4/11/2013 | 14:00 | 9.9 | | | 8.3 | | | 15 | | | 1240 | | | 6 | | | 46 | | | 402 | J | | 444 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-16-SS-B | 6-12 | 4/11/2013 | 14:10 | 7.3 | | | 8.3 | | | 14 | | | 962 | | | 5 | | | 43 | | | 431 | J | | 483 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-16-SS-C | 12-24 | 4/11/2013 | 14:20 | 7.4 | | | 8.3 | | | 8 | | | 337 | | | < 1 | | | 27 | | | 303 | J | | 297 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-17-SS-A | 0-6 | 4/15/2013 | 12:05 | 15 | | | 8.0 | | | 5 | | | 194 | | | < 1 | | | 12 | | | 183 | | | 177 | | | < 1 | | | < 1 | | | < 1 | | | < 0.39 | | | | | |
| YMW-17-SS-B | 6-12 | 4/15/2013 | 12:10 | 9.6 | | | 8.5 | | | 4 | | | 128 | | | < 1 | | | 9 | | | 22 | | | 24 | | | < 1 | | | < 1 | | | < 1 | | | < 0.37 | | | | | |
| YMW-17-SS-C | 12-24 | 4/15/2013 | 12:15 | 7.9 | | | 8.3 | | | 6 | | | 166 | | | < 1 | | | 11 | | | 65 | | | 60 | | | < 1 | | | < 1 | | | < 1 | | | < 0.36 | | | | | |
| YMW-18-SS-A | 0-6 | 4/23/2013 | 9:50 | 22 | | | 8.6 | | | 5 | | | 183 | | | < 1 | | | 32 | | | 12 | | D | 11 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-18-SS-B | 6-12 | 4/23/2013 | 10:00 | 23 | | | 8.8 | | | 6 | | | 202 | | | < 1 | | | 32 | | | 8 | | D | 13 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-18-SS-C | 12-24 | 4/23/2013 | 10:05 | 23 | | | 8.6 | | | 5 | | | 185 | | | < 1 | | | 29 | | | 9 | | D | 8 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-19-SS-A | 0-6 | 4/23/2013 | 13:00 | 36 | | | 7.8 | | | 5 | | | 243 | | | < 1 | | | 27 | | | 31 | | D | 25 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-19-SS-B | 6-12 | 4/23/2013 | 13:05 | 18 | | | 7.8 | | | 6 | | | 186 | | | < 1 | | | 21 | | | 18 | | D | 21 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-19-SS-C | 12-24 | 4/23/2013 | 13:15 | 19 | | | 7.7 | | | 5 | | | 161 | | | < 1 | | | 27 | | | 39 | | D | 50 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-20-SS-A | 0-6 | 4/18/2013 | 15:40 | 15 | J | | 8.3 | | | 4 | | | 168 | J | | < 1 | | | 25 | | | 15 | J | | 21 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-20-SS-B | 6-12 | 4/18/2013 | 16:00 | 17 | J | | 8.1 | | | 5 | | | 159 | J | | < 1 | | | 18 | | | 18 | J | D | 20 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-20-SS-C | 12-24 | 4/18/2013 | 16:10 | 30 | J | | 7.9 | | | 6 | | | 220 | J | | < 1 | | | 22 | | | 143 | J | D | 256 | | D | 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-20-SS-CD | 12-24 | 4/18/2013 | 16:15 | 19 | J | | 7.8 | | | 6 | | | 379 | J | | < 1 | | | 17 | | | 289 | J | D | 308 | | D | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-21-SS-A | 0-6 | 4/19/2013 | 14:10 | 26 | J | | 7.9 | | | 27 | | | 246 | J | | < 1 | | | 26 | | | 26700 | J | D | 21700 | | D | < 1 | | | < 1 | | | < 1 | | | < 0.91 | | | | | |
| YMW-21-SS-B | 6-12 | 4/19/2013 | 14:15 | 13 | J | | 7.7 | | | 24 | | | 219 | J | | < 1 | | | 21 | | | 23600 | J | D | 22400 | | D | < 1 | | | < 1 | | | < 1 | | | < 0.77 | | | | | |
| YMW-21-SS-C | 12-24 | 4/19/2013 | 14:20 | 13 | J | | 7.6 | | | 17 | | | 198 | J | | < 1 | | | 20 | | | 13000 | J | D | 14900 | | D | < 1 | | | < 1 | | | < 1 | | | < 1.2 | | | | | |
| YMW-22-SS-A | 0-6 | 4/17/2013 | 10:20 | 18 | | | 7.9 | | | 11 | | | 3490 | | D | < 1 | | | 18 | | | 75 | | | 114 | | | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-22-SS-B | 6-12 | 4/17/2013 | 10:25 | 15 | | | 7.8 | | | 11 | | | 3610 | | D | < 1 | | | 18 | | | 84 | | | 148 | | | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-22-SS-C | 12-24 | 4/17/2013 | 10:35 | 14 | | | 7.9 | | | 10 | | | 3350 | | D | < 1 | | | 18 | | | 69 | | | 89 | | | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-23-SS-A | 0-6 | 4/17/2013 | 13:00 | 13 | | | 8.8 | | | 3 | | | 259 | | | < 1 | | | 19 | | | 122 | | | 170 | | | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-23-SS-B | 6-12 | 4/17/2013 | 13:05 | 8.7 | | | 9.0 | | | 4 | | | 338 | | | < 1 | | | 33 | | | 159 | | | 353 | | | < 1 | | | < 1 | | | < 1 | | | | | | | | |
| YMW-23-SS-C | 12-24 | 4/17/2013 | 13:10 | 11 | | | 8.7 | | | 3 | | | 663 | | | < 1 | | | 14 | | | 90 | | | 175 | | | < 1 | | | < 1 | | | < 1 | | | | | | | | |

**NOTES:**

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| 2.5 | **Exceeds Direct Contact Commercial RSL** |
| 1360 | **Exceeds Direct Contact Residential RSL** |
| 3.1 | **Exceeds MDEQ Leaching to Groundwater Screening Level** |
| <0.53 | **Non-Detect Result that Exceeds an Associated Screening Level** |

**(1) - Compared to http://deq.mt.gov/StateSuperfund/background.mcpx**
**(2) - EPA RSL Version used for screening level development: January 2015**
**†- Determined by the January 29, 2014 Background Soils Data Submittal, lowest value of SP-SS-A or NP-SS-A**

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| ale il o out a ota ur ace oil am ling H | | | | H H | | | | | | H | | | | | | | | | | | | | | H H | | | I | | | I H I | | | I H I | | | H | | |
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| et od | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | H | | | H | | | H | | | H | | |
| raction | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | H | | | H | | | H | | | H | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| irect ontact esidential | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s ommercial ur ace | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s esidential ur ace | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YMW-10-SS-A | 0-6 | 4/18/2013 | 9:30 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | 0.055 | | | < 0.053 | | | 0.055 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| YMW-10-SS-B | 6-12 | 4/18/2013 | 9:35 | < 0.13 | | | 0.058 | | J* | < 0.063 | | | < 0.063 | | | 0.077 | | | < 0.063 | | | 0.077 | | | < 0.13 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| YMW-10-SS-C | 12-24 | 4/18/2013 | 9:50 | < 0.11 | | | 0.058 | | * | < 0.054 | | | < 0.054 | | | 0.13 | | | < 0.054 | | | 0.13 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| YMW-11-SS-A | 0-6 | 4/11/2013 | 9:35 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| YMW-11-SS-B | 6-12 | 4/11/2013 | 9:45 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| YMW-11-SS-C | 12-24 | 4/11/2013 | 9:50 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| YMW-12-SS-A | 0-6 | 4/11/2013 | 11:55 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 2.0 | | D | < 0.055 | | | < 0.50 | | D | < 0.50 | | D | < 0.11 | | | 18 | J | | 51 | J | | 45 | J | | 84 | J | |
| YMW-12-SS-B | 6-12 | 4/11/2013 | 12:00 | < 0.11 | | | < 0.10 | | D | < 0.055 | | | < 4.0 | | D | < 0.055 | | D | < 1.0 | | | < 1.0 | | D | < 0.11 | | | 38 | J | | 89 | J | * | 85 | J | | 158 | J | * |
| YMW-12-SS-C | 12-24 | 4/11/2013 | 12:05 | < 1.1 | | D | < 1.0 | | D | < 0.56 | | D | < 30 | | D | < 2.5 | | D | < 6.0 | | D | < 6.0 | | D | 1.7 | | | 511 | | * | 777 | | * | 1310 | | * | 1720 | | * |
| YMW-13-SS-A | 0-6 | 4/10/2013 | 9:30 | < 0.14 | | | < 0.071 | | | < 0.071 | | | < 0.071 | | | < 0.071 | | | < 0.071 | | | < 0.071 | | | < 0.14 | | | < 2.8 | | | < 2.8 | | | < 2.8 | | | < 2.8 | | |
| YMW-13-SS-B | 6-12 | 4/10/2013 | 9:45 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| YMW-13-SS-C | 12-24 | 4/10/2013 | 10:10 | < 2.2 | | D | < 1.1 | | D | < 1.1 | | D | < 5.0 | | D | < 1.1 | | D | < 1.0 | | D | < 1.0 | | D | < 5.0 | | D | 146 | | * | 177 | | * | 263 | | * | 618 | | * |
| YMW-14-SS-A | 0-6 | 4/9/2013 | 10:50 | < 0.50 | | D | 0.21 | J | * | < 0.067 | | | < 0.20 | | D | 0.14 | J | | 0.068 | J | | 0.21 | J | | < 0.20 | | D | 10 | J | | 47 | J | | 7.5 | J | | 61 | J | |
| YMW-14-SS-B | 6-12 | 4/9/2013 | 10:59 | < 6.0 | | D | < 3.0 | | D | < 3.0 | | D | < 3.0 | | D | < 3.0 | | D | < 3.0 | | D | < 3.0 | | D | < 6.0 | | D | 491 | | * | 332 | | * | 427 | | * | 2240 | | * |
| YMW-14-SS-C | 12-24 | 4/9/2013 | 11:05 | < 12 | | D | 39 | | * | 37 | | * | 35 | | * | 52 | | | 14 | | | 67 | | | < 12 | | D | 1570 | | * | 3950 | | * | 1880 | | * | 8160 | | * |
| YMW-15-SS-A | 0-6 | 4/18/2013 | 13:00 | < 0.12 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | 0.098 | | | < 0.060 | | | 0.098 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| YMW-15-SS-B | 6-12 | 4/18/2013 | 13:10 | < 0.11 | | | 0.86 | | * | < 0.055 | | | < 0.25 | | D | 0.43 | | | 0.045 | | J | 0.48 | | | < 0.11 | | | 2.7 | | | 13 | | | 2.5 | | | 19 | | |
| YMW-15-SS-C | 12-24 | 4/18/2013 | 13:35 | < 0.12 | | | 0.51 | | * | 0.052 | | J | < 1.0 | | D | 2.0 | | | 0.41 | | | 2.4 | | | < 2.5 | | D | 29 | | | 30 | | | 28 | | | 148 | | * |
| YMW-16-SS-A | 0-6 | 4/11/2013 | 14:00 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| YMW-16-SS-B | 6-12 | 4/11/2013 | 14:10 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| YMW-16-SS-C | 12-24 | 4/11/2013 | 14:20 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| YMW-17-SS-A | 0-6 | 4/15/2013 | 12:05 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| YMW-17-SS-B | 6-12 | 4/15/2013 | 12:10 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| YMW-17-SS-C | 12-24 | 4/15/2013 | 12:15 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| YMW-18-SS-A | 0-6 | 4/23/2013 | 9:50 | < 0.13 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.13 | | | 5.6 | | | < 2.6 | | | 1.7 | | J | 12 | | |
| YMW-18-SS-B | 6-12 | 4/23/2013 | 10:00 | < 1.3 | | D | < 0.65 | | D | < 0.65 | | D | < 0.65 | | D | < 0.65 | | D | < 0.65 | | D | < 0.65 | | D | < 1.3 | | D | 172 | | * | < 26 | | D | 114 | | * | 818 | | * |
| YMW-18-SS-C | 12-24 | 4/23/2013 | 10:05 | < 13 | | D | < 6.5 | | D | < 6.5 | | D | < 6.5 | | D | < 6.5 | | D | < 6.5 | | D | < 6.5 | | D | < 13 | | D | 4010 | | * | < 260 | | D | 4240 | | * | 15100 | | * |
| YMW-19-SS-A | 0-6 | 4/23/2013 | 13:00 | < 0.16 | | | < 0.078 | | | < 0.078 | | | < 0.078 | | | < 0.078 | | | < 0.078 | | | < 0.078 | | | < 0.16 | | | < 3.1 | | | < 3.1 | | | < 3.1 | | | < 3.1 | | |
| YMW-19-SS-B | 6-12 | 4/23/2013 | 13:05 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| YMW-19-SS-C | 12-24 | 4/23/2013 | 13:15 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| YMW-20-SS-A | 0-6 | 4/18/2013 | 15:40 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| YMW-20-SS-B | 6-12 | 4/18/2013 | 16:00 | < 0.12 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | 0.049 | | J | < 0.060 | | | 0.049 | | J | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| YMW-20-SS-C | 12-24 | 4/18/2013 | 16:10 | < 0.14 | | | 0.12 | | * | < 0.072 | | | < 0.072 | | | 0.090 | | | < 0.072 | | | 0.090 | | | < 0.14 | | | < 2.9 | | | < 2.9 | | | < 2.9 | | | 2.6 | | |
| YMW-20-SS-CD | 12-24 | 4/18/2013 | 16:15 | < 0.12 | | | 0.061 | | J* | < 0.062 | | | < 0.062 | | | 0.061 | | J | < 0.062 | | | 0.061 | | J | < 0.12 | | | < 2.5 | | | < 2.5 | | | 2.5 | | J | 3.2 | | |
| YMW-21-SS-A | 0-6 | 4/19/2013 | 14:10 | < 0.14 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.14 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | | 3.0 | | |
| YMW-21-SS-B | 6-12 | 4/19/2013 | 14:15 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | 4.7 | | |
| YMW-21-SS-C | 12-24 | 4/19/2013 | 14:20 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.12 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | 5.7 | | |
| YMW-22-SS-A | 0-6 | 4/17/2013 | 10:20 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| YMW-22-SS-B | 6-12 | 4/17/2013 | 10:25 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| YMW-22-SS-C | 12-24 | 4/17/2013 | 10:35 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.12 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| YMW-23-SS-A | 0-6 | 4/17/2013 | 13:00 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| YMW-23-SS-B | 6-12 | 4/17/2013 | 13:05 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| YMW-23-SS-C | 12-24 | 4/17/2013 | 13:10 | < 0.11 | | | < 0.056 | | | 0.064 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
| 1.79 | Exceeds MDEQ - RBSLs Residential Surface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

**(1) - EPA RSL Version used for screening level development: January 2015**
**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| et od | | | | | | | H | | | H | | | H | | | H | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | H | | | H | | | H | | | H | | | H | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| irect ontact esidential | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | |
| s ommercial ur ace | | | | | | | | | | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | |
| s esidential ur ace | | | | | | | | | | | | | | | | | | | | | | | | | . | | | . | | | . | | | | | | | | | | | |
| ac ground ur ace oil alues† | | | | | | | | | | | | | | | | | | | . | | | . | | | . | | | . | | | . | | | | | | | | | . | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YMW-10-SS-A | 0-6 | 4/18/2013 | 9:30 | | | | < 11 | | | 56 | | | 20 | | | 138 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | 0.016 | | | 0.023 | | * | 0.029 | | | 0.015 | | | 0.013 | | | 0.018 | | |
| YMW-10-SS-B | 6-12 | 4/18/2013 | 9:35 | | | | < 13 | | | 42 | | | 14 | | | 73 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | 0.0068 | | | 0.011 | | | 0.0062 | | | < 0.0042 | | | < 0.0042 | | |
| YMW-10-SS-C | 12-24 | 4/18/2013 | 9:50 | | | | < 11 | | | 36 | | | 16 | | | 99 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | 0.023 | | | 0.033 | | * | 0.039 | | | 0.021 | | | 0.018 | | | 0.024 | | |
| YMW-11-SS-A | 0-6 | 4/11/2013 | 9:35 | | | | < 12 | | | 36 | | | 22 | | | 82 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | 0.025 | | | 0.037 | | * | 0.055 | | | 0.026 | | | 0.020 | | | 0.033 | | |
| YMW-11-SS-B | 6-12 | 4/11/2013 | 9:45 | | | | < 12 | | | 75 | | | 46 | | | 168 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | 0.052 | | * | 0.078 | | | 0.049 | | | 0.040 | | | < 0.039 | | |
| YMW-11-SS-C | 12-24 | 4/11/2013 | 9:50 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | 0.014 | | | 0.020 | | * | 0.024 | | | 0.014 | | | 0.011 | | | 0.016 | | |
| YMW-12-SS-A | 0-6 | 4/11/2013 | 11:55 | | | | 42 | | | 334 | | | 378 | | | 959 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | 0.11 | | | < 0.073 | | | < 0.073 | | |
| YMW-12-SS-B | 6-12 | 4/11/2013 | 12:00 | | | | 71 | | | 257 | | | 360 | | | 869 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | |
| YMW-12-SS-C | 12-24 | 4/11/2013 | 12:05 | | | | 718 | | * | 1600 | | | 2500 | | * | 7090 | | | < 0.56 | | | < 0.56 | | | < 0.56 | | | < 0.56 | | | < 0.56 | | | < 0.56 | | | < 0.56 | | | < 0.56 | | | < 0.56 | | | < 0.56 | | |
| YMW-13-SS-A | 0-6 | 4/10/2013 | 9:30 | | | | < 14 | | | 25 | | | 24 | | | 56 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | | 0.027 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | |
| YMW-13-SS-B | 6-12 | 4/10/2013 | 9:45 | | | | < 11 | | | 49 | | | 30 | | | 116 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | |
| YMW-13-SS-C | 12-24 | 4/10/2013 | 10:10 | | | | 1440 | | * | 2840 | | | 3920 | | * | 9670 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | 0.34 | | |
| YMW-14-SS-A | 0-6 | 4/9/2013 | 10:50 | | | | 688 | | * | 1190 | | | 1530 | | * | 4260 | | | < 0.090 | | | < 0.090 | | | < 0.090 | | | < 0.090 | | | < 0.090 | | | < 0.090 | | | < 0.090 | | | < 0.090 | | | < 0.090 | | | 0.18 | | |
| YMW-14-SS-B | 6-12 | 4/9/2013 | 10:59 | | | | 5100 | | * | 5530 | | | 9270 | | * | 26100 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | 0.46 | | |
| YMW-14-SS-C | 12-24 | 4/9/2013 | 11:05 | | | | 6490 | | * | < 427 | | | 7860 | | * | 26200 | | | 1.4 | U | | < 0.59 | | | < 0.59 | | | < 0.59 | | | < 0.59 | | | < 0.59 | | | 0.76 | | * | < 0.59 | | | < 0.59 | | | 1.4 | | |
| YMW-15-SS-A | 0-6 | 4/18/2013 | 13:00 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | 0.0096 | | |
| YMW-15-SS-B | 6-12 | 4/18/2013 | 13:10 | | | | < 11 | | | 34 | | | 12 | | | 74 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| YMW-15-SS-C | 12-24 | 4/18/2013 | 13:35 | | | | 74 | | | 101 | | | 49 | | | 316 | | | 0.047 | U | | 0.030 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | 0.0073 | | |
| YMW-16-SS-A | 0-6 | 4/11/2013 | 14:00 | | | | 42 | | | 753 | | | 205 | | | 1300 | | | < 0.074 | | | < 0.074 | | | < 0.074 | | | < 0.074 | | | 0.11 | | | < 0.074 | | | 0.10 | | | 0.16 | | | 0.15 | | | < 0.074 | | |
| YMW-16-SS-B | 6-12 | 4/11/2013 | 14:10 | | | | 91 | | | 912 | | | 184 | | | 1840 | | | 0.076 | U | | < 0.072 | | | < 0.072 | | | < 0.072 | | | 0.18 | | | 0.11 | | * | 0.18 | | | 0.16 | | | 0.21 | | | 0.17 | | |
| YMW-16-SS-C | 12-24 | 4/11/2013 | 14:20 | | | | 99 | | | 469 | | | 126 | | | 977 | | | 0.022 | U | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | 0.025 | | | < 0.018 | | | < 0.018 | | |
| YMW-17-SS-A | 0-6 | 4/15/2013 | 12:05 | | | | < 12 | | | 38 | | | 32 | | | 113 | | | 0.0099 | U | | < 0.0079 | | | 0.014 | U | | 0.016 | | | 0.080 | | | 0.15 | | * | 0.23 | | * | 0.089 | | | 0.095 | | | 0.12 | | |
| YMW-17-SS-B | 6-12 | 4/15/2013 | 12:10 | | | | < 11 | | | < 11 | | | < 11 | | | 11 | | | < 0.0074 | | | < 0.0074 | | | < 0.0074 | | | < 0.0074 | | | 0.020 | | | 0.044 | | * | 0.066 | | | 0.026 | | | 0.020 | | | 0.032 | | |
| YMW-17-SS-C | 12-24 | 4/15/2013 | 12:15 | | | | < 11 | | | 53 | | | 84 | | | 265 | | | 0.021 | U | | 0.013 | | | 0.036 | | | 0.040 | | | 0.16 | | | 0.25 | | * | 0.37 | | * | 0.15 | | | 0.12 | | | 0.22 | | |
| YMW-18-SS-A | 0-6 | 4/23/2013 | 9:50 | | | | < 13 | | | < 13 | | | < 13 | | | < 13 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | |
| YMW-18-SS-B | 6-12 | 4/23/2013 | 10:00 | | | | 389 | | * | < 13 | | | 59 | | | 464 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | |
| YMW-18-SS-C | 12-24 | 4/23/2013 | 10:05 | | | | 14600 | | * | 218 | | | 2190 | | * | 17100 | | | 4.8 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | |
| YMW-19-SS-A | 0-6 | 4/23/2013 | 13:00 | | | | < 16 | | | < 16 | | | < 16 | | | < 16 | | | < 0.0052 | | | < 0.0052 | | | 0.011 | | | 0.0091 | | | 0.061 | | | 0.13 | | * | 0.12 | | | 0.056 | | | 0.029 | | | 0.056 | | |
| YMW-19-SS-B | 6-12 | 4/23/2013 | 13:05 | | | | < 12 | | | 22 | | | < 12 | | | 72 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | 0.026 | | * | < 0.020 | | | 0.023 | | | < 0.020 | | | 0.058 | | |
| YMW-19-SS-C | 12-24 | 4/23/2013 | 13:15 | | | | < 12 | | | 32 | | | < 12 | | | 53 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | 0.013 | | | 0.018 | | | 0.031 | | | 0.021 | | | 0.015 | | | 0.019 | | |
| YMW-20-SS-A | 0-6 | 4/18/2013 | 15:40 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-B | 6-12 | 4/18/2013 | 16:00 | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-C | 12-24 | 4/18/2013 | 16:10 | 270 | | * | < 14 | | | 104 | | | 48 | | | 222 | | | < 0.0095 | | B | < 0.0095 | | | < 0.0095 | | | 0.033 | | | 0.19 | | | 0.41 | | * | 0.40 | | * | 0.24 | | | 0.13 | | | 0.21 | | |
| YMW-20-SS-CD | 12-24 | 4/18/2013 | 16:15 | 343 | | * | < 12 | | | 108 | | | 61 | | | 256 | | | < 0.0083 | | B | < 0.0083 | | | < 0.0083 | | | 0.049 | | | 0.29 | | * | 0.53 | | * | 0.52 | | * | 0.29 | | | 0.19 | | | 0.32 | | |
| YMW-21-SS-A | 0-6 | 4/19/2013 | 14:10 | | | | 270 | | * | 910 | | | 437 | | * | 2140 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | 0.025 | | | < 0.018 | | | < 0.018 | | |
| YMW-21-SS-B | 6-12 | 4/19/2013 | 14:15 | | | | 203 | | * | 634 | | | 441 | | * | 1700 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | 0.023 | | | < 0.015 | | | < 0.015 | | |
| YMW-21-SS-C | 12-24 | 4/19/2013 | 14:20 | | | | 395 | | * | 1510 | | | 1550 | | * | 4700 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | |
| YMW-22-SS-A | 0-6 | 4/17/2013 | 10:20 | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-22-SS-B | 6-12 | 4/17/2013 | 10:25 | 57 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-22-SS-C | 12-24 | 4/17/2013 | 10:35 | 76 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SS-A | 0-6 | 4/17/2013 | 13:00 | 107 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SS-B | 6-12 | 4/17/2013 | 13:05 | 245 | | * | < 22 | | | 48 | | | 37 | | | 187 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | 0.039 | | | 0.053 | | * | 0.066 | | | 0.039 | | | 0.031 | | | 0.039 | | |
| YMW-19-SS-C | 12-24 | 4/23/2013 | 13:15 | | | | < 12 | | | 32 | | | < 12 | | | 53 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | 0.013 | | | 0.018 | | | 0.031 | | | 0.021 | | | 0.015 | | | 0.019 | | |
| YMW-20-SS-C | 12-24 | 4/18/2013 | 16:10 | 270 | | * | < 14 | | | 104 | | | 48 | | | 222 | | | < 0.0095 | | B | < 0.0095 | | | < 0.0095 | | | 0.033 | | | 0.19 | | | 0.41 | | * | 0.40 | | * | 0.24 | | | 0.13 | | | 0.21 | | |
| YMW-20-SS-CD | 12-24 | 4/18/2013 | 16:15 | 343 | | * | < 12 | | | 108 | | | 61 | | | 256 | | | < 0.0083 | | B | < 0.0083 | | | < 0.0083 | | | 0.049 | | | 0.29 | | * | 0.53 | | * | 0.52 | | * | 0.29 | | | 0.19 | | | 0.32 | | |
| YMW-21-SS-A | 0-6 | 4/19/2013 | 14:10 | | | | 270 | | * | 910 | | | 437 | | * | 2140 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | 0.025 | | | < 0.018 | | | < 0.018 | | |
| YMW-21-SS-B | 6-12 | 4/19/2013 | 14:15 | | | | 203 | | * | 634 | | | 441 | | * | 1700 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | 0.023 | | | < 0.015 | | | < 0.015 | | |
| YMW-21-SS-C | 12-24 | 4/19/2013 | 14:20 | | | | 395 | | * | 1510 | | | 1550 | | * | 4700 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | |
| YMW-22-SS-A | 0-6 | 4/17/2013 | 10:20 | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-22-SS-B | 6-12 | 4/17/2013 | 10:25 | 57 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-22-SS-C | 12-24 | 4/17/2013 | 10:35 | 76 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SS-A | 0-6 | 4/17/2013 | 13:00 | 107 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SS-B | 6-12 | 4/17/2013 | 13:05 | 245 | | * | < 22 | | | 48 | | | 37 | | | 187 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | 0.039 | | | 0.053 | | * | 0.066 | | | 0.039 | | | 0.031 | | | 0.039 | | |
| YMW-23-SS-C | 12-24 | 4/17/2013 | 13:10 | 477 | | * | < 11 | | | 74 | | | 65 | | | 423 | | | 0.0099 | U | | < 0.0075 | | | < 0.0075 | | | 0.0087 | | | 0.016 | | | 0.022 | | * | 0.029 | | | 0.026 | | | 0.014 | | | 0.021 | | |

**NOTES:**

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| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
| 1.79 | Exceeds MDEQ - RBSLs Residential Surface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

†- Determined by the January 29, 2014 Background Soils Data Submittal, lowest value of SP-SS-A or NP-SS-A.

(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| YMW-10-SS-A | 0-6 | 4/18/2013 | 9:30 | < 0.0036 | | | 0.027 | | | < 0.0036 | | | 0.021 | | | < 0.0036 | | | 0.0078 | J | | 0.027 | | |
| YMW-10-SS-B | 6-12 | 4/18/2013 | 9:35 | < 0.0042 | | | 0.0093 | | | < 0.0042 | | | 0.0093 | | | < 0.0042 | | | < 0.0042 | J | | 0.0098 | | |
| YMW-10-SS-C | 12-24 | 4/18/2013 | 9:50 | < 0.0036 | | | 0.046 | | | < 0.0036 | | | 0.029 | | | < 0.0036 | | | 0.011 | J | | 0.044 | | |
| YMW-11-SS-A | 0-6 | 4/11/2013 | 9:35 | < 0.020 | | | 0.042 | | | < 0.020 | | | 0.037 | | | < 0.020 | | | 0.023 | | | 0.040 | | |
| YMW-11-SS-B | 6-12 | 4/11/2013 | 9:45 | < 0.039 | | | 0.057 | | | < 0.039 | | | 0.075 | | | < 0.039 | | | < 0.039 | | | 0.057 | | |
| YMW-11-SS-C | 12-24 | 4/11/2013 | 9:50 | < 0.0039 | | | 0.019 | | | < 0.0039 | | | 0.018 | | | < 0.0039 | | | 0.0075 | | | 0.018 | | |
| YMW-12-SS-A | 0-6 | 4/11/2013 | 11:55 | < 0.073 | | | < 0.073 | | | < 0.073 | | | 0.14 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | |
| YMW-12-SS-B | 6-12 | 4/11/2013 | 12:00 | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | |
| YMW-12-SS-C | 12-24 | 4/11/2013 | 12:05 | < 0.56 | | | < 0.56 | | | < 0.56 | | | < 0.56 | | | 0.62 | U | | < 0.56 | | | < 0.56 | | |
| YMW-13-SS-A | 0-6 | 4/10/2013 | 9:30 | < 0.024 | | | 0.032 | | | < 0.024 | | | 0.033 | | | < 0.024 | | | < 0.024 | | | 0.026 | | |
| YMW-13-SS-B | 6-12 | 4/10/2013 | 9:45 | < 0.038 | | | 0.041 | | | < 0.038 | | | 0.054 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | |
| YMW-13-SS-C | 12-24 | 4/10/2013 | 10:10 | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | < 0.27 | | | 0.54 | | |
| YMW-14-SS-A | 0-6 | 4/9/2013 | 10:50 | < 0.090 | | | < 0.090 | | | 0.12 | | | < 0.090 | | | < 0.090 | | | < 0.090 | | | 0.17 | | |
| YMW-14-SS-B | 6-12 | 4/9/2013 | 10:59 | < 0.30 | | | < 0.30 | | | 0.48 | | | < 0.30 | | | < 0.30 | | | 0.34 | | | 0.34 | | |
| YMW-14-SS-C | 12-24 | 4/9/2013 | 11:05 | < 0.59 | | | 0.71 | | | 2.1 | | | < 0.59 | | | 0.60 | U | | 1.8 | | | 1.2 | | |
| YMW-15-SS-A | 0-6 | 4/18/2013 | 13:00 | < 0.0040 | | | 0.0061 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | J | | 0.0097 | | |
| YMW-15-SS-B | 6-12 | 4/18/2013 | 13:10 | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | J | | < 0.0037 | | |
| YMW-15-SS-C | 12-24 | 4/18/2013 | 13:35 | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | 0.032 | U | | 0.0058 | J | | < 0.0040 | | |
| YMW-16-SS-A | 0-6 | 4/11/2013 | 14:00 | < 0.074 | | | 0.19 | | | < 0.074 | | | 0.16 | | | < 0.074 | | | 0.12 | | | 0.20 | | |
| YMW-16-SS-B | 6-12 | 4/11/2013 | 14:10 | < 0.072 | | | 0.26 | | | < 0.072 | | | 0.27 | | * | < 0.072 | | | 0.14 | | | 0.26 | | |
| YMW-16-SS-C | 12-24 | 4/11/2013 | 14:20 | < 0.018 | | | < 0.018 | | | < 0.018 | | | 0.027 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | |
| YMW-17-SS-A | 0-6 | 4/15/2013 | 12:05 | 0.031 | | * | 0.14 | | | < 0.0079 | | | 0.15 | | | < 0.0079 | | | 0.036 | | | 0.16 | | |
| YMW-17-SS-B | 6-12 | 4/15/2013 | 12:10 | 0.0093 | | | 0.040 | | | < 0.0074 | | | 0.046 | | | < 0.0074 | | | 0.0088 | | | 0.044 | | |
| YMW-17-SS-C | 12-24 | 4/15/2013 | 12:15 | 0.050 | | * | 0.33 | | | 0.020 | | | 0.25 | | * | 0.017 | U | | 0.083 | | | 0.30 | | |
| YMW-18-SS-A | 0-6 | 4/23/2013 | 9:50 | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | |
| YMW-18-SS-B | 6-12 | 4/23/2013 | 10:00 | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | |
| YMW-18-SS-C | 12-24 | 4/23/2013 | 10:05 | < 0.043 | | | 0.093 | | | 0.35 | | | < 0.043 | | | 5.1 | | * | 0.51 | | | 0.11 | | |
| YMW-19-SS-A | 0-6 | 4/23/2013 | 13:00 | < 0.0052 | | | 0.098 | | | < 0.0052 | | | 0.061 | | | < 0.0052 | | | 0.051 | | | 0.077 | | |
| YMW-19-SS-B | 6-12 | 4/23/2013 | 13:05 | < 0.020 | | | 0.040 | | | < 0.020 | | | 0.043 | | | < 0.020 | | | < 0.020 | | | 0.038 | | |
| YMW-19-SS-C | 12-24 | 4/23/2013 | 13:15 | < 0.0041 | | | 0.030 | | | < 0.0041 | | | 0.026 | | | < 0.0041 | | | 0.012 | | | 0.031 | | |
| YMW-20-SS-A | 0-6 | 4/18/2013 | 15:40 | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-B | 6-12 | 4/18/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-C | 12-24 | 4/18/2013 | 16:10 | 0.062 | | * | 0.31 | | | < 0.0095 | | | 0.25 | | * | < 0.0095 | | | 0.12 | J | | 0.32 | | |
| YMW-20-SS-CD | 12-24 | 4/18/2013 | 16:15 | 0.075 | | * | 0.47 | | | 0.0088 | | | 0.34 | | * | < 0.0083 | | | 0.22 | J | | 0.51 | | |
| YMW-21-SS-A | 0-6 | 4/19/2013 | 14:10 | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | J | | < 0.018 | | |
| YMW-21-SS-B | 6-12 | 4/19/2013 | 14:15 | < 0.015 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | < 0.015 | | | < 0.015 | J | | < 0.015 | | |
| YMW-21-SS-C | 12-24 | 4/19/2013 | 14:20 | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | | | < 0.023 | J | | 0.042 | | |
| YMW-22-SS-A | 0-6 | 4/17/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | |
| YMW-22-SS-B | 6-12 | 4/17/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | |
| YMW-22-SS-C | 12-24 | 4/17/2013 | 10:35 | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SS-A | 0-6 | 4/17/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SS-B | 6-12 | 4/17/2013 | 13:05 | < 0.015 | | | 0.089 | | | < 0.015 | | | 0.050 | | | < 0.015 | | | 0.033 | | | 0.080 | | |
| YMW-23-SS-C | 12-24 | 4/17/2013 | 13:10 | < 0.0075 | | | 0.029 | | | < 0.0075 | | | 0.029 | | | < 0.0075 | | | 0.021 | | | 0.043 | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
| 1.79 | Exceeds MDEQ - RBSLs Residential Surface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

†- Determined by the January 29, 2014 Background Soils Data Submittal, lowest value of SP-SS-A or NP-SS-A.

(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| YMW-10-SS-A | 0-6 | 4/18/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-10-SS-B | 6-12 | 4/18/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-10-SS-C | 12-24 | 4/18/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-11-SS-A | 0-6 | 4/11/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-11-SS-B | 6-12 | 4/11/2013 | 9:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-11-SS-C | 12-24 | 4/11/2013 | 9:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-12-SS-A | 0-6 | 4/11/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12-SS-B | 6-12 | 4/11/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12-SS-C | 12-24 | 4/11/2013 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13-SS-A | 0-6 | 4/10/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13-SS-B | 6-12 | 4/10/2013 | 9:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-13-SS-C | 12-24 | 4/10/2013 | 10:10 | 0.026 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-14-SS-A | 0-6 | 4/9/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14-SS-B | 6-12 | 4/9/2013 | 10:59 | 1.7 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | |
| YMW-14-SS-C | 12-24 | 4/9/2013 | 11:05 | 14 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | |
| YMW-15-SS-A | 0-6 | 4/18/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-15-SS-B | 6-12 | 4/18/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-15-SS-C | 12-24 | 4/18/2013 | 13:35 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16-SS-A | 0-6 | 4/11/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16-SS-B | 6-12 | 4/11/2013 | 14:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-16-SS-C | 12-24 | 4/11/2013 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-17-SS-A | 0-6 | 4/15/2013 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | |
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| YMW-17-SS-C | 12-24 | 4/15/2013 | 12:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-18-SS-A | 0-6 | 4/23/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18-SS-B | 6-12 | 4/23/2013 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
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| YMW-19-SS-B | 6-12 | 4/23/2013 | 13:05 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-19-SS-C | 12-24 | 4/23/2013 | 13:15 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-A | 0-6 | 4/18/2013 | 15:40 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-B | 6-12 | 4/18/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-C | 12-24 | 4/18/2013 | 16:10 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-CD | 12-24 | 4/18/2013 | 16:15 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-21-SS-A | 0-6 | 4/19/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-21-SS-B | 6-12 | 4/19/2013 | 14:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-21-SS-C | 12-24 | 4/19/2013 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-22-SS-A | 0-6 | 4/17/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-22-SS-B | 6-12 | 4/17/2013 | 10:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-22-SS-C | 12-24 | 4/17/2013 | 10:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-23-SS-A | 0-6 | 4/17/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SS-B | 6-12 | 4/17/2013 | 13:05 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SS-C | 12-24 | 4/17/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | |

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| YMW-10-SS-A | 0-6 | 4/18/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-10-SS-B | 6-12 | 4/18/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-10-SS-C | 12-24 | 4/18/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-11-SS-A | 0-6 | 4/11/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-11-SS-B | 6-12 | 4/11/2013 | 9:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
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| YMW-12-SS-A | 0-6 | 4/11/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12-SS-B | 6-12 | 4/11/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12-SS-C | 12-24 | 4/11/2013 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13-SS-A | 0-6 | 4/10/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13-SS-B | 6-12 | 4/10/2013 | 9:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-13-SS-C | 12-24 | 4/10/2013 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-14-SS-A | 0-6 | 4/9/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14-SS-B | 6-12 | 4/9/2013 | 10:59 | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | |
| YMW-14-SS-C | 12-24 | 4/9/2013 | 11:05 | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | |
| YMW-15-SS-A | 0-6 | 4/18/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-15-SS-B | 6-12 | 4/18/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-15-SS-C | 12-24 | 4/18/2013 | 13:35 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16-SS-A | 0-6 | 4/11/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | |
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| YMW-16-SS-C | 12-24 | 4/11/2013 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
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| YMW-18-SS-A | 0-6 | 4/23/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18-SS-B | 6-12 | 4/23/2013 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-18-SS-C | 12-24 | 4/23/2013 | 10:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-19-SS-A | 0-6 | 4/23/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-19-SS-B | 6-12 | 4/23/2013 | 13:05 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-19-SS-C | 12-24 | 4/23/2013 | 13:15 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-A | 0-6 | 4/18/2013 | 15:40 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-B | 6-12 | 4/18/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-C | 12-24 | 4/18/2013 | 16:10 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-CD | 12-24 | 4/18/2013 | 16:15 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-21-SS-A | 0-6 | 4/19/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-21-SS-B | 6-12 | 4/19/2013 | 14:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
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| YMW-22-SS-A | 0-6 | 4/17/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-22-SS-B | 6-12 | 4/17/2013 | 10:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-22-SS-C | 12-24 | 4/17/2013 | 10:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-23-SS-A | 0-6 | 4/17/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SS-B | 6-12 | 4/17/2013 | 13:05 | | | | | | | | | | | | | | | | | | | | | | | | |
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| | |
|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
| 1.79 | Exceeds MDEQ - RBSLs Residential Surface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H nalysis er ormed ast recommended olding time.

J - Estimated value. The analyte was present but less than the reporting limit.

o est a aila le re orting limit or t e analytical met od used.

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| ale il o out a ota ur ace oil am ling | | | | I H | | | , I H | | | , I H | | | , I H | | | I H I H | | | I , H I H | | | , I H I H | | | I , H I H | | | , I H I H | | | , I H I H | | | , I H I H | | | , I H I H | | | , I H I H | | | I , I H I H | | | I H , I H | | |
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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| irect ontact ommercial | | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | . | | | . | | | | | | . | | | | | | . | | | | | | . | | | . | | | . | | | . | | | . | | | | | | | | | | | | | | | | | |
| s ommercial ur ace | | | | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| YMW-10-SS-B | 6-12 | 4/18/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-10-SS-C | 12-24 | 4/18/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-11-SS-A | 0-6 | 4/11/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-11-SS-B | 6-12 | 4/11/2013 | 9:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-11-SS-C | 12-24 | 4/11/2013 | 9:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-12-SS-A | 0-6 | 4/11/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12-SS-B | 6-12 | 4/11/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12-SS-C | 12-24 | 4/11/2013 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13-SS-A | 0-6 | 4/10/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13-SS-B | 6-12 | 4/10/2013 | 9:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-13-SS-C | 12-24 | 4/10/2013 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-14-SS-A | 0-6 | 4/9/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14-SS-B | 6-12 | 4/9/2013 | 10:59 | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | |
| YMW-14-SS-C | 12-24 | 4/9/2013 | 11:05 | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | |
| YMW-15-SS-A | 0-6 | 4/18/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-15-SS-B | 6-12 | 4/18/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-15-SS-C | 12-24 | 4/18/2013 | 13:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16-SS-A | 0-6 | 4/11/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16-SS-B | 6-12 | 4/11/2013 | 14:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-16-SS-C | 12-24 | 4/11/2013 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-17-SS-A | 0-6 | 4/15/2013 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-17-SS-B | 6-12 | 4/15/2013 | 12:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-17-SS-C | 12-24 | 4/15/2013 | 12:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-18-SS-A | 0-6 | 4/23/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18-SS-B | 6-12 | 4/23/2013 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-18-SS-C | 12-24 | 4/23/2013 | 10:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-19-SS-A | 0-6 | 4/23/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-19-SS-B | 6-12 | 4/23/2013 | 13:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-19-SS-C | 12-24 | 4/23/2013 | 13:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-A | 0-6 | 4/18/2013 | 15:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-B | 6-12 | 4/18/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-C | 12-24 | 4/18/2013 | 16:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-CD | 12-24 | 4/18/2013 | 16:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-21-SS-A | 0-6 | 4/19/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-21-SS-B | 6-12 | 4/19/2013 | 14:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-21-SS-C | 12-24 | 4/19/2013 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-22-SS-A | 0-6 | 4/17/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-22-SS-B | 6-12 | 4/17/2013 | 10:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-22-SS-C | 12-24 | 4/17/2013 | 10:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-23-SS-A | 0-6 | 4/17/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SS-B | 6-12 | 4/17/2013 | 13:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SS-C | 12-24 | 4/17/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | |
|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
| 1.79 | Exceeds MDEQ - RBSLs Residential Surface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H nalysis er ormed ast recommended olding time.

J - Estimated value. The analyte was present but less than the reporting limit.

o est a aila le re orting limit or t e analytical met od used.

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| ale il o out a ota ur ace oil am ling | | | | H | | | H H | | | H H I | | | H H | | | | | | , , , H H | | | , , , H H | | | H H | | | | | | , , I H H | | | , , I H H | | | I H H | | | I H H | | | , , I H | | | I H I | | | | | |
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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | . | | | . | | | | | |
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| eac ing to round ater creening e el | | | | | | | | | | . | | | | | | . | | | . | | | . | | | . | | | | | | . | | | . | | | . | | | . | | | . | | | . | | | | | |
| s ommercial ur ace | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s esidential ur ace | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YMW-10-SS-A | 0-6 | 4/18/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-10-SS-B | 6-12 | 4/18/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-10-SS-C | 12-24 | 4/18/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-11-SS-A | 0-6 | 4/11/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-11-SS-B | 6-12 | 4/11/2013 | 9:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-11-SS-C | 12-24 | 4/11/2013 | 9:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-12-SS-A | 0-6 | 4/11/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12-SS-B | 6-12 | 4/11/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12-SS-C | 12-24 | 4/11/2013 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13-SS-A | 0-6 | 4/10/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13-SS-B | 6-12 | 4/10/2013 | 9:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-13-SS-C | 12-24 | 4/10/2013 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-14-SS-A | 0-6 | 4/9/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14-SS-B | 6-12 | 4/9/2013 | 10:59 | 1.1 | | J | < 1.2 | | | < 1.2 | | | < 24 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | 0.82 | | J | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | 2.9 | | |
| YMW-14-SS-C | 12-24 | 4/9/2013 | 11:05 | 7.7 | | | < 1.2 | | | < 1.2 | | | < 24 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | 13 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | 21 | | |
| YMW-15-SS-A | 0-6 | 4/18/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-15-SS-B | 6-12 | 4/18/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-15-SS-C | 12-24 | 4/18/2013 | 13:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16-SS-A | 0-6 | 4/11/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16-SS-B | 6-12 | 4/11/2013 | 14:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-16-SS-C | 12-24 | 4/11/2013 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-17-SS-A | 0-6 | 4/15/2013 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-17-SS-B | 6-12 | 4/15/2013 | 12:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-17-SS-C | 12-24 | 4/15/2013 | 12:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-18-SS-A | 0-6 | 4/23/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18-SS-B | 6-12 | 4/23/2013 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-18-SS-C | 12-24 | 4/23/2013 | 10:05 | 0.067 | | J | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-19-SS-A | 0-6 | 4/23/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-19-SS-B | 6-12 | 4/23/2013 | 13:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-19-SS-C | 12-24 | 4/23/2013 | 13:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-A | 0-6 | 4/18/2013 | 15:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-B | 6-12 | 4/18/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-C | 12-24 | 4/18/2013 | 16:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SS-CD | 12-24 | 4/18/2013 | 16:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-21-SS-A | 0-6 | 4/19/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-21-SS-B | 6-12 | 4/19/2013 | 14:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-21-SS-C | 12-24 | 4/19/2013 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-22-SS-A | 0-6 | 4/17/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-22-SS-B | 6-12 | 4/17/2013 | 10:25 | 0.090 | | J | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.13 | | J |
| YMW-22-SS-C | 12-24 | 4/17/2013 | 10:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-23-SS-A | 0-6 | 4/17/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SS-B | 6-12 | 4/17/2013 | 13:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SS-C | 12-24 | 4/17/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
| 1.79 | Exceeds MDEQ - RBSLs Residential Surface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

(1) - EPA RSL Version used for screening level development: January 2015
VQs - Validator Qualifiers
J - Associated numerical value is an estimated quantity because quality control criteria were not met.
R - Rejected Data
U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers
* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)
B - The analyte was detected in the method blank.
D - Analyte Reporting Limit increased due to sample matrix.
E - Estimated value. Result exceeds the instrument upper quantitation limit.
H nalysis er ormed ast recommended olding time.
J - Estimated value. The analyte was present but less than the reporting limit.
o est a aila le re orting limit or t e analytical met od used.

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| eac ing to round ater creening e el | | | | | | | | | |
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| s esidential ur ace | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s |
| YMW-10-SS-A | 0-6 | 4/18/2013 | 9:30 | | | | | | |
| YMW-10-SS-B | 6-12 | 4/18/2013 | 9:35 | | | | | | |
| YMW-10-SS-C | 12-24 | 4/18/2013 | 9:50 | | | | | | |
| YMW-11-SS-A | 0-6 | 4/11/2013 | 9:35 | | | | | | |
| YMW-11-SS-B | 6-12 | 4/11/2013 | 9:45 | < 0.20 | | | < 0.20 | | |
| YMW-11-SS-C | 12-24 | 4/11/2013 | 9:50 | < 0.20 | | | < 0.20 | | |
| YMW-12-SS-A | 0-6 | 4/11/2013 | 11:55 | | | | | | |
| YMW-12-SS-B | 6-12 | 4/11/2013 | 12:00 | | | | | | |
| YMW-12-SS-C | 12-24 | 4/11/2013 | 12:05 | | | | | | |
| YMW-13-SS-A | 0-6 | 4/10/2013 | 9:30 | | | | | | |
| YMW-13-SS-B | 6-12 | 4/10/2013 | 9:45 | < 0.20 | | | < 0.20 | | |
| YMW-13-SS-C | 12-24 | 4/10/2013 | 10:10 | < 0.20 | | | < 0.20 | | |
| YMW-14-SS-A | 0-6 | 4/9/2013 | 10:50 | | | | | | |
| YMW-14-SS-B | 6-12 | 4/9/2013 | 10:59 | 0.59 | | J | 3.5 | | |
| YMW-14-SS-C | 12-24 | 4/9/2013 | 11:05 | 3.6 | | | 25 | | |
| YMW-15-SS-A | 0-6 | 4/18/2013 | 13:00 | | | | | | |
| YMW-15-SS-B | 6-12 | 4/18/2013 | 13:10 | | | | | | |
| YMW-15-SS-C | 12-24 | 4/18/2013 | 13:35 | | | | | | |
| YMW-16-SS-A | 0-6 | 4/11/2013 | 14:00 | | | | | | |
| YMW-16-SS-B | 6-12 | 4/11/2013 | 14:10 | < 0.20 | | | < 0.20 | | |
| YMW-16-SS-C | 12-24 | 4/11/2013 | 14:20 | < 0.20 | | | < 0.20 | | |
| YMW-17-SS-A | 0-6 | 4/15/2013 | 12:05 | | | | | | |
| YMW-17-SS-B | 6-12 | 4/15/2013 | 12:10 | < 0.20 | | | < 0.20 | | |
| YMW-17-SS-C | 12-24 | 4/15/2013 | 12:15 | < 0.20 | | | < 0.20 | | |
| YMW-18-SS-A | 0-6 | 4/23/2013 | 9:50 | | | | | | |
| YMW-18-SS-B | 6-12 | 4/23/2013 | 10:00 | < 0.20 | | | < 0.20 | | |
| YMW-18-SS-C | 12-24 | 4/23/2013 | 10:05 | < 0.20 | | | < 0.20 | | |
| YMW-19-SS-A | 0-6 | 4/23/2013 | 13:00 | | | | | | |
| YMW-19-SS-B | 6-12 | 4/23/2013 | 13:05 | | | | | | |
| YMW-19-SS-C | 12-24 | 4/23/2013 | 13:15 | | | | | | |
| YMW-20-SS-A | 0-6 | 4/18/2013 | 15:40 | | | | | | |
| YMW-20-SS-B | 6-12 | 4/18/2013 | 16:00 | | | | | | |
| YMW-20-SS-C | 12-24 | 4/18/2013 | 16:10 | | | | | | |
| YMW-20-SS-CD | 12-24 | 4/18/2013 | 16:15 | | | | | | |
| YMW-21-SS-A | 0-6 | 4/19/2013 | 14:10 | | | | | | |
| YMW-21-SS-B | 6-12 | 4/19/2013 | 14:15 | < 0.20 | | | < 0.20 | | |
| YMW-21-SS-C | 12-24 | 4/19/2013 | 14:20 | < 0.20 | | | < 0.20 | | |
| YMW-22-SS-A | 0-6 | 4/17/2013 | 10:20 | | | | | | |
| YMW-22-SS-B | 6-12 | 4/17/2013 | 10:25 | < 0.20 | | | 0.13 | | J |
| YMW-22-SS-C | 12-24 | 4/17/2013 | 10:35 | < 0.20 | | | < 0.20 | | |
| YMW-23-SS-A | 0-6 | 4/17/2013 | 13:00 | | | | | | |
| YMW-23-SS-B | 6-12 | 4/17/2013 | 13:05 | | | | | | |
| YMW-23-SS-C | 12-24 | 4/17/2013 | 13:10 | | | | | | |

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
| 1.79 | Exceeds MDEQ - RBSLs Residential Surface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H nalysis er ormed ast recommended olding time.

J - Estimated value. The analyte was present but less than the reporting limit.

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| irect ontact ommercial | | | | | | | . | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | | | | . | | | | | | | | | | | | | | | | | | | | | . | | | . | | | | | | | | | | | |
| s ommercial ur ace | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s esidential ur ace | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | . |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| SP-SS-A | 0-6 | 12/23/2013 | 13:20 | 22 | | | 7 | | | 150 | | | <1 | | | 23 | | | 20 | | | 18 | | D | <1 | | | <1 | | | <1 | | | <0.0043 | | | 0.0082 | | | 0.026 | | |
| NP-SS-A | 0-6 | 12/23/2013 | 14:00 | 20 | | | 7 | | | 172 | | | <1 | | | 20 | | | 28 | | | 28 | | | <1 | | | <1 | | | <1 | | | <0.0042 | | | <0.0042 | | | 0.019 | | |
| TMP-SS-A | 0-6 | 12/23/2013 | 14:45 | 17 | | | 3 | | | 91 | | | <1 | | | 14 | | | 17 | | | 14 | | | <1 | | | <1 | | | <1 | | | <0.0040 | | | <0.0040 | | | <0.0040 | | |

**NOTES:**

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| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
| 1.79 | Exceeds MDEQ - RBSLs Residential Surface |
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**(1) - Compared to http://deq.mt.gov/StateSuperfund/background.mcpx**

**(2) - EPA RSL Version used for screening level development: January 2015**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

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**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s ommercial ur ace | | | | . | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | |
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| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| SP-SS-A | 0-6 | 12/23/2013 | 13:20 | 0.029 | | | 0.041 | | | 0.020 | | | 0.036 | | | <0.0043 | | | 0.069 | | | <0.0043 | | | 0.028 | | | <0.0043 | | | 0.058 | | |
| NP-SS-A | 0-6 | 12/23/2013 | 14:00 | 0.027 | | | 0.025 | | | 0.012 | | | 0.013 | | | <0.0042 | | | 0.035 | | | <0.0042 | | | 0.023 | | | <0.0042 | | | 0.037 | | |
| TMP-SS-A | 0-6 | 12/23/2013 | 14:45 | 0.0098 | | | 0.012 | | | <0.0040 | | | <0.0040 | | | <0.0040 | | | 0.0060 | | | <0.0040 | | | 0.014 | | | <0.0040 | | | 0.0059 | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 1360 | Exceeds Direct Contact Residential RSL |
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| 22 | Exceeds MDEQ - RBSLs Commercial Surface |
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**(1) - Compared to http://deq.mt.gov/StateSuperfund/background.mcpx**

**(2) - EPA RSL Version used for screening level development: January 2015**

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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| nit | | | | | | | s.u. | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | . | | | | | | | | | | | | | | | . | | | | | | | | | . | | |
| eac ing to round ater creening e el | | | | | | | | | | . | | | | | | | | | | | | | | | | | | . | | | . | | | . | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-SB-A | 4-4.8 | 5/17/2013 | 11:10 | 13 | | | 7.9 | | | 3 | | | 162 | | | < 1 | | | 29 | | | 14 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 1-SB-B | 8-11 | 8/8/2013 | 13:10 | 17 | | | 8.1 | | | 2 | | | 68 | | | < 1 | | | 12 | | | 7 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 1-SB-C | 11-15 | 8/8/2013 | 13:15 | 12 | | | 8.2 | | | 4 | | | 74 | | | < 1 | | | 14 | | | 7 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 2-SB-A | 2-4 | 5/17/2013 | 12:00 | 15 | | | 8.4 | | | 6 | | | 230 | | | < 1 | | | 29 | | | 13 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 2-SB-B | 8-11.5 | 8/8/2013 | 11:20 | 13 | | | 8.6 | | | 3 | | | 84 | | | < 1 | | | 16 | | | 4 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 2-SB-C | 11.5-15.5 | 8/8/2013 | 11:30 | 13 | | | 8.3 | | | 4 | | | 99 | | | < 1 | | | 11 | | | 5 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 3-SB-A | 4-5.4 | 5/17/2013 | 13:35 | 10 | | | 8.5 | | | 5 | | | 131 | | | < 1 | | | 23 | | | 26 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 3-SB-B | 7.5-8.0 | 8/8/2013 | 10:00 | 24 | | | 8.1 | | | 4 | | | 89 | | | < 1 | | | 12 | | | 12 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 3-SB-C | 8.0-11.5 | 8/8/2013 | 10:30 | 14 | | | 8.1 | | | 2 | | | 61 | | | < 1 | | | 19 | | | 8 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 4-SB-A | 6-8 | 5/7/2013 | 11:20 | 23 | | | 8.0 | | | 5 | | | 160 | | | < 1 | | | 22 | | | 18 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 4-SB-B | 8-10.5 | 6/6/2013 | 10:20 | 5.9 | | | 8.6 | | | 3 | | | 128 | | | < 1 | | | 33 | | | 15 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 5-SB-A | 6-8 | 5/7/2013 | 10:00 | 24 | | | 8.1 | | | 7 | | | 171 | | | < 1 | | | 24 | | | 13 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 5-SB-B | 8-12 | 6/6/2013 | 9:00 | 9.1 | | | 8.9 | | | 7 | | | 162 | | | < 1 | | | 14 | | | 8 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 5-SB-C | 12-15 | 6/6/2013 | 9:15 | 11 | | | 8.8 | | | 3 | | | 100 | | | < 1 | | | 14 | | | 4 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 6-SB-A | 4-6 | 5/9/2013 | 12:00 | 22 | | | 8.2 | | | 8 | | | 192 | | | < 1 | | | 30 | | | 14 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 6-SB-B | 8-12 | 8/2/2013 | 10:50 | 9.4 | J | | 8.1 | | | 3 | | | 112 | J | | < 1 | | | 13 | | | 11 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 6-SB-C | 12-16 | 8/2/2013 | 11:10 | 9.5 | J | | 8.4 | | | 3 | | | 238 | J | | < 1 | | | 16 | | | 11 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 6-SB-CD | 12-16 | 8/2/2013 | 11:15 | 10 | J | | 8.4 | | | 3 | | | 98 | J | | < 1 | | | 15 | | | 12 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 7-SB-A | 6-8 | 5/6/2013 | 14:20 | 15 | | | 8.3 | | | 5 | | | 137 | | | < 1 | | | 19 | | | 6 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 7-SB-B | 8-9.5 | 5/6/2013 | 14:30 | 24 | | | 8.6 | | | 6 | | | 173 | | | < 1 | | | 25 | | | 9 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 7-SB-C | 12-14 | 6/6/2013 | 14:30 | 20 | | | 8.8 | | | 3 | | | 140 | | | < 1 | | | 16 | | | 2 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 8-SB-A | 2-4 | 5/6/2013 | 15:30 | 20 | | | 8.2 | | | 5 | | | 183 | | | < 1 | | | 23 | | | 12 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 8-SB-B | 7.8-8.8 | 7/11/2013 | 13:45 | 9.6 | | | 8.6 | | | 5 | | | 66 | | | < 1 | | | 9 | | | 6 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 8-SB-C | 8.8-15 | 7/31/2013 | 11:10 | 12 | | | 8.6 | | | 4 | | | 126 | | | < 1 | | | 9 | | | 7 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 9-SB-A | 2-4 | 5/16/2013 | 14:30 | 9.0 | | | 8.4 | | | 8 | | | 223 | | | < 1 | | | 31 | | | 15 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 9-SB-B | 8-9 | 7/11/2013 | 12:23 | 12 | | | 8.9 | | | 6 | | | 53 | | | < 1 | | | 15 | | | 5 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 9-SB-C | 8-11 | 8/1/2013 | 10:00 | 10 | | | 8.7 | | | 3 | | | 63 | | | < 1 | | | 12 | | | 7 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 10-SB-A | 4-6 | 4/24/2013 | 11:40 | 18 | | | 7.8 | | | 5 | | | 173 | | | < 1 | | | 22 | | | 7 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| 10-SB-B | 8-12 | 7/30/2013 | 15:25 | 15 | | | 8.3 | | | 5 | | | 96 | | | < 1 | | | 17 | | | 9 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 10-SB-C | 12-16 | 7/30/2013 | 16:20 | 19 | | | 8.5 | | | 7 | | | 106 | | | < 1 | | | 18 | | | 7 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 11-SB-A | 4-6 | 5/16/2013 | 15:10 | 14 | | | 8.6 | | | 5 | | | 135 | | | < 1 | | | 28 | | | 10 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 11-SB-B | 8-10 | 6/27/2013 | 8:50 | 6.4 | | | 8.0 | | | 4 | | | 79 | J | | < 1 | | | 18 | J | | 7 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 12-SB-A | 2-4 | 5/7/2013 | 14:40 | 10 | | | 8.3 | | | 6 | | | 151 | | | < 1 | | | 23 | | | 34 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 12-SB-B | 8-9 | 7/11/2013 | 9:50 | 14 | | | 8.6 | | | 7 | | | 147 | | | < 1 | | | 14 | | | 5 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 12-SB-C | 12-15 | 7/31/2013 | 7:30 | 13 | | | 8.4 | | | 4 | | | 81 | | | < 1 | | | 11 | | | 6 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 13-SB-A | 6-6.6 | 5/7/2013 | 13:05 | 22 | | | 8.9 | | | 7 | | | 190 | | | < 1 | | | 29 | | | 13 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 13-SB-B | 8-11.5 | 7/31/2013 | 8:20 | 19 | | | 9.1 | | | 3 | | | 121 | | | < 1 | | | 13 | | | 10 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 13-SB-C | 11.5-14.5 | 7/31/2013 | 8:30 | 18 | | | 8.8 | | | 3 | | | 83 | | | < 1 | | | 10 | | | 8 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 14-SB-A | 6-8 | 4/29/2013 | 11:55 | 8.2 | | | 7.9 | | | 5 | | | 107 | J | | < 1 | | | 14 | | | 18 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 14-SB-B | 6-12 | 6/6/2013 | 12:15 | 4.9 | | | 8.8 | | | 3 | | | 118 | | | < 1 | | | 21 | | | 5 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 14-SB-C | 12-15 | 6/6/2013 | 12:30 | 8.4 | | | 8.7 | | | 4 | | | 106 | | | < 1 | | | 13 | | | 3 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 15-SB-A | 4-6 | 5/8/2013 | 15:45 | 9.7 | | | 7.9 | | | 6 | | | 92 | | | < 1 | | | 15 | | | 49 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 15-SB-AD | 4-6 | 5/8/2013 | 15:47 | 7.5 | | | 7.8 | | | 4 | | | 80 | | | < 1 | | | 13 | | | 37 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 15-SB-B | 7.8-8.8 | 7/12/2013 | 10:25 | 16 | | | 8.6 | | | 2 | | | 84 | | | < 1 | | | 12 | | | 5 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 15-SB-C | 8-14 | 8/2/2013 | 11:40 | 21 | J | | 7.8 | | | 4 | | | 108 | J | | < 1 | | | 36 | | | 7 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 16-SB-A | 4-6 | 5/9/2013 | 16:15 | 21 | | | 8.7 | | | 8 | | | 170 | | | < 1 | | | 27 | | | 18 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 16-SB-B | 8-9.5 | 5/9/2013 | 16:55 | 21 | | | 9.0 | | | 9 | | | 203 | | | < 1 | | | 27 | | | 13 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 16-SB-C | 8-13 | 8/2/2013 | 12:25 | 14 | J | | 9.4 | | | 4 | | | 117 | J | | < 1 | | | 14 | | | 22 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 17-SB-A | 4-6 | 5/10/2013 | 12:00 | 24 | | | 9.0 | | | 7 | | | 184 | | | < 1 | | | 27 | | | 16 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 17-SB-B | 6-8 | 5/10/2013 | 12:50 | 21 | | | 8.4 | | | 4 | | | 133 | | | < 1 | | | 22 | | | 12 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 17-SB-C | 8-9.2 | 5/10/2013 | 13:33 | 21 | | | 7.7 | | | 4 | | | 98 | | | < 1 | | | 12 | | | 19 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 18-SB-A | 2-4 | 5/8/2013 | 11:33 | 19 | | | 7.8 | | | 4 | | | 148 | | | < 1 | | | 24 | | | 26 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 18-SB-B | 7.7-8.5 | 7/12/2013 | 11:15 | 20 | | | 7.9 | | | 4 | | | 110 | | | < 1 | | | 17 | | | 13 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 18-SB-C | 8-11.5 | 8/2/2013 | 13:10 | 15 | J | | 8.0 | | | 4 | | | 119 | J | | < 1 | | | 17 | | | 15 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 18-SB-CD | 8-11.5 | 8/2/2013 | 13:15 | 21 | J | | 7.9 | | | 4 | | | 103 | J | | < 1 | | | 15 | | | 16 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 19-SB-A | 4-4.8 | 5/2/2013 | 12:30 | 13 | | | 7.5 | | | 4 | | | 168 | | | < 1 | | | 26 | | | 12 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 19-SB-B | 6.5-8.0 | 8/9/2013 | 9:55 | 21 | | | 7.8 | | | 9 | | | 80 | | | < 1 | | | 15 | | | 10 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 19-SB-C | 8.0-15.5 | 8/9/2013 | 10:55 | 10 | | | 8.2 | | | 3 | | | 125 | | | < 1 | | | 11 | | | 6 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 20-SB-A | 4-6 | 4/24/2013 | 9:50 | 15 | | | 8.4 | | | 7 | | | 190 | | | < 1 | | | 24 | | | 19 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 20-SB-B | 6-8 | 4/24/2013 | 10:00 | 20 | | | 7.7 | | | 7 | | | 168 | | | < 1 | | | 22 | | | 14 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 20-SB-C | 9-15 | 8/1/2013 | 9:00 | 15 | | | 8.5 | | | 4 | | | 80 | | | < 1 | | | 16 | | | 8 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 21-SB-A | 4-6 | 5/13/2013 | 11:00 | 17 | | | 7.7 | | | 8 | | | 181 | | | < 1 | | | 25 | | | 10 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 21-SB-B | 7-8 | 6/11/2013 | 10:10 | 11 | | | 8.1 | | | 4 | | | 62 | | | < 1 | | | 9 | | | 7 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 21-SB-C | 8-11.5 | 6/27/2013 | 11:00 | 10 | | | 8.2 | | | 5 | | | 104 | J | | < 1 | | | 12 | J | | 3 | | L | < 1 | | | < 1 | | | < 1 | | | | | |
| 22-SB-A | 6-8 | 5/16/2013 | 11:32 | 16 | | | 8.2 | | | 5 | | | 190 | | | < 1 | | | 30 | | | 10 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 22-SB-B | 8-10 | 5/16/2013 | 11:58 | 19 | | | 8.2 | | | 5 | | | 97 | | | < 1 | | | 16 | | | 6 | | | < 1 | | | < 1 | | | < 1 | | | | | |

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| 22-SB-C | 10-10.5 | 5/16/2013 | 12:20 | 21 | 8.1 | 6 | 144 | < 1 | 15 | 6 | < 1 | < 1 | < 1 | |
| 23-SB-A | 6-8 | 5/16/2013 | 11:50 | 17 | 8.1 | 5 | 160 | < 1 | 26 | 58 | < 1 | < 1 | < 1 | |
| 23-SB-B | 8-10 | 5/16/2013 | 12:20 | 24 | 7.6 | 4 | 199 | < 1 | 28 | 60 | < 1 | < 1 | < 1 | |
| 23-SB-C | 10.5-11.5 | 5/16/2013 | 13:00 | 17 | 8.0 | 3 | 181 | < 1 | 14 | 20 | < 1 | < 1 | < 1 | |
| 25-SB-A | 2-4 | 4/29/2013 | 15:30 | 11 | 8.6 | 2 | 152 J | < 1 | 17 | 1800 D | < 1 | < 1 | < 1 | |
| 25-SB-AD | 2-4 | 4/29/2013 | 15:32 | 11 | 8.6 | 4 | 219 J | < 1 | 15 | 2420 | < 1 | < 1 | < 1 | |
| 25-SB-B | 7-8 | 8/8/2013 | 9:15 | 14 | 8.8 | 1 | 282 | < 1 | 11 | 138 J | < 1 | < 1 | < 1 | |
| 25-SB-C | 8-11.5 | 7/31/2013 | 9:20 | 10 | 8.2 | 3 | 95 | < 1 | 15 | 49 J | < 1 | < 1 | < 1 | |
| 26-SB-A | 6-8 | 4/30/2013 | 12:25 | 20 | 7.8 | 6 | 168 J | < 1 | 25 | 221 D | < 1 | < 1 | < 1 | |
| 26-SB-B | 8.1-11 | 7/31/2013 | 12:10 | 22 | 8.6 | 6 | 168 | < 1 | 11 | 23 J | < 1 | < 1 | < 1 | |
| 26-SB-C | 11-14.5 | 7/31/2013 | 12:30 | 15 | 8.3 | 5 | 108 | < 1 | 14 | 9 J | < 1 | < 1 | < 1 | |
| 27-SB-A | 6-7 | 4/30/2013 | 10:10 | 22 | 8.0 | 7 | 125 J | < 1 | 18 | 48 D | < 1 | < 1 | < 1 | |
| 27-SB-B | 7.5-8.5 | 7/9/2013 | 14:33 | 13 | 8.4 | 4 | 61 | < 1 | 14 | 11 | < 1 | < 1 | < 1 | |
| 27-SB-C | 8-13 | 7/31/2013 | 13:10 | 12 | 8.5 | 5 | 145 | < 1 | 15 | 12 J | < 1 | < 1 | < 1 | |
| 28-SB-A | 6-7.3 | 4/30/2013 | 15:00 | 21 | 7.9 | 5 | 101 J | < 1 | 16 | 14 D | < 1 | < 1 | < 1 | 0.51 |
| 28-SB-B | 7.3-8.5 | 7/9/2013 | 15:30 | 17 | 7.6 | 5 | 100 | < 1 | 16 | 12 | < 1 | < 1 | < 1 | 0.091 J |
| 28-SB-C | 8-11.5 | 7/31/2013 | 13:55 | 13 | 8.2 | 5 | 173 | < 1 | 12 | 37 J | < 1 | < 1 | < 1 | |
| 29-SB-A | 6-6.7 | 5/1/2013 | 15:20 | 21 | 7.5 | 2 | 195 | < 1 | 26 | 446 D | < 1 | < 1 | < 1 | < 2.1 |
| 29-SB-B | 6.7-8 | 6/11/2013 | 12:15 | 17 | 8.2 | 3 | 88 | < 1 | 15 | 50 | < 1 | < 1 | < 1 | < 0.33 |
| 29-SB-C | 8-11.5 | 6/28/2013 | 12:30 | 17 | 8.7 | 5 | 88 | < 1 | 14 | 8 L | < 1 | < 1 | < 1 | |
| 30-SB-A | 4-6 | 5/1/2013 | 10:00 | 22 | 8.7 | 8 | 149 | < 1 | 13 | 38400 D | < 1 | < 1 | < 1 | |
| 30-SB-B | 8-9.9 | 5/1/2013 | 10:50 | 23 | 8.6 | 3 | 121 | < 1 | 18 | 939 D | < 1 | < 1 | < 1 | |
| 30-SB-C | 9.9-15 | 8/1/2013 | 8:00 | 13 | 8.8 | 3 | 86 | < 1 | 16 | 128 J | < 1 | < 1 | < 1 | |
| 31-SB-A | 6-7.5 | 5/2/2013 | 11:50 | 19 | 7.4 | 6 | 162 | < 1 | 25 | 64 D | < 1 | < 1 | < 1 | < 2.1 |
| 31-SB-B | 5.5-7 | 8/7/2013 | 9:40 | 18 | 8.0 | 5 | 150 | < 1 | 26 | 27 J | < 1 | < 1 | < 1 | |
| 31-SB-C | 8-11.5 | 6/28/2013 | 10:00 | 12 | 8.0 | 4 | 84 | < 1 | 12 | 55 | < 1 | < 1 | < 1 | |
| 32-SB-A | 2-4 | 5/2/2013 | 9:30 | 13 | 7.9 | 5 | 160 | < 1 | 24 | 945 D | < 1 | < 1 | < 1 | |
| 32-SB-B | 5-7.5 | 6/6/2013 | 16:25 | 25 | 8.0 | 5 | 222 | < 1 | 34 | 37 D | < 1 | < 1 | < 1 | |
| 32-SB-BD | 5-7.5 | 6/6/2013 | 16:30 | 23 | 8.0 | 4 | 217 | < 1 | 33 | 39 D | < 1 | < 1 | < 1 | |
| 32-SB-C | 8-12 | 6/6/2013 | 16:00 | 16 | 8.1 | 14 | 67 | < 1 | 14 | 88 D | < 1 | < 1 | < 1 | |
| 33-SB-A | 4-6 | 5/2/2013 | 13:55 | 25 | 7.8 | 14 | 320 | < 1 | 19 | 3410 D | < 1 | < 1 | < 1 | |
| 33-SB-B | 8-9 | 5/2/2013 | 14:30 | 18 | 7.6 | 4 | 140 | < 1 | 19 | 343 D | < 1 | < 1 | < 1 | |
| 33-SB-C | 12-16 | 6/6/2013 | 17:35 | 15 | 8.1 | 6 | 125 | < 1 | 10 | 32 | < 1 | < 1 | < 1 | |
| 34-SB-A | 6-8 | 6/10/2013 | 12:45 | 18 | 7.3 | 6 | 164 | < 1 | 28 | 14 | < 1 | < 1 | < 1 | |
| 34-SB-AD | 6-8 | 6/10/2013 | 12:50 | 18 | 7.6 | 6 | 154 | < 1 | 26 | 14 | < 1 | < 1 | < 1 | |
| 34-SB-B | 8-11.5 | 6/28/2013 | 11:10 | 20 | 8.0 | 5 | 163 | < 1 | 24 | 9 | < 1 | < 1 | < 1 | |
| 34-SB-C | 11.5-15 | 6/28/2013 | 11:20 | 15 | 8.4 | 5 | 109 | < 1 | 14 | 6 | < 1 | < 1 | < 1 | |
| 35-SB-A | 4-6 | 5/6/2013 | 11:20 | 13 | 8.4 | 5 | 134 | < 1 | 15 | 34 D | < 1 | < 1 | < 1 | |
| 35-SB-B | 8.5-11 | 6/7/2013 | 9:10 | 15 | 8.0 | 7 | 130 | < 1 | 17 | 18 | < 1 | < 1 | < 1 | |
| 35-SB-C | 15-20 | 6/7/2013 | 9:25 | 15 | 8.5 | 8 | 53 | < 1 | 15 | 2 | < 1 | < 1 | < 1 | |
| 36-SB-A | 2-4 | 5/13/2013 | 12:15 | 16 | 8.6 | 17 | 192 | < 1 | 26 | 13 D | < 1 | < 1 | < 1 | |
| 36-SB-B | 6-8 | 5/13/2013 | 12:30 | 18 | 8.4 | 7 | 182 | < 1 | 25 | 13 | < 1 | < 1 | < 1 | |
| 36-SB-C | 8-10 | 5/13/2013 | 13:00 | 23 | 7.9 | 20 | 188 | < 1 | 25 | 9 | < 1 | < 1 | < 1 | |
| 37-SB-A | 2-4 | 5/13/2013 | 15:00 | 19 | 7.8 | 10 | 219 | < 1 | 34 | 14 | < 1 | < 1 | < 1 | |
| 37-SB-B | 8-11.5 | 6/27/2013 | 11:35 | 9.5 | 8.1 | 4 | 110 J | < 1 | 10 J | 6 | < 1 | < 1 | < 1 | |
| 37-SB-C | 11.5-15.5 | 6/27/2013 | 12:25 | 13 | 8.6 | 3 | 55 J | < 1 | 20 J | 13 | < 1 | < 1 | < 1 | |
| 37-SB-CD | 11.5-15.5 | 6/27/2013 | 12:30 | 12 | 8.4 | 3 | 93 J | < 1 | 14 J | 10 | < 1 | < 1 | < 1 | |
| 38-SB-A | 2-4 | 5/16/2013 | 9:10 | 7.7 | 8.3 | 5 | 106 | < 1 | 25 | 54 | < 1 | < 1 | < 1 | |
| 38-SB-B | 6-8 | 6/7/2013 | 13:50 | 14 | 8.2 | 6 | 136 | < 1 | 28 | 89 | < 1 | < 1 | < 1 | |
| 38-SB-C | 8-10 | 6/27/2013 | 10:10 | 11 | 8.4 | 5 | 96 J | < 1 | 30 J | 9 | < 1 | < 1 | < 1 | |
| 39-SB-A | 2-4 | 4/26/2013 | 15:20 | 6.2 | 7.6 | 6 | 201 | < 1 | 21 | 381 D | < 1 | < 1 | < 1 | |
| 39-SB-B | 8-11.5 | 6/27/2013 | 14:15 | 37 | 7.5 | 23 | 589 J | 10 | 40 J | 384 L | < 1 | < 1 | < 1 | |
| 39-SB-C | 11.5-15.5 | 6/27/2013 | 13:35 | 9.0 | 8.3 | 4 | 101 J | < 1 | 11 J | 19 | < 1 | < 1 | < 1 | |
| 40-SB-A | 6-7.5 | 4/29/2013 | 15:15 | 15 | 7.8 | 6 | 149 J | < 1 | 19 | 12 | < 1 | < 1 | < 1 | < 2.0 |
| 40-SB-B | 8-11.5 | 6/28/2013 | 7:15 | 7.8 | 8.5 | 4 | 117 | < 1 | 14 | 5 | < 1 | < 1 | < 1 | |
| 40-SB-C | 11.5-19.5 | 6/28/2013 | 8:05 | 15 | 8.4 | 5 | 225 | < 1 | 17 | 8 | < 1 | < 1 | < 1 | |
| 41-SB-A | 6-6.6 | 4/30/2013 | 13:40 | 29 | 7.6 | 10 | 183 J | < 1 | 26 | 74 D | < 1 | < 1 | < 1 | |
| 41-SB-B | 8-9.2 | 7/10/2013 | 14:00 | 12 | 8.2 | 5 | 70 | < 1 | 11 | 13 | < 1 | < 1 | < 1 | |
| 41-SB-C | 12-16 | 8/1/2013 | 15:55 | 16 | 8.6 | 4 | 83 | < 1 | 11 | 82 J | < 1 | < 1 | < 1 | |
| 41-SB-CD | 12-16 | 8/1/2013 | 15:59 | 13 | 8.5 | 4 | 102 | < 1 | 12 | 12 J | < 1 | < 1 | < 1 | |
| 42-SB-A | 6-7 | 4/30/2013 | 10:25 | 21 | 7.6 | 7 | 189 J | < 1 | 25 | 16 D | < 1 | < 1 | < 1 | < 2.1 |
| 42-SB-B | 7.2-82 | 7/10/2013 | 10:55 | 19 | 8.5 | 5 | 86 | < 1 | 14 | 8 | < 1 | < 1 | < 1 | < 2.1 |
| 42-SB-C | 8-11.5 | 7/31/2013 | 15:15 | 19 | 8.7 | 6 | 99 | < 1 | 14 | 7 J | < 1 | < 1 | < 1 | |
| 43-SB-A | 2-4 | 4/30/2013 | 14:45 | 18 | 7.2 | 6 | 331 J | < 1 | 19 | 112 D | < 1 | < 1 | < 1 | < 30 |
| 43-SB-B | 6-8 | 7/10/2013 | 11:22 | 13 | 8.2 | 3 | 58 | < 1 | 12 | 6 | < 1 | < 1 | < 1 | 0.28 J |
| 43-SB-C | 8.3-11.5 | 7/31/2013 | 14:40 | 10 | 7.8 | 3 | 121 | < 1 | 10 | 7 J | < 1 | < 1 | < 1 | |

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| 44-SB-A | 2-4 | 5/1/2013 | 13:25 | 23 | 7.3 | 4 | 165 | < 1 | 11 | 919 D | < 1 | < 1 | < 1 | < 8.7 |
| 44-SB-B | 2-4 | 5/1/2013 | 12:25 | 22 | 8.5 | 9 | 166 | < 1 | 18 | 5990 D | < 1 | < 1 | < 1 | < 4.3 |
| 44-SB-C | 4-6 | 5/1/2013 | 12:30 | 17 | 8.7 | 1 | 78 | < 1 | 13 | 113 D | < 1 | < 1 | < 1 | |
| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | 22 | 8.0 | 10 | 184 | < 1 | 21 | 5920 D | < 1 | < 1 | < 1 | < 8.6 |
| 45-SB-B | 4-4.9 | 5/1/2013 | 11:35 | 23 | 8.5 | 2 | 146 | < 1 | 22 | 261 D | < 1 | < 1 | < 1 | < 2.2 |
| 45-SB-C | 8-11.5 | 8/9/2013 | 14:10 | 16 | 8.6 | 3 | 116 | < 1 | 20 | 41 J | < 1 | < 1 | < 1 | |
| 46-SB-A | 4-6 | 5/1/2013 | 15:05 | 13 | 7.5 | 4 | 201 | < 1 | 26 | 274 D | < 1 | < 1 | < 1 | |
| 46-SB-B | 5-6.2 | 8/6/2013 | 11:25 | 16 | 7.6 | 8 | 172 | < 1 | 22 | 152 J | < 1 | < 1 | < 1 | < 4.0 |
| 46-SB-BD | 5-6.2 | 8/6/2013 | 11:30 | 17 | 7.4 | 6 | 225 | < 1 | 28 | 125 J | < 1 | < 1 | < 1 | < 4.0 |
| 46-SB-C | 8-11.5 | 6/28/2013 | 8:50 | 13 | 8.5 | 2 | 69 | < 1 | 8 | 10 | < 1 | < 1 | < 1 | |
| 47-SB-A | 6-7.7 | 5/2/2013 | 9:45 | 21 | 8.1 | 6 | 231 | < 1 | 23 | 1660 D | < 1 | < 1 | < 1 | < 4.2 |
| 47-SB-B | 5-7 | 8/6/2013 | 14:25 | 19 | 7.4 | 6 | 285 | < 1 | 21 | 1840 J | < 1 | < 1 | < 1 | < 2.1 |
| 47-SB-BD | 5-7 | 8/6/2013 | 14:30 | 21 | 7.8 | 4 | 199 | < 1 | 25 | 35 J | < 1 | < 1 | < 1 | < 4.2 |
| 47-SB-C | 8-10 | 6/27/2013 | 16:50 | 14 | 8.5 | 4 | 110 J | < 1 | 17 J | 34 | < 1 | < 1 | < 1 | |
| 48-SB-A | 4-6 | 4/25/2013 | 14:00 | 26 | 8.3 | 6 | 207 | < 1 | 22 | 72 | < 1 | < 1 | < 1 | |
| 48-SB-B | 6-8 | 4/25/2013 | 14:35 | 28 | 8.4 | 5 | 149 | < 1 | 18 | 7 U | < 1 | < 1 | < 1 | |
| 48-SB-C | 8-9.2 | 4/25/2013 | 15:00 | 21 | 8.5 | 4 | 162 | < 1 | 16 | 8 U | < 1 | < 1 | < 1 | |
| 48-SB-CD | 8-9.2 | 4/25/2013 | 15:03 | 22 | 8.2 | 4 | 161 | < 1 | 15 | 9 U | < 1 | < 1 | < 1 | |
| 49-SB-A | 6-7.2 | 4/25/2013 | 12:30 | 23 | 7.9 | 9 | 154 | < 1 | 13 | 3200 | < 1 | < 1 | < 1 | |
| 49-SB-B | 8-11.5 | 6/27/2013 | 15:15 | 15 | 7.9 | 9 | 208 J | < 1 | 17 J | 1270 L | < 1 | 1 | < 1 | |
| 49-SB-C | 11.5-14.5 | 6/27/2013 | 16:00 | 8.4 | 8.6 | 5 | 65 J | < 1 | 19 J | 13 | < 1 | < 1 | < 1 | |
| 50-SB-A | 6-8 | 4/25/2013 | 10:40 | 20 | 7.6 | 8 | 182 | < 1 | 22 | 20 | < 1 | < 1 | < 1 | |
| 50-SB-B | 8-11.5 | 7/31/2013 | 9:55 | 17 | 8.1 | 4 | 105 | < 1 | 10 | 20 J | < 1 | < 1 | < 1 | |
| 50-SB-C | 11.5-14 | 7/31/2013 | 10:10 | 9.4 | 8.8 | 3 | 55 | < 1 | 12 | 5 J | < 1 | < 1 | < 1 | |
| 51-SB-A | 4-6 | 4/24/2013 | 15:00 | 33 | 7.0 | 9 | 197 | < 1 | 26 | 20 | < 1 | < 1 | < 1 | |
| 51-SB-B | 8-9 | 6/7/2013 | 10:45 | 18 | 8.0 | 6 | 111 | < 1 | 15 | 8 | < 1 | < 1 | < 1 | |
| 51-SB-C | 9-12 | 6/7/2013 | 11:00 | 16 | 8.2 | 3 | 93 | < 1 | 9 | 3 | < 1 | < 1 | < 1 | |
| 52-SB-A | 4-6 | 5/17/2013 | 15:20 | 18 | 8.4 | 6 | | | | 9 | | < 1 | | |
| 52-SB-B | 6-8 | 5/17/2013 | 16:05 | 21 | 8.4 | 6 | | | | 6 | | < 1 | | |
| 52-SB-C | 8-10 | 5/17/2013 | 16:40 | 20 | 8.2 | 4 | | | | 5 | | < 1 | | |
| 53-SB-A | 2-2.9 | 5/21/2013 | 11:00 | 4.0 | 8.1 | 5 | 135 | < 1 | 18 | 10 | < 1 | < 1 | < 1 | |
| 53-SB-B | 6-8 | 5/23/2013 | 11:30 | 18 | 8.1 | 5 | 232 | < 1 | 16 | 10 | < 1 | < 1 | < 1 | |
| 53-SB-C | 10-12 | 6/5/2013 | 15:10 | 19 | 8.0 | 2 | 64 | < 1 | 12 | 3 D | < 1 | < 1 | < 1 | |
| 54-SB-A | 6-7 | 5/20/2013 | 14:05 | 19 | 8.1 | 4 | 336 | < 1 | 18 | 7 | < 1 | < 1 | < 1 | |
| 54-SB-B | 8-8.5 | 5/23/2013 | 15:45 | 17 | 8.0 | 4 | 212 | < 1 | 10 | 5 | < 1 | < 1 | < 1 | |
| 54-SB-C | 7-10 | 6/5/2013 | 16:40 | 17 | 8.4 | 4 | 189 | < 1 | 12 | 2 D | < 1 | < 1 | < 1 | |
| 55-SB-A | 4-5.75 | 5/21/2013 | 10:00 | 15 | 7.7 | 5 | 183 | < 1 | 30 | 10 | < 1 | < 1 | < 1 | |
| 55-SB-B | 5.5-7.5 | 8/8/2013 | 15:25 | 13 | 7.5 | 7 | 127 | < 1 | 20 | 7 J | < 1 | < 1 | < 1 | |
| 55-SB-C | 6-8 | 6/5/2013 | 17:40 | 12 | 8.5 | 5 | 149 | < 1 | 14 | 6 D | < 1 | < 1 | < 1 | |
| 56-SB-A | 6-8 | 5/20/2013 | 14:30 | 22 | 9.0 | 7 | 162 | < 1 | 30 | 9 | < 1 | < 1 | < 1 | |
| 56-SB-B | 6.5-8.5 | 8/12/2013 | 10:40 | 21 | 8.3 | 6 | 183 | < 1 | 24 | 10 J | < 1 | < 1 | < 1 | |
| 56-SB-C | 8-10 | 6/5/2013 | 18:25 | 12 | 9.3 | 4 | 117 | < 1 | 15 | < 2 D | < 1 | < 1 | < 1 | |
| 57-SB-A | 4-6 | 5/21/2013 | 12:00 | 9.2 | 7.8 | 4 | 90 | < 1 | 12 | 6 | < 1 | < 1 | < 1 | |
| 57-SB-B | 6-8 | 5/21/2013 | 12:35 | 18 | 7.5 | 3 | 55 | < 1 | 10 | 5 | < 1 | < 1 | < 1 | |
| 57-SB-C | 8-12 | 7/2/2013 | 9:25 | 11 | 8.6 | 4 | 82 | < 1 | 16 | 5 | < 1 | < 1 | < 1 | |
| 58-SB-A | 6-8 | 5/22/2013 | 10:40 | 17 | 8.0 | 6 | 235 | < 1 | 28 | 27 | < 1 | < 1 | < 1 | |
| 58-SB-B | 10-10.8 | 5/22/2013 | 11:40 | 23 | 7.9 | 7 | 139 | < 1 | 22 J | 16 | < 1 | < 1 | < 1 | |
| 58-SB-C | 10.8-14 | 8/1/2013 | 12:15 | 25 | 7.9 | 6 | 183 | < 1 | 17 | 25 J | < 1 | < 1 | < 1 | |
| 59-SB-A | 4-6 | 5/22/2013 | 13:15 | 8.4 | 8.3 | 6 | 136 | < 1 | 17 J | 6 | < 1 | < 1 | < 1 | |
| 59-SB-B | 6-8 | 5/28/2013 | 11:40 | 19 | 8.1 | 3 | 46 | < 1 | 12 | 5 | < 1 | < 1 | < 1 | |
| 59-SB-C | 8-8.7 | 5/28/2013 | 15:00 | 13 | 8.0 | 4 | 38 | < 1 | 10 | 4 | < 1 | < 1 | < 1 | |
| 60-SB-A | 4-5.3 | 5/22/2013 | 9:45 | 16 | 9.6 | 5 | 186 | < 1 | 29 J | 10 | < 1 | < 1 | < 1 | |
| 60-SB-B | 6-8 | 5/28/2013 | 11:00 | 16 | 8.8 | 3 | 67 | < 1 | 8 | 4 | < 1 | < 1 | < 1 | |
| 60-SB-C | 8-15.5 | 7/1/2013 | 16:40 | 12 | 9.3 | 4 | 76 | < 1 | 10 | 7 | < 1 | < 1 | < 1 | |
| 61-SB-A | 2-4 | 5/21/2013 | 15:25 | 23 | 8.3 | 7 | 190 | < 1 | 33 | 12 | < 1 | < 1 | < 1 | |
| 61-SB-B | 6-8 | 5/21/2013 | 15:45 | 25 | 8.0 | 3 | 167 | < 1 | 23 | 8 | < 1 | < 1 | < 1 | |
| 61-SB-C | 8-9 | 5/21/2013 | 16:00 | 23 | 7.8 | 3 | 145 | < 1 | 23 | 8 | < 1 | < 1 | < 1 | |
| 62-SB-A | 4-6 | 5/21/2013 | 15:00 | 10 | 8.5 | 4 | 89 | < 1 | 15 | 6 | < 1 | < 1 | < 1 | |
| 62-SB-B | 6-8 | 5/21/2013 | 15:05 | 19 | 8.6 | 3 | 108 | < 1 | 15 | 6 | < 1 | < 1 | < 1 | |
| 62-SB-C | 8-9 | 8/1/2013 | 13:00 | 15 | 8.9 | 4 | 130 | < 1 | 15 | 8 J | < 1 | < 1 | < 1 | |
| 63-SB-A | 2-4 | 5/21/2013 | 14:15 | 20 | 8.6 | 5 | 175 | < 1 | 30 | 11 | < 1 | < 1 | < 1 | |
| 63-SB-B | 4-5.3 | 5/21/2013 | 14:35 | 22 | 8.4 | 5 | 125 | < 1 | 17 | 7 | < 1 | < 1 | < 1 | |
| 63-SB-C | 6-8 | 5/28/2013 | 10:00 | 17 | 8.2 | 4 | 98 | < 1 | 11 | 6 | < 1 | < 1 | < 1 | |
| 64-SB-A | 4-6 | 5/21/2013 | 12:15 | 19 | 8.6 | 6 | 150 | < 1 | 25 | 10 | < 1 | < 1 | < 1 | |
| 64-SB-B | 6-6.7 | 5/21/2013 | 12:35 | 17 | 8.2 | 5 | 79 | < 1 | 14 | 6 | < 1 | < 1 | < 1 | |
| 64-SB-C | 8-15.5 | 7/2/2013 | 8:45 | 14 | 8.8 | 3 | 80 | < 1 | 14 | 5 L | < 1 | < 1 | < 1 | |

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| ale il o out a ota u sur ace oil am ling I I | | | | I . | | | H I | | | I | | | I | | | I | | | H I | | | | | | H | | | I | | | I | | | H | | |
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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | | | | | | | . | | | | | | | | | | | | | | | | | | . | | | . | | | . | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 65-SB-A | 6-8 | 5/28/2013 | 16:10 | 12 | | | 8.0 | | | 5 | | | 153 | | | < 1 | | | 22 | | | 13 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 65-SB-B | 8-11.5 | 8/1/2013 | 11:30 | 17 | | | 7.9 | | | 6 | | | 141 | | | < 1 | | | 20 | | | 10 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 65-SB-C | 11.5-15 | 8/1/2013 | 11:40 | 15 | | | 8.4 | | | 3 | | | 75 | | | < 1 | | | 13 | | | 6 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 66-SB-A | 6-7 | 5/30/2013 | 15:30 | 12 | | | 8.2 | | | 6 | J | | | | | | | | | | | 10 | | | | | | < 1 | | | | | | | | |
| 66-SB-B | 2-4 | 5/31/2013 | 9:30 | 31 | | | 8.0 | | | 11 | J | | | | | | | | | | | 47 | | D | | | | < 1 | | | | | | | | |
| 66-SB-C | 4-5.5 | 5/31/2013 | 9:45 | 40 | | | 8.0 | | | 13 | J | | | | | | | | | | | 49 | | D | | | | 2 | | | | | | | | |
| 67-SB-A | 4-6 | 5/30/2013 | 10:50 | 21 | | | 8.3 | | | 19 | J | | 157 | | | < 1 | | | 21 | | | 65 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 67-SB-AD | 4-6 | 5/30/2013 | 10:55 | 21 | | | 8.2 | | | 9 | J | | 135 | | | < 1 | | | 16 | | | 75 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 67-SB-B | 6-7 | 5/30/2013 | 11:20 | 30 | | | 7.8 | | | 7 | J | | 130 | | | < 1 | | | 15 | | | 29 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 67-SB-BD | 6-7 | 5/30/2013 | 11:25 | 30 | | | 7.7 | | | 7 | J | | 130 | | | < 1 | | | 12 | | | 24 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 67-SB-C | 8-16 | 7/2/2013 | 10:10 | 12 | | | 8.6 | | | 5 | | | 68 | | | < 1 | | | 12 | | | 8 | | L | < 1 | | | < 1 | | | < 1 | | | | | |
| 68-SB-A | 2-4 | 5/30/2013 | 12:45 | 5.1 | | | 8.3 | | | 2 | J | | | | | | | | | | | 7 | | D | | | | < 1 | | | | | | | | |
| 68-SB-B | 4-6 | 6/6/2013 | 11:30 | 16 | | | 8.4 | | | 6 | | | | | | | | | | | | 6 | | | | | | < 1 | | | | | | | | |
| 68-SB-C | 6-8 | 6/6/2013 | 11:45 | 18 | | | 8.2 | | | 6 | | | | | | | | | | | | 4 | | | | | | < 1 | | | | | | | | |
| 69-SB-A | 2-4 | 5/30/2013 | 13:10 | 4.4 | | | 9.0 | | | 7 | J | | 119 | | | < 1 | | | 16 | | | 15 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 69-SB-B | 4-6 | 6/6/2013 | 10:40 | 13 | | | 8.9 | | | 6 | | | 200 | | | < 1 | | | 13 | | | 5 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 69-SB-C | 8-10 | 7/2/2013 | 11:15 | 11 | | | 9.0 | | | 4 | | | 85 | | | < 1 | | | 14 | | | 6 | | L | < 1 | | | < 1 | | | < 1 | | | | | |
| 70-SB-A | 2-4 | 5/30/2013 | 14:45 | 4.5 | | | 8.7 | | | 6 | J | | | | | | | | | | | 5 | | | | | | < 1 | | | | | | | | |
| 70-SB-B | 4-6 | 6/6/2013 | 9:40 | 22 | | | 8.6 | | | 6 | | | | | | | | | | | | 3 | | | | | | < 1 | | | | | | | | |
| 70-SB-C | 6-8 | 6/6/2013 | 10:00 | 20 | | | 8.2 | | | 4 | | | | | | | | | | | | 3 | | | | | | < 1 | | | | | | | | |
| 71-SB-A | 2-4 | 5/30/2013 | 10:25 | 7.1 | | | 8.4 | | | 6 | J | | | | | | | | | | | 10 | | D | | | | < 1 | | | | | | | | |
| 71-SB-AD | 2-4 | 5/30/2013 | 10:30 | 6.0 | | | 8.4 | | | 6 | J | | | | | | | | | | | 12 | | D | | | | < 1 | | | | | | | | |
| 71-SB-B | 6-8 | 6/3/2013 | 14:05 | 20 | | | 8.4 | | | 3 | | | | | | | | | | | | < 2 | | D | | | | < 1 | | | | | | | | |
| 71-SB-C | 8-11.5 | 6/28/2013 | 13:30 | 11 | | | 8.5 | | | 4 | | | | | | | | | | | | 4 | | | | | | < 1 | | | | | | | | |
| 72-SB-A | 4-6 | 5/29/2013 | 10:10 | 21 | | | 8.0 | | | 7 | | | | | | | | | | | | 11 | | | | | | < 1 | | | | | | | | |
| 72-SB-B | 6-7.5 | 5/29/2013 | 10:20 | 22 | | | 7.8 | | | 5 | | | | | | | | | | | | 10 | | | | | | < 1 | | | | | | | | |
| 72-SB-C | 7.5-9.5 | 5/29/2013 | 10:50 | 20 | | | 7.6 | | | 4 | | | | | | | | | | | | 7 | | | | | | < 1 | | | | | | | | |
| 73-SB-A | 2-3.2 | 5/22/2013 | 11:35 | 9.3 | | | 8.9 | | | 6 | | | 235 | | | < 1 | | | 21 | J | | 20 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 73-SB-B | 7.5-8.5 | 8/12/2013 | 9:30 | 23 | | | 7.9 | | | 5 | | | 147 | | | < 1 | | | 19 | | | 8 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 73-SB-C | 8-10.5 | 6/28/2013 | 14:30 | 15 | | | 8.0 | | | 7 | | | 338 | | | < 1 | | | 18 | | | 7 | | L | < 1 | | | < 1 | | | < 1 | | | | | |
| 74-SB-A | 2-4 | 5/22/2013 | 15:00 | 12 | | | 9.7 | | | 8 | | | 445 | | | < 1 | | | 16 | J | | 19 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 74-SB-AD | 2-4 | 5/22/2013 | 15:10 | 12 | | | 9.8 | | | 6 | | | 543 | | | < 1 | | | 27 | J | | 24 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 74-SB-B | 5.0-6.5 | 8/12/2013 | 11:10 | 22 | | | 10.4 | | | 5 | | | 175 | | | < 1 | | | 21 | | | 58 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 74-SB-C | 8-11.5 | 8/1/2013 | 13:30 | 12 | | | 9.4 | | | 5 | | | 268 | | | < 1 | | | 29 | | | 8 | J | | < 1 | | H | < 1 | | | < 1 | | | | | |
| 75-SB-A | 2-4 | 5/22/2013 | 13:55 | 11 | | | 7.8 | | | 7 | | | 159 | | | < 1 | | | 22 | J | | 26 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 75-SB-B | 4-6 | 5/22/2013 | 14:55 | 26 | | | 8.1 | | | 5 | | | 136 | | | < 1 | | | 18 | J | | 15 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 75-SB-C | 8-11.5 | 7/1/2013 | 11:05 | 15 | | | 8.4 | | | 9 | | | 77 | | | < 1 | | | 13 | | | 18 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 76-SB-A | 2-4 | 5/23/2013 | 9:35 | 25 | | | 7.3 | | | 6 | | | 195 | | | < 1 | | | 20 | | | 169 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 76-SB-B | 4-6 | 5/23/2013 | 9:50 | 23 | | | 7.8 | | | 4 | | | 213 | | | < 1 | | | 17 | | | 12 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 76-SB-C | 6-7.4 | 5/23/2013 | 10:10 | 25 | | | 7.7 | | | 4 | | | 145 | | | < 1 | | | 22 | | | 9 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 77-SB-A | 2-4 | 5/24/2013 | 11:55 | 19 | | | 8.2 | | | 17 | | | 248 | | | < 1 | | | 27 | | | 88 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 77-SB-B | 4-6 | 5/24/2013 | 12:15 | 27 | | | 8.3 | | | 14 | | | 161 | | | < 1 | | | 24 | | | 23 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 77-SB-C | 8-15.5 | 7/1/2013 | 11:50 | 12 | | | 9.1 | | | 3 | | | 122 | | | < 1 | | | 12 | | | 6 | | L | < 1 | | | < 1 | | | < 1 | | | | | |
| 78-SB-A | 2-4 | 5/24/2013 | 11:50 | 21 | | | 8.7 | | | 6 | | | 167 | | | < 1 | | | 24 | | | 13 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 78-SB-B | 4-5.5 | 5/24/2013 | 12:15 | 26 | | | 8.3 | | | 6 | | | 178 | | | < 1 | | | 29 | | | 9 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 78-SB-C | 6-8 | 6/5/2013 | 9:45 | 18 | | | 8.5 | | | 5 | | | 74 | | | < 1 | | | 18 | | | 5 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 79-SB-B | 2-4 | 5/23/2013 | 11:05 | 32 | | | 8.0 | | | 7 | | | 142 | | | < 1 | | | 19 | | | 11 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 79-SB-C | 4-6 | 5/23/2013 | 11:25 | 26 | | | 8.0 | | | 6 | | | 104 | | | < 1 | | | 21 | | | 10 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 80-SB-A | 2-2.5 | 5/23/2013 | 10:15 | 25 | | | 7.3 | | | 3 | | | 130 | | | < 1 | | | 19 | | | 19 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 80-SB-B | 2.5-3.5 | 5/23/2013 | 10:00 | 23 | | | 8.4 | | | 5 | | | 157 | | | < 1 | | | 22 | | | 103 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 80-SB-C | 3.5-5.8 | 5/23/2013 | 10:45 | 25 | | | 8.3 | | | 6 | | | 179 | | | < 1 | | | 27 | | | 62 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 81-SB-A | 2-4 | 5/14/2013 | 15:25 | 9.7 | | | 7.9 | | | 5 | | | | | | | | | | | | 50 | | | | | | < 1 | | | | | | | | |
| 81-SB-B | 5-6 | 6/11/2013 | 13:45 | 21 | | | 8.0 | | | 3 | | | | | | | | | | | | 6 | | | | | | < 1 | | | | | | | | |
| 81-SB-C | 6-7 | 6/11/2013 | 14:10 | 20 | | | 8.2 | | | 4 | | | | | | | | | | | | 7 | | | | | | < 1 | | | | | | | | |
| 82-SB-A | 4-6 | 5/15/2013 | 9:35 | 9.5 | J | | 7.7 | | | 5 | | | 126 | | | < 1 | | | 22 | | | 8 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 82-SB-AD | 4-6 | 5/15/2013 | 9:36 | 18 | J | | 8.1 | | | 7 | | | 127 | | | < 1 | | | 20 | | | 7 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 82-SB-B | 5-6 | 6/11/2013 | 14:30 | 13 | | | 7.9 | | | 4 | | | 84 | | | < 1 | | | 13 | | | 6 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 82-SB-C | 6-7 | 6/11/2013 | 14:50 | 17 | | | 7.9 | | | 4 | | | 75 | | | < 1 | | | 15 | | | 6 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 83-SB-A | 2-4 | 5/15/2013 | 9:15 | 7.0 | J | | 8.6 | | | 6 | | | | | | | | | | | | 9 | | | | | | < 1 | | | | | | | | |
| 83-SB-B | 6-7 | 6/11/2013 | 15:20 | 20 | | | 8.4 | | | 4 | | | | | | | | | | | | 6 | | | | | | < 1 | | | | | | | | |
| 83-SB-C | 7-8 | 6/11/2013 | 15:50 | 21 | | | 8.0 | | | 3 | | | | | | | | | | | | 4 | | | | | | < 1 | | | | | | | | |
| 84-SB-A | 4-6 | 5/15/2013 | 11:05 | 20 | J | | 8.5 | | | 6 | | | 184 | | | < 1 | | | 30 | | | 20 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 84-SB-B | 7.5-8.5 | 6/12/2013 | 10:30 | 18 | | | 8.2 | | | 4 | | | 65 | | | < 1 | | | 13 | | | 5 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 84-SB-C | 10.5-15.5 | 8/9/2013 | 9:10 | 9.8 | | | 8.4 | | | 4 | | | 125 | | | < 1 | | | 15 | | | 6 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| 85-SB-A | 2-4 | 5/15/2013 | 11:50 | 4.1 | J | | 7.8 | | | 3 | | | | | | | | | | | | 10 | | | | | | < 1 | | | | | | | | |
| 85-SB-B | 5.5-6.5 | 6/12/2013 | 11:20 | 19 | | | 7.7 | | | 3 | | | | | | | | | | | | 6 | | | | | | < 1 | | | | | | | | |

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| ale il o out a ota u sur ace oil am ling I I | | | | I . | | | H I | | | I | | | I | | | I | | | H I | | | | | | H | | | I | | | I | | | H | | |
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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| irect ontact ommercial | | | | | | | | | | . | | | | | | | | | | | | | | | . | | | | | | | | | . | | |
| eac ing to round ater creening e el | | | | | | | | | | . | | | | | | | | | | | | | | | | | | . | | | . | | | . | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 85-SB-C | 6.5-7.5 | 6/12/2013 | 11:40 | 25 | | | 7.4 | | | 4 | | | | | | | | | | | | 11 | | | | | | < 1 | | | | | | | | |
| 86-SB-A | 2-4 | 5/15/2013 | 14:50 | 9.1 | J | | 8.5 | | | 4 | | | | | | | | | | | | 20 | | | | | | < 1 | | | | | | | | |
| 86-SB-B | 5.5-6.5 | 6/12/2013 | 15:50 | 19 | | | 8.5 | | | 5 | | | | | | | | | | | | 10 | | | | | | < 1 | | | | | | | | |
| 86-SB-C | 6.5-7.0 | 6/12/2013 | 16:05 | 18 | | | 8.2 | | | 5 | | | | | | | | | | | | 8 | | | | | | < 1 | | | | | | | | |
| 87-SB-A | 2-4 | 5/28/2013 | 10:50 | 13 | | | 8.2 | | | 7 | | | | | | | | | | | | 18 | | | | | | < 1 | | | | | | | | |
| 87-SB-B | 4-6 | 5/28/2013 | 11:15 | 21 | | | 8.6 | | | 6 | | | | | | | | | | | | 9 | | | | | | < 1 | | | | | | | | |
| 87-SB-C | 6.5-7.2 | 5/28/2013 | 11:40 | 16 | | | 8.4 | | | 6 | | | | | | | | | | | | 7 | | | | | | < 1 | | | | | | | | |
| 88-SB-A | 2-3.8 | 5/24/2013 | 14:45 | 16 | | | 8.8 | | | 5 | | | | | | | | | | | | 8 | | D | | | | < 1 | | | | | | | | |
| 88-SB-AD | 2-3.8 | 5/24/2013 | 14:50 | 16 | | | 8.9 | | | 5 | | | | | | | | | | | | 7 | | | | | | < 1 | | | | | | | | |
| 88-SB-B | 3.8-4.2 | 5/24/2013 | 15:20 | 15 | | | 8.8 | | | 5 | | | | | | | | | | | | 9 | | | | | | < 1 | | | | | | | | |
| 88-SB-C | 8-11.5 | 7/2/2013 | 7:35 | 12 | | | 8.8 | | | 4 | | | | | | | | | | | | 6 | | | | | | < 1 | | | | | | | | |
| 89-SB-A | 2-4 | 5/24/2013 | 10:15 | 31 | | | 7.8 | | | 6 | | | 147 | | | < 1 | | | 19 | | | 19 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 89-SB-B | 4-5.9 | 5/24/2013 | 10:50 | 30 | | | 7.6 | | | 5 | | | 132 | | | < 1 | | | 22 | | | 14 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 89-SB-C | 8-11.5 | 7/1/2013 | 12:40 | 16 | | | 7.8 | | | 4 | | | 110 | | | < 1 | | | 19 | | | 7 | | L | < 1 | | | < 1 | | | < 1 | | | | | |
| 90-SB-A | 2-4 | 5/24/2013 | 10:00 | 14 | | | 7.9 | | | 5 | | | 141 | | | < 1 | | | 22 | | | 10 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 90-SB-B | 4-6 | 5/24/2013 | 10:25 | 22 | | | 8.2 | | | 5 | | | 130 | | | < 1 | | | 23 | | | 8 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 90-SB-C | 6-7 | 5/24/2013 | 11:00 | 14 | | | 8.4 | | | 6 | | | 71 | | | < 1 | | | 14 | | | 8 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 91-SB-A | 2-4 | 5/23/2013 | 13:45 | 12 | | | 8.0 | | | 6 | | | 162 | | | < 1 | | | 21 | | | 8 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 91-SB-B | 4-6 | 6/4/2013 | 11:10 | 18 | | | 8.0 | | | 4 | | | 104 | | | < 1 | | | 16 | | | 3 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 91-SB-C | 8-14.5 | 7/1/2013 | 13:40 | 13 | | | 8.1 | | | 3 | | | 77 | | | < 1 | | | 11 | | | 6 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 92-SB-A | 2-3.1 | 5/23/2013 | 13:00 | 3.7 | | | 8.3 | | | 5 | | | 143 | | | < 1 | | | 19 | | | 7 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 92-SB-B | 4-6 | 6/4/2013 | 11:50 | 15 | | | 8.8 | | | 5 | | | 102 | | | < 1 | | | 14 | | | 4 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 92-SB-C | 8-10.5 | 7/1/2013 | 14:30 | 8.4 | | | 8.7 | | | 3 | | | 207 | | | < 1 | | | 10 | | | 5 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 93-SB-A | 2-3.1 | 5/3/2013 | 12:10 | 2.6 | | | 9.7 | | | 6 | | | 93 | | | < 1 | | | 19 | | | 5 | | | < 1 | | | <1 | | | < 1 | | | | | |
| 93-SB-B | 4-6 | 6/5/2013 | 15:15 | 15 | | | 9.0 | | | 5 | | | 68 | | | < 1 | | | 16 | | | 2 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 93-SB-C | 6.5-8 | 6/5/2013 | 15:30 | 18 | | | 8.8 | | | 3 | | | 67 | | | < 1 | | | 14 | | | 2 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 94-SB-A | 2-4 | 5/24/2013 | 9:15 | 25 | | | 8.3 | | | 5 | | | 145 | | | < 1 | | | 19 | | | 9 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 94-SB-B | 4-6 | 6/5/2013 | 10:30 | 19 | | | 8.3 | | | 3 | | | 92 | | | < 1 | | | 19 | | | 3 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 94-SB-C | 6-8 | 6/5/2013 | 10:45 | 17 | | | 8.2 | | | 3 | | | 85 | | | < 1 | | | 17 | | | 5 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 95-SB-A | 4-6 | 5/23/2013 | 15:45 | 21 | | | 7.4 | | | 5 | | | 187 | | | < 1 | | | 22 | | | 28 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 95-SB-B | 6-8 | 5/23/2013 | 16:05 | 30 | | | 7.9 | | | 5 | | | 148 | | | < 1 | | | 20 | | | 21 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 95-SB-C | 8-11 | 7/1/2013 | 15:10 | 11 | | | 8.5 | | | 5 | | | 69 | | | < 1 | | | 11 | | | 6 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 96-SB-A | 2-2.6 | 5/23/2013 | 15:15 | 2.7 | | | 9.4 | | | 8 | | | 106 | | | < 1 | | | 15 | | | 7 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 96-SB-B | 4-6 | 6/5/2013 | 12:45 | 16 | | | 8.7 | | | 7 | | | 83 | | | < 1 | | | 12 | | | 3 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 96-SB-C | 6-8 | 6/5/2013 | 13:00 | 16 | | | 8.4 | | | 4 | | | 66 | | | < 1 | | | 13 | | | 2 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 97-SB-A | 2-4 | 5/14/2013 | 16:10 | 2.7 | | | 8.6 | | | 5 | | | 130 | | | < 1 | | | 24 | | | 12 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 97-SB-B | 4-6 | 6/10/2013 | 10:50 | 11 | | | 7.8 | | | 5 | | | 49 | | | < 1 | | | 9 | | | 7 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 97-SB-BD | 4-6 | 6/10/2013 | 10:35 | 11 | | | 8.1 | | | 4 | | | 65 | | | < 1 | | | 12 | | | 6 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 97-SB-C | 6-7 | 6/10/2013 | 11:15 | 16 | | | 7.7 | | | 4 | | | 65 | | | < 1 | | | 11 | | | 6 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 98-SB-A | 2-4 | 5/14/2013 | 10:15 | 13 | | | 8.6 | | | 6 | | | | | | | | | | | | 11 | | | | | | < 1 | | | | | | | | |
| 98-SB-B | 3.5-4.5 | 6/11/2013 | 10:35 | 22 | | | 8.7 | | | 7 | | | | | | | | | | | | 18 | | | | | | < 1 | | | | | | | | |
| 98-SB-C | 4.5-5.5 | 6/11/2013 | 10:45 | 12 | | | 7.4 | | | 5 | | | | | | | | | | | | 6 | | | | | | < 1 | | | | | | | | |
| 99-SB-A | 2-4 | 5/14/2013 | 10:20 | 9.9 | | | 7.6 | | | 8 | | | 138 | | | < 1 | | | 26 | | | 14 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 99-SB-B | 5.5-6 | 6/11/2013 | 11:40 | 12 | | | 7.6 | | | 7 | | | 34 | | | < 1 | | | 8 | | | 7 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 99-SB-C | 6-7 | 6/11/2013 | 12:00 | 13 | | | 7.8 | | | 9 | | | 52 | | | < 1 | | | 10 | | | 4 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 100-SB-A | 2-3 | 5/15/2013 | 14:55 | 4.2 | J | | 8.5 | | | 5 | | | | | | | | | | | | 8 | | | | | | < 1 | | | | | | | | |
| 100-SB-B | 5.5-6.5 | 6/12/2013 | 9:15 | 17 | | | 8.3 | | | 7 | | | | | | | | | | | | 7 | | | | | | < 1 | | | | | | | | |
| 100-SB-C | 6.5-7.5 | 6/12/2013 | 9:35 | 26 | | | 8.7 | | | 5 | | | | | | | | | | | | 6 | | | | | | < 1 | | | | | | | | |
| 100-SB-CD | 6.5-7.5 | 6/12/2013 | 9:40 | 24 | | | 8.6 | | | 7 | | | | | | | | | | | | 7 | | | | | | < 1 | | | | | | | | |
| 101-SB-A | 2-3 | 5/15/2013 | 16:20 | 4.0 | J | | 8.4 | | | 6 | | | | | | | | | | | | 22 | | | | | | < 1 | | | | | | | | |
| 101-SB-B | 6.6-7.2 | 6/12/2013 | 13:55 | 16 | | | 8.8 | | | 4 | | | | | | | | | | | | 10 | | | | | | < 1 | | | | | | | | |
| 101-SB-C | 7.2-8.2 | 6/12/2013 | 14:10 | 11 | | | 8.9 | | | 5 | | | | | | | | | | | | 7 | | | | | | < 1 | | | | | | | | |
| 102-SB-A | 2-3.3 | 5/28/2013 | 14:50 | 3.6 | | | 9.0 | | | 5 | | | | | | | | | | | | 8 | | | | | | < 1 | | | | | | | | |
| 102-SB-B | 5.7-11 | 8/2/2013 | 9:10 | 15 | J | | 8.7 | | | 4 | | | | | | | | | | | | 6 | | | | | | < 1 | | | | | | | | |
| 102-SB-C | 11-15 | 8/2/2013 | 9:20 | 19 | J | | 8.6 | | | 4 | | | | | | | | | | | | 6 | | | | | | < 1 | | | | | | | | |
| 103-SB-A | 2-3 | 5/28/2013 | 13:30 | 2.8 | | | 8.9 | | | 5 | | | | | | | | | | | | 7 | | | | | | < 1 | | | | | | | | |
| 103-SB-B | 8-11.5 | 8/2/2013 | 10:00 | 15 | J | | 8.4 | | | 3 | | | | | | | | | | | | 6 | | | | | | < 1 | | | | | | | | |
| 103-SB-C | 11.5-14 | 8/2/2013 | 10:10 | 12 | J | | 8.8 | | | 3 | | | | | | | | | | | | 4 | | | | | | < 1 | | | | | | | | |
| 104-SB-A | 2-4 | 5/3/2013 | 10:40 | 3.2 | | | 9.2 | | | 6 | | | 105 | | | < 1 | | | 16 | | | 4 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 104-SB-B | 4-6 | 6/5/2013 | 14:30 | 12 | | | 8.9 | | | 4 | | | 72 | | | < 1 | | | 19 | | | 4 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 104-SB-C | 6.5-8 | 6/5/2013 | 14:45 | 19 | | | 8.6 | | | 10 | | | 113 | | | < 1 | | | 18 | | | 4 | | D | < 1 | | | < 1 | | | 2 | | | | | |
| 105-SB-A | 2-4 | 5/3/2013 | 10:15 | 3.2 | | | 9.0 | | | 5 | | | 131 | | | < 1 | | | 19 | | | 9 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| 105-SB-B | 6-8 | 6/5/2013 | 13:40 | 20 | | | 8.3 | | | 4 | | | 110 | | | < 1 | | | 13 | | | 2 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 105-SB-C | 8-11 | 7/1/2013 | 15:55 | 19 | | | 8.3 | | | 5 | | | 86 | | | < 1 | | | 14 | | | 5 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 106-SB-A | 2-4 | 4/26/2013 | 9:30 | 23 | | | 8.1 | | | 5 | | | 153 | | | < 1 | | | 21 | | | 14 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 106-SB-B | 4-6 | 4/26/2013 | 10:00 | 23 | | | 8.2 | | | 5 | | | 166 | | | < 1 | | | 19 | | | 17 | | | < 1 | | | < 1 | | | < 1 | | | | | |

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| ale il o out a ota u sur ace oil am ling I I | | | | I . | | | H I | | | I | | | I | | | I | | | H I | | | | | | H | | | I | | | I | | | H | | |
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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | | | | s.u. | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | . | | | | | | | | | | | | | | | . | | | | | | | | | . | | |
| eac ing to round ater creening e el | | | | | | | | | | . | | | | | | | | | | | | | | | | | | . | | | . | | | . | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 106-SB-C | 6-6.8 | 4/26/2013 | 10:35 | 32 | | | 8.2 | | | 4 | | | 125 | | | < 1 | | | 14 | | | 55 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 107-SB-A | 2-4 | 4/26/2013 | 11:20 | 30 | | | 8.0 | | | 5 | | | 188 | | | < 1 | | | 21 | | | 23 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 107-SB-B | 4-6 | 4/26/2013 | 11:35 | 28 | | | 8.3 | | | 5 | | | 171 | | | < 1 | | | 27 | | | 24 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 107-SB-C | 6-8 | 4/26/2013 | 11:55 | 30 | | | 8.1 | | | 5 | | | 189 | | | < 1 | | | 19 | | | 27 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| 108-SB-A | 2-4 | 5/14/2013 | 11:50 | 11 | | | 8.7 | | | 5 | | | | | | | | | | | | 9 | | | | | | < 1 | | | | | | | | |
| 108-SB-B | 4-4.5 | 6/10/2013 | 12:05 | 14 | | | 9.0 | | | 7 | | | | | | | | | | | | 18 | | | | | | < 1 | | | | | | | | |
| 108-SB-C | 6-7 | 6/10/2013 | 14:30 | 17 | | | 8.9 | | | 4 | | | | | | | | | | | | 7 | | | | | | < 1 | | | | | | | | |
| 109-SB-A | 4-5 | 5/14/2013 | 12:20 | 4.1 | | | 8.2 | | | 4 | | | | | | | | | | | | 10 | | | | | | < 1 | | | | | | | | |
| 109-SB-B | 4-6 | 6/10/2013 | 15:10 | 14 | | | 8.6 | | | 5 | | | | | | | | | | | | 16 | | | | | | < 1 | | | | | | | | |
| 109-SB-C | 5-7 | 6/11/2013 | 10:20 | 18 | | | 8.0 | | | 3 | | | | | | | | | | | | 11 | | | | | | < 1 | | | | | | | | |

**NOTES:**

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|---|---|
| 2.5 | **Exceeds Direct Contact Commercial RSL** |
| 3.1 | **Exceeds MDEQ Leaching to Groundwater Screening Level** |
| <0.53 | **Non-Detect Result that Exceeds an Associated Screening Level** |

**(1) - Compared to http://deq.mt.gov/StateSuperfund/background.mcpx**
**(2) - EPA RSL Version used for screening level development: January 2015**
**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| et od | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| raction | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s ommercial u sur ace | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-SB-A | 4-4.8 | 5/17/2013 | 11:10 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 1-SB-B | 8-11 | 8/8/2013 | 13:10 | < 0.12 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.20 | | D | 6.0 | J | | < 2.4 | | | 4.4 | J | | 22 | J | |
| 1-SB-C | 11-15 | 8/8/2013 | 13:15 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.3 | J | | < 2.3 | | | < 2.3 | J | | < 2.3 | J | |
| 2-SB-A | 2-4 | 5/17/2013 | 12:00 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 2-SB-B | 8-11.5 | 8/8/2013 | 11:20 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.12 | | | < 2.3 | J | | < 2.3 | | | < 2.3 | J | | < 2.3 | J | |
| 2-SB-C | 11.5-15.5 | 8/8/2013 | 11:30 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | J | | < 2.3 | | | < 2.3 | J | | < 2.3 | J | |
| 3-SB-A | 4-5.4 | 5/17/2013 | 13:35 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 3-SB-B | 7.5-8.0 | 8/8/2013 | 10:00 | < 0.13 | | | < 0.066 | | | < 0.066 | | | < 0.066 | | | < 0.066 | | | < 0.066 | | | < 0.066 | | | < 0.13 | | | < 2.6 | J | | < 2.6 | | | < 2.6 | J | | 2.2 | J | J |
| 3-SB-C | 8.0-11.5 | 8/8/2013 | 10:30 | < 0.58 | | D | < 0.29 | | D | 0.37 | | | 7.2 | | * | 1.2 | | | 1.2 | | | 2.4 | | | < 6.5 | | D | 349 | J | * | 212 | | * | 505 | J | * | 1270 | J | * |
| 4-SB-A | 6-8 | 5/7/2013 | 11:20 | < 2.6 | | D | 6.4 | J | * | < 5.0 | | D | 105 | J | * | 12 | J | | < 10 | | D | 12 | J | | 56 | J | * | 1800 | J | * | 1870 | J | * | 2320 | J | * | 6460 | J | * |
| 4-SB-B | 8-10.5 | 6/6/2013 | 10:20 | < 2.7 | | D | 1.7 | | * | < 2.0 | | D | 36 | | * | 5.5 | | | 4.4 | | | 9.9 | | | 42 | | * | 1420 | J | * | 464 | | * | 1610 | J | * | 4330 | J | * |
| 5-SB-A | 6-8 | 5/7/2013 | 10:00 | < 2.6 | | D | 3.2 | | * | < 2.0 | | D | 32 | | * | 14 | | | 7.9 | | | 22 | | | 23 | | * | 1380 | | * | 602 | | * | 1850 | | * | 4340 | | * |
| 5-SB-B | 8-12 | 6/6/2013 | 9:00 | < 3.0 | | D | 2.5 | | * | 4.0 | | | 56 | | * | 51 | | | 8.8 | | | 60 | | | 39 | | * | 1210 | J | * | 1160 | | * | 1050 | J | * | 3410 | J | * |
| 5-SB-C | 12-15 | 6/6/2013 | 9:15 | < 2.8 | | D | 4.3 | | * | 1.5 | | | 18 | | * | 11 | | | 2.8 | | | 13 | | | 12 | | * | 541 | J | * | 456 | | * | 565 | J | * | 1730 | J | * |
| 6-SB-A | 4-6 | 5/9/2013 | 12:00 | < 2.6 | | D | 1.8 | | * | < 1.5 | | D | 14 | | * | 16 | | | 3.6 | | | 20 | | | 6.3 | | * | 558 | | * | 398 | | * | 1490 | | * | 2010 | | * |
| 6-SB-B | 8-12 | 8/2/2013 | 10:50 | < 11 | | D | 17 | | * | 9.4 | | | 170 | | * | 116 | | | 15 | | | 132 | | * | 84 | | * | 3640 | | * | 4570 | J | * | 7870 | J | * | 15700 | | * |
| 6-SB-C | 12-16 | 8/2/2013 | 11:10 | < 2.8 | | D | < 1.4 | | D | < 1.4 | | D | 26 | | * | 11 | | | 3.5 | | | 14 | | | 15 | | * | 738 | | * | 971 | J | * | 1650 | J | * | 3290 | | * |
| 6-SB-CD | 12-16 | 8/2/2013 | 11:15 | < 2.8 | | D | < 1.4 | | D | < 1.4 | | D | 20 | | * | 8.2 | | | 2.8 | | | 11 | | | 13 | | * | 645 | | * | 513 | J | * | 761 | J | * | 2210 | | * |
| 7-SB-A | 6-8 | 5/6/2013 | 14:20 | < 3.0 | | D | < 1.5 | | D | < 1.5 | | D | 22 | | * | < 1.5 | | D | < 5.0 | | D | < 5.0 | | D | < 9.5 | | D | 763 | | * | 344 | | * | 2160 | | * | 2620 | | * |
| 7-SB-B | 8-9.5 | 5/6/2013 | 14:30 | < 3.3 | | D | < 1.6 | | D | < 1.6 | | D | 18 | | * | < 1.6 | | D | < 2.0 | | D | < 2.0 | | D | < 8.0 | | D | 544 | | * | 375 | | * | 1470 | | * | 2050 | | * |
| 7-SB-C | 12-14 | 6/6/2013 | 14:30 | < 3.1 | | D | 3.7 | | * | < 1.6 | | D | 14 | | * | 2.3 | | | 2.2 | | | 4.5 | | | 8.7 | | * | 468 | J | * | 258 | | * | 526 | J | * | 1530 | J | * |
| 8-SB-A | 2-4 | 5/6/2013 | 15:30 | < 5.0 | | D | 11 | J | * | < 5.0 | | D | 103 | J | * | 54 | J | | 14 | J | | 68 | J | | < 57 | | D | 2730 | J | * | 3260 | J | * | 7710 | J | * | 12100 | J | * |
| 8-SB-B | 7.8-8.8 | 7/11/2013 | 13:45 | < 2.2 | | D | 2.1 | | * | < 1.1 | | D | < 9.0 | | D | 2.8 | | | < 2.2 | | D | 2.8 | | | < 6.0 | | D | 423 | | * | 317 | | * | 495 | | * | 1450 | | * |
| 8-SB-C | 8.8-15 | 7/31/2013 | 11:10 | < 0.50 | | D | 0.87 | | * | 0.32 | | | 5.0 | | | 1.2 | | | 0.81 | | | 2.0 | | | 3.9 | | | 166 | | * | 213 | J | * | 284 | | * | 679 | | * |
| 9-SB-A | 2-4 | 5/16/2013 | 14:30 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 9-SB-B | 8-9 | 7/11/2013 | 12:23 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 9-SB-C | 8-11 | 8/1/2013 | 10:00 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | J | | < 2.2 | | | < 2.2 | | |
| 10-SB-A | 4-6 | 4/24/2013 | 11:40 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 10-SB-B | 8-12 | 7/30/2013 | 15:25 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.3 | | | < 2.3 | J | | < 2.3 | | | < 2.3 | | |
| 10-SB-C | 12-16 | 7/30/2013 | 16:20 | < 0.12 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.12 | | | < 2.5 | | | < 2.5 | J | | < 2.5 | | | < 2.5 | | |
| 11-SB-A | 4-6 | 5/16/2013 | 15:10 | < 2.9 | | D | < 1.5 | | D | < 1.5 | | D | < 12 | | D | 6.0 | | | 4.6 | | | 11 | | | < 21 | | D | 1200 | | * | 387 | | * | 1870 | | * | 3920 | | * |
| 11-SB-B | 8-10 | 6/27/2013 | 8:50 | < 0.53 | | D | < 0.27 | | D | < 0.27 | | D | < 6.4 | | D | < 0.27 | | D | < 1.6 | | D | < 1.6 | | D | < 4.0 | | D | 259 | | * | 141 | J | * | 441 | | * | 920 | | * |
| 12-SB-A | 2-4 | 5/7/2013 | 14:40 | < 2.2 | | D | < 1.1 | | D | < 1.1 | | D | < 30 | | D | < 1.1 | | D | < 5.0 | | D | < 5.0 | | D | < 11 | | D | 671 | | * | 459 | | * | 1170 | | * | 2280 | | * |
| 12-SB-B | 8-9 | 7/11/2013 | 9:50 | < 2.3 | | D | < 1.2 | | D | < 1.2 | | D | < 29 | | D | < 4.0 | | D | < 6.0 | | D | < 6.0 | | D | 7.7 | J | * | 869 | J | * | 923 | J | * | 1560 | J | * | 3220 | J | * |
| 12-SB-C | 12-15 | 7/31/2013 | 7:30 | < 1.2 | | D | < 0.29 | | D | < 0.60 | | D | < 17 | | D | < 0.29 | | D | < 3.5 | | D | < 3.5 | | D | < 4.6 | | D | 384 | J | * | 787 | J | * | 832 | J | * | 1740 | J | * |
| 13-SB-A | 6-6.6 | 5/7/2013 | 13:05 | < 6.4 | | D | 15 | | * | < 10 | | D | 71 | | * | 97 | | | 19 | | | 115 | | * | 29 | | * | 2120 | | * | 1900 | | * | 2900 | | * | 7060 | | * |
| 13-SB-B | 8-11.5 | 7/31/2013 | 8:20 | < 2.5 | | D | 18 | J | * | 5.6 | J | | 63 | J | * | 73 | J | | 8.8 | J | | 82 | J | * | 32 | J | * | 1360 | J | * | 1690 | J | * | 2110 | J | * | 5170 | J | * |
| 13-SB-C | 11.5-14.5 | 7/31/2013 | 8:30 | < 2.4 | | D | 7.0 | | * | 2.8 | | | 29 | | * | 31 | | | 4.3 | | | 35 | | | 16 | | * | 713 | | * | 821 | J | * | 1050 | | * | 2650 | | * |
| 14-SB-A | 6-8 | 4/29/2013 | 11:55 | < 2.7 | | D | 2.2 | | * | < 2.0 | | D | 36 | | * | 21 | | | 3.9 | | | 25 | | | 27 | | * | 952 | | * | 614 | | * | 2090 | | * | 3420 | | * |
| 14-SB-B | 6-12 | 6/6/2013 | 12:15 | < 2.6 | | D | 1.2 | | J* | 1.2 | | J | 16 | | * | 12 | | | 2.5 | | | 15 | | | 27 | | * | 731 | J | * | 291 | | * | 624 | J | * | 2150 | J | * |
| 14-SB-C | 12-15 | 6/6/2013 | 12:30 | < 1.0 | | D | 1.7 | | * | 0.82 | | | 13 | | * | 6.8 | | | 1.5 | | | 8.3 | | | 10 | | * | 336 | J | * | 215 | | * | 340 | J | * | 1060 | J | * |
| 15-SB-A | 4-6 | 5/8/2013 | 15:45 | < 4.4 | | D | 3.5 | J | * | < 5.0 | | D | 56 | J | * | 164 | J | | 9.9 | J | | 174 | J | * | 90 | J | * | 2820 | J | * | 1120 | J | * | 2890 | J | * | 8890 | J | * |
| 15-SB-AD | 4-6 | 5/8/2013 | 15:47 | < 4.3 | | D | 3.9 | | * | < 5.0 | | D | 58 | | * | 173 | | | 10 | | | 183 | | * | 92 | | * | 2960 | | * | 1200 | | * | 2920 | | * | 9210 | | * |
| 15-SB-B | 7.8-8.8 | 7/12/2013 | 10:25 | < 2.4 | | D | < 1.2 | | D | < 1.2 | | D | 6.4 | | | 2.6 | | | < 1.2 | | D | 2.6 | | | < 12 | | D | 409 | | * | 143 | | * | 389 | | * | 1440 | | * |
| 15-SB-C | 8-14 | 8/2/2013 | 11:40 | < 3.1 | | D | 11 | | * | 1.8 | | | 46 | | * | 44 | | | 4.1 | | | 48 | | | 35 | | * | 1320 | | * | 1050 | J | * | 1410 | J | * | 4690 | | * |
| 16-SB-A | 4-6 | 5/9/2013 | 16:15 | < 2.5 | | D | 3.8 | | * | 2.3 | | | 17 | | * | 26 | | | 9.7 | | | 36 | | | 5.4 | | * | 459 | | * | 530 | | * | 1390 | | * | 1720 | | * |
| 16-SB-B | 8-9.5 | 5/9/2013 | 16:55 | < 1.3 | | D | 4.7 | | * | 2.4 | | | 31 | | * | 44 | | | 4.9 | | | 49 | | | 15 | | * | 626 | | * | 648 | | * | 1510 | | * | 2280 | | * |
| 16-SB-C | 8-13 | 8/2/2013 | 12:25 | < 5.8 | | D | 50 | | * | 13 | | * | 184 | | * | 357 | | | 25 | | | 382 | | * | 93 | | * | 4040 | | * | 4140 | J | * | 4600 | J | * | 13900 | | * |
| 17-SB-A | 4-6 | 5/10/2013 | 12:00 | < 1.3 | | D | < 0.66 | | D | < 0.66 | | D | < 15 | | D | < 0.66 | | D | < 2.5 | | D | < 2.5 | | D | < 26 | | D | 1380 | | * | 441 | | * | 3850 | | * | 5380 | | * |
| 17-SB-B | 6-8 | 5/10/2013 | 12:50 | < 13 | | D | 22 | | * | 10 | | * | 140 | | * | 156 | | | 20 | | | 176 | | * | 72 | | * | 3570 | | * | 3800 | | * | 9180 | | * | 14800 | | * |
| 17-SB-C | 8-9.2 | 5/10/2013 | 13:33 | < 25 | | D | 37 | | * | 16 | | * | 166 | | * | 153 | | | 25 | | | 178 | | * | 87 | | * | 4540 | | * | 5560 | | * | 12100 | | * | 19600 | | * |
| 18-SB-A | 2-4 | 5/8/2013 | 11:33 | < 4.9 | | D | < 2.5 | | D | < 4.0 | | D | < 60 | | D | 35 | | | 22 | | | 57 | | | 24 | | * | 1880 | | * | 1720 | | * | 3050 | | * | 6190 | | * |
| 18-SB-B | 7.7-8.5 | 7/12/2013 | 11:15 | < 6.3 | | D | 5.7 | J | * | < 5.0 | | D | < 60 | | D | 30 | J | | 17 | J | | 48 | J | | < 22 | | D | 1520 | J | * | 2040 | J | * | 2070 | J | * | 5110 | J | * |
| 18-SB-C | 8-11.5 | 8/2/2013 | 13:10 | < 2.3 | | D | 4.5 | | * | 3.0 | | | 56 | | * | 29 | | | 16 | | | 45 | | | 9.1 | | * | 1330 | | * | 1910 | J | * | 2140 | J | * | 5030 | | * |
| 18-SB-CD | 8-11.5 | 8/2/2013 | 13:15 | < 3.2 | | D | 6.4 | | * | 3.6 | | | 76 | | * | 39 | | | 21 | | | 59 | | | 12 | | * | 1750 | | * | 2520 | J | * | 2700 | J | * | 6520 | | * |
| 19-SB-A | 4-4.8 | 5/2/2013 | 12:30 | < 2.9 | | D | < 1.4 | | D | < 1.4 | | D | < 20 | | D | < 2.0 | | D | < 10 | | D | < 10 | | D | < 12 | | D | 1260 | | * | 386 | | * | 3580 | | * | 4220 | | * |
| 19-SB-B | 6.5-8.0 | 8/9/2013 | 9:55 | < 4.0 | | D | < 3.0 | | D | 2.5 | | | 82 | | * | 11 | | | 14 | | | 25 | | | < 22 | | D | 1810 | J | * | 3010 | | * | 3090 | J | * | 7910 | J | * |
| 19-SB-C | 8.0-15.5 | 8/9/2013 | 10:55 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.20 | | D | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | 7.2 | J | | 3.7 | | | 5.1 | J | | 19 | J | |
| 20-SB-A | 4-6 | 4/24/2013 | 9:50 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 20-SB-B | 6-8 | 4/24/2013 | 10:00 | < 0.12 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.12 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| 20-SB-C | 9-15 | 8/1/2013 | 9:00 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | J | | < 2.4 | | | < 2.4 | | |
| 21-SB-A | 4-6 | 5/13/2013 | 11:00 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 21-SB-B | 7-8 | 6/11/2013 | 10:10 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 21-SB-C | 8-11.5 | 6/27/2013 | 11:00 | < 0.56 | | D | < 0.28 | | D | < 0.60 | | D | < 10 | | D | < 0.28 | | D | < 3.0 | | D | < 3.0 | | D | < 0.56 | | | 536 | | * | 166 | J | * | 888 | | * | 1770 | | * |
| 22-SB-A | 6-8 | 5/16/2013 | 11:32 | < 3.0 | | D | < 1.5 | | D | < 1.5 | | D | < 18 | | D | < 1.5 | | D | 6.4 | | | 6.4 | | | < 21 | | D | 1360 | | * | 455 | | * | 2310 | | * | 4660 | | * |

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| et od | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 22-SB-B | 8-10 | 5/16/2013 | 11:58 | < 3.1 | | D | < 2.0 | | D | < 1.5 | | D | < 25 | | D | < 1.5 | | D | 8.6 | J | | 8.6 | J | | < 18 | | D | 1330 | J | * | 1210 | J | * | 2370 | J | * | 5080 | J | * |
| 22-SB-C | 10-10.5 | 5/16/2013 | 12:20 | < 6.3 | | D | < 3.0 | | D | < 1.6 | | D | < 29 | | D | < 1.6 | | D | 10 | J | | 10 | J | | < 25 | | D | 1540 | J | * | 1940 | J | * | 2780 | J | * | 6300 | J | * |
| 23-SB-A | 6-8 | 5/16/2013 | 11:50 | < 3.0 | | D | 5.6 | J | * | < 3.0 | | D | 61 | J | D | 6.0 | J | | 14 | J | | 20 | J | | 43 | J | * | 2460 | J | * | 2090 | J | * | 4170 | J | * | 9300 | J | * |
| 23-SB-B | 8-10 | 5/16/2013 | 12:20 | < 3.3 | | D | 5.2 | | * | < 3.0 | | D | 58 | | D | 6.1 | | | 13 | | | 19 | | | 39 | | * | 2210 | | * | 2120 | | * | 3670 | | * | 8400 | | * |
| 23-SB-C | 10.5-11.5 | 5/16/2013 | 13:00 | < 2.4 | | D | 1.5 | J | * | < 1.2 | | D | < 22 | | D | 1.6 | J | | 4.9 | J | | 6.5 | J | | 11 | J | * | 711 | J | * | 991 | J | * | 1390 | J | * | 2680 | J | * |
| 25-SB-A | 2-4 | 4/29/2013 | 15:30 | < 2.8 | | D | < 1.5 | | D | 2.8 | | | 9.7 | | * | 16 | | | 7.2 | | | 23 | | | < 5.6 | | D | 474 | | * | 329 | | * | 1140 | | * | 1890 | | * |
| 25-SB-AD | 2-4 | 4/29/2013 | 15:32 | < 2.8 | | D | < 2.0 | | D | 3.1 | | | 9.9 | | * | 17 | | | 7.2 | | | 24 | | | < 5.6 | | D | 465 | | * | 374 | | * | 1120 | | * | 1890 | | * |
| 25-SB-B | 7-8 | 8/8/2013 | 9:15 | < 0.46 | | D | 0.93 | | * | < 0.60 | | D | < 16 | | D | < 5.0 | | D | < 2.0 | | D | < 7.0 | | D | < 14 | | D | 566 | J | * | 271 | | * | 920 | J | * | 2190 | J | * |
| 25-SB-C | 8-11.5 | 7/31/2013 | 9:20 | < 0.56 | | D | < 0.28 | | D | < 0.35 | | D | < 2.2 | | D | < 0.56 | | D | < 0.56 | | D | < 0.56 | | D | < 5.6 | | D | 232 | | * | 103 | J | * | 357 | | * | 955 | | * |
| 26-SB-A | 6-8 | 4/30/2013 | 12:25 | < 3.1 | | D | 3.7 | | * | < 2.0 | | D | 42 | | * | 44 | | | < 10 | | D | 44 | | | 25 | | * | 1740 | | * | 803 | | * | 4380 | | * | 6080 | | * |
| 26-SB-B | 8.1-11 | 7/31/2013 | 12:10 | < 3.8 | | D | 9.5 | J | * | 5.8 | J | | 83 | J | * | 106 | J | | 15 | J | | 121 | J | * | 68 | J | * | 2990 | J | * | 2440 | J | * | 5030 | J | * | 11500 | J | * |
| 26-SB-C | 11-14.5 | 7/31/2013 | 12:30 | < 2.3 | | D | 11 | | * | 2.0 | | | 22 | | * | 19 | | | 3.9 | | | 23 | | | 17 | | * | 792 | | * | 793 | J | * | 1230 | | * | 3240 | | * |
| 27-SB-A | 6-7 | 4/30/2013 | 10:10 | < 5.1 | | D | 3.3 | | * | < 2.0 | | D | 40 | | * | 9.9 | | | < 10 | | D | 9.9 | | | 22 | | * | 1090 | | * | 888 | | * | 2610 | | * | 4110 | | * |
| 27-SB-B | 7.5-8.5 | 7/9/2013 | 14:33 | < 5.8 | | D | 3.8 | | * | < 2.9 | | D | < 29 | | D | 6.0 | | | < 6.0 | | D | 6.0 | | | < 19 | | D | 1020 | | * | 771 | | * | 1220 | | * | 3850 | | * |
| 27-SB-C | 8-13 | 7/31/2013 | 13:10 | < 3.8 | | D | 7.6 | J | * | < 3.2 | | D | 48 | J | * | 9.4 | J | | 8.1 | J | | 17 | J | | 26 | J | * | 1240 | J | * | 1670 | J | * | 2170 | J | * | 5180 | J | * |
| 28-SB-A | 6-7.3 | 4/30/2013 | 15:00 | < 1.5 | | D | 2.5 | J | * | < 1.5 | | D | 24 | J | * | 23 | J | | 4.7 | J | | 27 | J | | 13 | J | * | 750 | J | * | 663 | J | * | 1780 | J | * | 2820 | J | * |
| 28-SB-B | 7.3-8.5 | 7/9/2013 | 15:30 | < 3.0 | | D | < 1.5 | | D | < 1.5 | | D | < 17 | | D | 19 | | | < 5.0 | | D | 19 | | | < 7.0 | | D | 560 | | * | 539 | | * | 651 | | * | 1980 | | * |
| 28-SB-C | 8-11.5 | 7/31/2013 | 13:55 | < 2.3 | | D | 1.9 | J | * | < 1.2 | | D | 17 | J | * | 9.1 | J | | 6.0 | J | | 15 | J | | 5.7 | J | * | 433 | J | * | 994 | J | * | 836 | J | * | 2010 | J | * |
| 29-SB-A | 6-6.7 | 5/1/2013 | 15:20 | < 0.13 | | | < 0.063 | | | < 0.063 | | | < 4.0 | | D | 0.40 | | | 0.85 | | | 1.3 | | | 0.82 | | | 116 | | * | 85 | | * | 317 | | * | 476 | | * |
| 29-SB-B | 6.7-8 | 6/11/2013 | 12:15 | < 0.60 | | D | < 0.30 | | D | < 0.30 | | D | < 2.4 | | D | < 0.30 | | D | < 0.50 | | D | < 0.50 | | D | < 0.84 | | D | 64 | | | 46 | | | 84 | | | 213 | | * |
| 29-SB-C | 8-11.5 | 6/28/2013 | 12:30 | < 0.24 | | D | < 0.12 | | D | < 0.12 | | D | < 1.2 | | D | < 0.12 | | D | < 0.42 | | D | < 0.42 | | D | < 0.61 | | D | 55 | | | 25 | | | 84 | | | 170 | | * |
| 30-SB-A | 4-6 | 5/1/2013 | 10:00 | < 13 | | D | < 6.4 | | D | 6.6 | | | < 38 | | D | 65 | | | 31 | | | 96 | | * | < 38 | | D | 3750 | | * | 2070 | | * | 6760 | | * | 11600 | | * |
| 30-SB-B | 8-9.9 | 5/1/2013 | 10:50 | < 3.2 | | D | < 1.6 | | D | < 1.6 | | D | < 12 | | D | 3.3 | | | 4.5 | | | 7.8 | | | < 13 | | D | 1110 | | * | 581 | | * | 2160 | | * | 3780 | | * |
| 30-SB-C | 9.9-15 | 8/1/2013 | 8:00 | < 0.23 | | D | < 0.11 | | D | < 0.11 | | D | < 2.3 | | D | < 0.30 | | D | < 0.57 | | D | < 0.57 | | D | < 2.3 | | D | 110 | | * | 93 | J | * | 220 | | * | 455 | | * |
| 31-SB-A | 6-7.5 | 5/2/2013 | 11:50 | < 3.1 | | D | < 1.5 | | D | < 1.5 | | D | < 15 | | D | < 1.5 | | D | < 5.0 | | D | < 5.0 | | D | < 37 | | D | 1810 | | * | 185 | | * | 4820 | | * | 6530 | | * |
| 31-SB-B | 5.5-7 | 8/7/2013 | 9:40 | < 0.61 | | D | < 0.30 | | D | < 0.30 | | D | 9.2 | | * | < 0.30 | | D | 2.6 | | | 2.6 | | | 10 | | * | 662 | J | * | 127 | | * | 961 | J | * | 1950 | J | * |
| 31-SB-C | 8-11.5 | 6/28/2013 | 10:00 | < 0.23 | | D | < 0.11 | | D | < 0.11 | | D | < 1.1 | | D | < 0.11 | | D | < 0.40 | | D | < 0.40 | | D | < 4.0 | | D | 186 | | * | 17 | | | 281 | | * | 650 | | * |
| 32-SB-A | 2-4 | 5/2/2013 | 9:30 | < 2.9 | | D | < 1.4 | | D | < 1.4 | | D | < 1.4 | | D | < 1.4 | | D | < 1.4 | | D | < 1.4 | | D | < 6.0 | | D | 173 | | * | < 58 | | D | 363 | | * | 768 | | * |
| 32-SB-B | 5-7.5 | 6/6/2013 | 16:25 | < 0.67 | | D | < 0.33 | | D | < 0.33 | | D | < 0.33 | | D | < 0.33 | | D | < 0.50 | | D | < 0.50 | | D | < 0.67 | | D | 96 | J | | 34 | | | 139 | J | * | 308 | J | * |
| 32-SB-BD | 5-7.5 | 6/6/2013 | 16:30 | < 0.26 | | | < 0.13 | | | < 0.13 | | | < 0.13 | | | < 0.13 | | | < 0.13 | | | < 0.13 | | | < 0.26 | | | 12 | J | | < 5.2 | | | 9.1 | J | | 32 | J | |
| 32-SB-C | 8-12 | 6/6/2013 | 16:00 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | 2.5 | J | | < 2.4 | | | 0.76 | J | J | 6.6 | J | |
| 33-SB-A | 4-6 | 5/2/2013 | 13:55 | < 3.3 | | D | < 1.7 | | D | < 1.7 | | D | < 20 | | D | 4.7 | | | < 5.0 | | D | 4.7 | | | < 19 | | D | 1020 | | * | 616 | | * | 2560 | | * | 4140 | | * |
| 33-SB-B | 8-9 | 5/2/2013 | 14:30 | < 3.1 | | D | < 1.5 | | D | < 1.5 | | D | < 10 | | D | < 1.5 | | D | < 2.0 | | D | < 2.0 | | D | < 12 | | D | 601 | | * | 148 | | * | 1440 | | * | 2350 | | * |
| 33-SB-C | 12-16 | 6/6/2013 | 17:35 | < 1.2 | | D | < 0.59 | | D | < 0.59 | | D | < 0.59 | | D | < 0.59 | | D | < 0.50 | | D | < 0.50 | | D | < 5.0 | | D | 131 | J | * | 38 | | | 132 | J | * | 459 | J | * |
| 34-SB-A | 6-8 | 6/10/2013 | 12:45 | < 1.2 | | D | < 0.61 | | D | < 0.61 | | D | 77 | | * | < 4.0 | | D | 14 | | | 14 | | | 21 | | * | 1420 | | * | 1330 | | * | 2030 | | * | 4250 | | * |
| 34-SB-AD | 6-8 | 6/10/2013 | 12:50 | < 1.2 | | D | < 0.61 | | D | < 1.2 | | D | 53 | | * | < 0.61 | | D | 9.7 | | | 9.7 | | | 28 | | * | 1400 | | * | 996 | | * | 2380 | | * | 4520 | | * |
| 34-SB-B | 8-11.5 | 6/28/2013 | 11:10 | < 0.25 | | D | < 0.12 | | D | < 0.31 | | D | < 12 | | D | < 0.12 | | D | < 2.5 | | D | < 2.5 | | D | < 5.7 | | D | 411 | | * | 229 | | * | 726 | | * | 1340 | | * |
| 34-SB-C | 11.5-15 | 6/28/2013 | 11:20 | < 0.23 | | D | < 0.12 | | D | < 0.12 | | D | < 0.30 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.23 | | D | 15 | | | 7.2 | | | 25 | | | 47 | | |
| 35-SB-A | 4-6 | 5/6/2013 | 11:20 | < 2.9 | | D | < 1.4 | | D | < 1.4 | | D | < 10 | | D | < 1.4 | | D | < 2.0 | | D | < 2.0 | | D | < 8.0 | | D | 514 | | * | 140 | | * | 1450 | | * | 1920 | | * |
| 35-SB-B | 8.5-11 | 6/7/2013 | 9:10 | < 3.0 | | D | < 1.5 | | D | < 1.5 | | D | < 1.5 | | D | < 1.5 | | D | < 5.0 | | D | < 5.0 | | D | < 10 | | D | 866 | J | * | 553 | | * | 1060 | J | * | 2690 | J | * |
| 35-SB-C | 15-20 | 6/7/2013 | 9:25 | < 0.23 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.23 | | D | 6.7 | J | | 3.9 | | J | 7.6 | J | | 19 | J | |
| 36-SB-A | 2-4 | 5/13/2013 | 12:15 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 36-SB-B | 6-8 | 5/13/2013 | 12:30 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 36-SB-C | 8-10 | 5/13/2013 | 13:00 | < 0.13 | | | < 0.065 | | | < 0.065 | | | < 0.065 | | | < 0.065 | | | < 0.065 | | | < 0.065 | | | < 0.13 | | | < 2.6 | | | < 2.6 | | | < 2.6 | | | < 2.6 | | |
| 37-SB-A | 2-4 | 5/13/2013 | 15:00 | < 0.12 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.12 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| 37-SB-B | 8-11.5 | 6/27/2013 | 11:35 | < 0.55 | | D | < 0.28 | | D | < 0.28 | | D | < 15 | | D | < 0.28 | | D | < 4.4 | | D | < 4.4 | | D | < 2.2 | | D | 288 | | * | 467 | J | * | 559 | | * | 1150 | | * |
| 37-SB-C | 11.5-15.5 | 6/27/2013 | 12:25 | < 0.58 | | D | < 0.29 | | D | < 0.29 | | D | < 3.5 | | D | < 0.29 | | D | < 0.92 | | D | < 0.92 | | D | < 1.2 | | D | 125 | | * | 71 | J | * | 217 | | * | 428 | | * |
| 37-SB-CD | 11.5-15.5 | 6/27/2013 | 12:30 | < 0.57 | | D | < 0.28 | | D | < 0.28 | | D | < 2.6 | | D | < 0.28 | | D | < 0.74 | | D | < 0.74 | | D | < 1.5 | | D | 100 | | * | 41 | J | | 138 | | * | 301 | | * |
| 38-SB-A | 2-4 | 5/16/2013 | 9:10 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | 2.5 | | |
| 38-SB-B | 6-8 | 6/7/2013 | 13:50 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.12 | | | < 2.3 | J | | < 2.3 | | | < 2.3 | J | | 6.8 | J | |
| 38-SB-C | 8-10 | 6/27/2013 | 10:10 | < 0.56 | | D | < 0.28 | | D | < 0.28 | | D | < 16 | | D | < 0.28 | | D | < 4.0 | | D | < 4.0 | | D | < 6.0 | | D | 549 | | * | 342 | J | * | 883 | | * | 1840 | | * |
| 39-SB-A | 2-4 | 4/26/2013 | 15:20 | < 2.7 | | D | < 1.3 | | D | < 1.3 | | D | < 40 | | D | < 1.3 | | D | 18 | | | 18 | | | 26 | | * | 2690 | | * | 169 | | * | 6890 | | * | 7710 | | * |
| 39-SB-B | 8-11.5 | 6/27/2013 | 14:15 | < 16 | | D | < 8.0 | | | < 8.0 | | | < 400 | | D | 131 | | | 215 | | | 346 | | * | 259 | | * | 23600 | | * | 3830 | J | * | 33900 | | * | 57400 | | * |
| 39-SB-C | 11.5-15.5 | 6/27/2013 | 13:35 | < 1.1 | | D | 1.1 | | * | < 1.1 | | D | < 44 | | D | 19 | | | 23 | | | 42 | | | 40 | | * | 2910 | | * | 667 | J | * | 4570 | | * | 7920 | | * |
| 40-SB-A | 6-7.5 | 4/29/2013 | 15:15 | < 2.9 | | D | < 1.5 | | D | < 1.5 | | D | < 8.0 | | D | < 1.5 | | D | < 2.5 | | D | < 2.5 | | D | < 5.9 | | D | 1300 | | * | 143 | | * | 3300 | | * | 4990 | | * |
| 40-SB-B | 8-11.5 | 6/28/2013 | 7:15 | < 2.2 | | D | < 1.1 | | D | < 1.1 | | D | < 15 | | D | < 1.1 | | D | < 3.8 | | D | < 3.8 | | D | < 33 | | D | 1790 | | * | 198 | | * | 2810 | | * | 5780 | | * |
| 40-SB-C | 11.5-19.5 | 6/28/2013 | 8:05 | < 0.24 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.24 | | D | 9.2 | | | < 4.7 | | D | 14 | | | 33 | | |
| 41-SB-A | 6-6.6 | 4/30/2013 | 13:40 | < 1.4 | | D | 2.7 | J | * | < 2.0 | | D | 65 | J | * | 17 | J | | 12 | J | | 29 | J | | 65 | J | * | 2820 | J | * | 1250 | J | * | 7280 | J | * | 10900 | J | * |
| 41-SB-B | 8-9.2 | 7/10/2013 | 14:00 | < 2.3 | | D | 2.5 | | * | < 1.1 | | D | < 12 | | D | 3.2 | | | < 2.2 | | D | 3.2 | | | < 17 | | D | 826 | | * | 253 | | * | 1110 | | * | 3090 | | * |
| 41-SB-C | 12-16 | 8/1/2013 | 15:55 | < 2.4 | | D | < 1.2 | | D | < 1.2 | | D | < 4.8 | | D | < 1.2 | | D | < 1.2 | | D | < 1.2 | | D | < 13 | | D | 546 | | * | 98 | J | * | 727 | | * | 2020 | | * |
| 41-SB-CD | 12-16 | 8/1/2013 | 15:59 | < 2.3 | | D | 1.5 | | * | < 1.2 | | D | < 14 | | D | < 3.5 | | D | < 3.5 | | D | < 3.5 | | D | < 17 | | D | 795 | | * | 319 | J | * | 959 | | * | 2810 | | * |
| 42-SB-A | 6-7 | 4/30/2013 | 10:25 | < 3.2 | | D | < 1.6 | | D | < 1.6 | | D | < 2.0 | | D | < 1.6 | | D | < 1.6 | | D | < 1.6 | | D | < 6.3 | | D | 315 | | * | < 63 | | | 673 | | * | 1140 | | * |
| 42-SB-B | 7.2-82 | 7/10/2013 | 10:55 | < 6.2 | | D | < 3.1 | | D | < 3.1 | | D | < 32 | | D | < 4.0 | | D | < 8.0 | | D | < 8.0 | | D | < 62 | | D | 2950 | | * | 611 | | * | 4180 | | * | 10900 | | * |
| 42-SB-C | 8-11.5 | 7/31/2013 | 15:15 | < 2.5 | | D | < 1.2 | | D | < 1.2 | | D | < 8.6 | | D | < 1.2 | | D | < 2.5 | | D | < 2.5 | | D | < 21 | | D | 930 | | * | 211 | J | * | 1560 | | * | 3500 | | * |
| 43-SB-A | 2-4 | 4/30/2013 | 14:45 | < 3.0 | | D | < 2.0 | | D | < 2.0 | | D | < 40 | | D | < 5.0 | | D | < 10 | | D | < 15 | | D | 17 | | * | 1280 | | * | 844 | | * | 3430 | | * | 4600 | | * |
| 43-SB-B | 6-8 | 7/10/2013 | 11:22 | < 2.3 | | D | < 1.1 | | D | < 1.1 | | D | < 18 | | D | < 2.0 | | D | < 5.0 | | D | < 5.0 | | D | < 10 | | D | 905 | | * | 294 | | * | 1360 | | * | 2820 | | * |
| 43-SB-C | 8.3-11.5 | 7/31/2013 | 14:40 | < 1.1 | | D | < 0.56 | | D | < 0.56 | | D | < 11 | | D | < 0.56 | | D | < 2.8 | | D | < 2.8 | | D | < 6.7 | | D | 506 | | * | 240 | J | * | 908 | | * | 1720 | | * |

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| 44-SB-A | 2-4 | 5/1/2013 | 13:25 | < 0.13 | | | < 0.065 | | | < 0.065 | | | < 0.26 | | D | < 0.065 | | | < 0.13 | | D | < 0.13 | | D | < 0.13 | | | 17 | | | < 2.6 | | | 26 | | | 37 | | |
| 44-SB-B | 2-4 | 5/1/2013 | 12:25 | < 13 | | D | < 6.4 | | D | < 6.4 | | D | < 38 | | D | < 6.4 | | D | < 13 | | D | < 13 | | D | < 38 | | D | 2910 | | * | 1870 | | * | 4680 | | * | 9230 | | * |
| 44-SB-C | 4-6 | 5/1/2013 | 12:30 | < 0.60 | | D | < 0.30 | | D | < 0.30 | | D | < 3.0 | | D | 0.61 | | | 0.82 | | | 1.4 | | | < 2.4 | | D | 202 | | * | 142 | | * | 424 | | * | 763 | | * |
| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | < 13 | | D | < 6.4 | | D | < 6.4 | | D | < 50 | | D | 45 | | | 15 | | | 60 | | | < 50 | | D | 3890 | | * | 2940 | | * | 6940 | | * | 13300 | | * |
| 45-SB-B | 4-4.9 | 5/1/2013 | 11:35 | < 0.65 | | D | < 0.32 | | D | < 0.32 | | D | < 6.5 | | D | 2.7 | | | 1.6 | | | 4.3 | | | < 3.9 | | D | 396 | | * | 287 | | * | 973 | | * | 1690 | | * |
| 45-SB-C | 8-11.5 | 8/9/2013 | 14:10 | < 0.24 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.20 | | D | < 0.20 | | D | < 0.60 | | D | 41 | J | | 5.5 | | | 54 | J | | 143 | J | * |
| 46-SB-A | 4-6 | 5/1/2013 | 15:05 | < 1.1 | | D | < 0.57 | | D | < 0.57 | | D | < 5.7 | | D | < 0.57 | | D | < 2.3 | | D | < 2.3 | | D | < 4.6 | | D | 697 | J | * | 67 | J | * | 1220 | J | * | 1910 | J | * |
| 46-SB-B | 5-6.2 | 8/6/2013 | 11:25 | < 0.60 | | D | < 0.30 | | D | < 0.30 | | D | < 4.5 | | D | < 0.30 | | D | < 2.0 | | D | < 2.3 | | D | < 4.0 | | D | 331 | J | * | 44 | | | 457 | J | * | 966 | J | * |
| 46-SB-BD | 5-6.2 | 8/6/2013 | 11:30 | < 0.60 | | D | < 0.30 | | D | < 0.30 | | D | < 5.0 | | D | < 0.30 | | D | < 2.0 | | D | < 2.3 | | D | < 5.5 | | D | 422 | J | * | 53 | | | 529 | J | * | 1190 | J | * |
| 46-SB-C | 8-11.5 | 6/28/2013 | 8:50 | < 0.23 | | D | < 0.11 | | D | < 0.11 | | D | < 0.90 | | D | < 0.11 | | D | < 0.34 | | D | < 0.34 | | D | < 1.7 | | D | 85 | | | 8.7 | | | 118 | | * | 266 | | * |
| 47-SB-A | 6-7.7 | 5/2/2013 | 9:45 | < 3.2 | | D | < 1.6 | | D | < 1.6 | | D | < 5.0 | | D | < 1.6 | | D | < 1.6 | | D | < 1.6 | | D | < 13 | | D | 531 | | * | 64 | | * | 1230 | | * | 2140 | | * |
| 47-SB-B | 5-7 | 8/6/2013 | 14:25 | < 0.62 | | D | < 0.31 | | D | < 0.31 | | D | < 0.31 | | D | < 0.31 | | D | < 0.31 | | D | < 0.31 | | D | < 1.5 | | D | 88 | J | | < 12 | | D | 69 | J | | 253 | J | * |
| 47-SB-BD | 5-7 | 8/6/2013 | 14:30 | < 0.13 | | | < 0.063 | | | < 0.063 | | | < 0.10 | | D | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.50 | | D | 22 | J | | < 2.5 | | | 19 | J | | 73 | J | |
| 47-SB-C | 8-10 | 6/27/2013 | 16:50 | < 0.23 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.12 | | D | < 0.40 | | D | 21 | | | < 4.6 | J | D | 21 | | | 70 | | |
| 48-SB-A | 4-6 | 4/25/2013 | 14:00 | < 0.14 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.14 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | |
| 48-SB-B | 6-8 | 4/25/2013 | 14:35 | < 0.14 | | | < 0.070 | | | < 0.070 | | | < 0.070 | | | < 0.070 | | | < 0.070 | | | < 0.070 | | | < 0.14 | | | < 2.8 | | | < 2.8 | | | < 2.8 | | | < 2.8 | | |
| 48-SB-C | 8-9.2 | 4/25/2013 | 15:00 | < 0.13 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.13 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| 48-SB-CD | 8-9.2 | 4/25/2013 | 15:03 | < 0.13 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.13 | | | < 2.6 | | | < 2.6 | | | < 2.6 | | | < 2.6 | | |
| 49-SB-A | 6-7.2 | 4/25/2013 | 12:30 | < 6.5 | | D | < 3.3 | | D | < 3.3 | | D | < 25 | | D | < 3.3 | | D | < 5.0 | | D | < 5.0 | | D | < 39 | | D | 2440 | | * | 533 | | * | 5910 | | * | 9380 | | * |
| 49-SB-B | 8-11.5 | 6/27/2013 | 15:15 | < 0.24 | | D | < 0.12 | | D | < 0.12 | | D | < 1.0 | | D | < 0.12 | | D | < 0.40 | | D | < 0.40 | | D | < 0.90 | | D | 50 | | | 14 | J | | 60 | | | 153 | | * |
| 49-SB-C | 11.5-14.5 | 6/27/2013 | 16:00 | < 0.22 | | D | < 0.11 | | D | < 0.11 | | D | < 0.11 | | D | < 0.11 | | D | < 0.11 | | D | < 0.11 | | D | < 0.22 | | D | 4.8 | | | < 4.4 | J | D | 6.1 | | | 16 | | |
| 50-SB-A | 6-8 | 4/25/2013 | 10:40 | < 0.13 | | | < 0.063 | | | < 0.063 | | | < 0.50 | | D | < 0.063 | | D | < 0.20 | | | < 0.20 | | D | < 3.1 | | D | 134 | | * | 4.6 | | | 271 | | * | 423 | | * |
| 50-SB-B | 8-11.5 | 7/31/2013 | 9:55 | < 0.12 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | 0.86 | | | 25 | | | < 2.4 | J | | 28 | | | 85 | | |
| 50-SB-C | 11.5-14 | 7/31/2013 | 10:10 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | J | | < 2.2 | | | < 2.2 | | |
| 51-SB-A | 4-6 | 4/24/2013 | 15:00 | < 7.5 | | D | < 3.8 | | D | < 3.8 | | D | < 10 | | D | < 3.8 | | D | < 2.5 | | D | < 2.5 | | D | < 30 | | D | 1730 | | * | 139 | | DJ* | 3780 | | * | 5590 | | * |
| 51-SB-B | 8-9 | 6/7/2013 | 10:45 | < 1.2 | | D | < 0.61 | | D | < 0.61 | | D | < 5.0 | | * | < 0.61 | | D | < 2.5 | | D | < 2.5 | | D | < 5.0 | | D | 442 | J | * | 59 | | | 460 | J | * | 1260 | J | * |
| 51-SB-C | 9-12 | 6/7/2013 | 11:00 | < 0.48 | | D | < 0.24 | | D | < 0.24 | | D | < 0.50 | | D | < 0.24 | | D | < 0.20 | | D | < 0.20 | | D | 1.1 | | | 69 | J | | < 9.5 | | D | 96 | J | | 221 | J | * |
| 52-SB-A | 4-6 | 5/17/2013 | 15:20 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 52-SB-B | 6-8 | 5/17/2013 | 16:05 | < 0.13 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.13 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| 52-SB-C | 8-10 | 5/17/2013 | 16:40 | < 0.13 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.13 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| 53-SB-A | 2-2.9 | 5/21/2013 | 11:00 | < 0.21 | | D | < 0.10 | | D | < 0.10 | | D | < 0.10 | | D | < 0.10 | | D | < 0.10 | | D | < 0.10 | | D | < 0.21 | | D | < 4.2 | | D | < 4.2 | | D | < 4.2 | | D | 9.1 | | |
| 53-SB-B | 6-8 | 5/23/2013 | 11:30 | < 0.61 | | D | < 0.30 | | D | < 0.30 | | D | < 0.30 | | D | < 0.30 | | D | < 0.30 | | D | < 0.30 | | D | < 2.0 | | D | 26 | | | < 12 | | D | 14 | | | 111 | | * |
| 53-SB-C | 10-12 | 6/5/2013 | 15:10 | < 0.62 | | D | < 0.31 | | D | < 0.31 | | D | < 1.0 | | D | < 0.31 | | D | < 0.31 | | D | < 0.31 | | D | < 3.0 | | D | 144 | | * | < 12 | | D | 156 | | * | 396 | | * |
| 54-SB-A | 6-7 | 5/20/2013 | 14:05 | < 6.2 | | D | < 3.1 | | D | < 3.1 | | D | < 5.0 | | D | < 3.1 | | D | < 5.0 | | D | < 5.0 | | D | < 50 | | D | 1840 | | * | 232 | | * | 2390 | | * | 6080 | | * |
| 54-SB-B | 8-8.5 | 5/23/2013 | 15:45 | < 6.1 | | D | < 3.0 | | D | < 3.0 | | D | < 3.0 | | D | < 3.0 | | D | < 10 | | D | < 10 | | D | 24 | | * | 1640 | | * | 469 | | * | 1880 | | * | 4580 | | * |
| 54-SB-C | 7-10 | 6/5/2013 | 16:40 | < 12 | | D | < 6.0 | | D | < 6.0 | | D | < 10 | | D | < 6.0 | | D | < 6.0 | | D | < 6.0 | | D | < 25 | | D | 1330 | | * | < 240 | | D | 1980 | | * | 3720 | | * |
| 55-SB-A | 4-5.75 | 5/21/2013 | 10:00 | < 2.9 | | D | < 1.5 | | D | < 1.5 | | D | < 1.5 | | D | < 1.5 | | D | < 2.5 | | D | < 2.5 | | D | < 50 | | D | 1960 | | * | 47 | | DJ | 2640 | | * | 7060 | | * |
| 55-SB-B | 5.5-7.5 | 8/8/2013 | 15:25 | < 2.3 | | D | < 1.1 | | D | < 1.1 | | D | < 1.1 | | D | < 4.0 | | D | < 4.0 | | D | < 8.0 | | D | < 34 | | D | 2020 | J | * | 101 | | * | 3200 | J | * | 6740 | J | * |
| 55-SB-C | 6-8 | 6/5/2013 | 17:40 | < 11 | | D | < 5.7 | | D | < 5.7 | | D | < 7.0 | | D | < 5.7 | | D | < 5.7 | | D | < 5.7 | | D | < 35 | | D | 2130 | | * | < 227 | | D | 3030 | | * | 6000 | | * |
| 56-SB-A | 6-8 | 5/20/2013 | 14:30 | < 13 | | D | < 6.4 | | D | < 6.4 | | D | < 15 | | D | < 6.4 | | D | < 6.4 | | D | < 6.4 | | D | < 80 | | D | 3180 | | * | < 256 | | D | 4420 | | * | 11300 | | * |
| 56-SB-B | 6.5-8.5 | 8/12/2013 | 10:40 | < 5.1 | | D | < 2.5 | | D | < 2.5 | | D | < 25 | | D | < 2.5 | | D | 6.7 | | | 6.7 | | | < 64 | | D | 3350 | J | * | 310 | | * | 4650 | J | * | 10600 | J | * |
| 56-SB-C | 8-10 | 6/5/2013 | 18:25 | < 11 | | D | < 5.7 | | D | < 5.7 | | D | < 10 | | D | < 5.7 | | D | < 5.7 | | D | < 5.7 | | D | < 50 | | D | 3040 | | * | < 228 | | D | 4870 | | * | 9090 | | * |
| 57-SB-A | 4-6 | 5/21/2013 | 12:00 | < 1.1 | | D | < 0.55 | | D | < 0.55 | | D | < 0.55 | | D | < 0.55 | | D | < 0.55 | | D | < 0.55 | | D | < 15 | | D | 180 | | * | < 22 | | D | 147 | | * | 682 | | * |
| 57-SB-B | 6-8 | 5/21/2013 | 12:35 | < 3.0 | | D | < 1.5 | | D | < 1.5 | | D | < 1.5 | | D | < 1.5 | | D | < 2.5 | | D | < 2.5 | | D | < 40 | | D | 1580 | | * | 104 | | * | 2010 | | * | 5400 | | * |
| 57-SB-C | 8-12 | 7/2/2013 | 9:25 | < 0.56 | | D | < 0.28 | | D | < 0.28 | | D | < 6.7 | | D | < 0.28 | | D | < 2.2 | | D | < 2.2 | | D | < 18 | | D | 843 | | * | 164 | | * | 1450 | | * | 3210 | | * |
| 58-SB-A | 6-8 | 5/22/2013 | 10:40 | < 2.4 | | D | < 1.2 | | D | < 1.2 | | D | 9.0 | J | * | < 1.2 | | D | 3.4 | J | | 3.4 | J | | 6.5 | J | * | 671 | J | * | 394 | J | * | 1200 | J | * | 1880 | J | * |
| 58-SB-B | 10-10.8 | 5/22/2013 | 11:40 | < 13 | | D | < 6.5 | | D | < 6.5 | | D | < 21 | | D | < 6.5 | | D | < 6.5 | | D | < 6.5 | | D | < 16 | | D | 1570 | | * | 769 | | * | 2370 | | * | 4120 | | * |
| 58-SB-C | 10.8-14 | 8/1/2013 | 12:15 | < 6.7 | | D | < 3.3 | | D | < 3.3 | | D | < 67 | | D | < 3.3 | | D | < 16 | | D | < 16 | | D | < 65 | | D | 4760 | | * | 2250 | J | * | 7560 | | * | 17400 | | * |
| 59-SB-A | 4-6 | 5/22/2013 | 13:15 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 59-SB-B | 6-8 | 5/28/2013 | 11:40 | < 3.1 | | D | < 1.6 | | D | < 1.6 | | D | < 1.6 | | D | < 1.6 | | D | < 1.6 | | D | < 1.6 | | D | < 8.0 | | D | 278 | | * | < 62 | | D | 284 | | * | 930 | | * |
| 59-SB-C | 8-8.7 | 5/28/2013 | 15:00 | < 2.9 | | D | < 1.4 | | D | < 1.4 | | D | < 1.4 | | | < 1.4 | | D | < 1.4 | | D | < 1.4 | | D | < 7.0 | | D | 243 | | * | < 57 | | D | 242 | | * | 806 | | * |
| 60-SB-A | 4-5.3 | 5/22/2013 | 9:45 | < 1.2 | | D | < 0.59 | | | < 0.59 | | D | 7.4 | J | * | < 0.59 | | D | 2.6 | J | | 2.6 | J | | < 4.0 | | D | 741 | J | * | 113 | J | * | 1440 | J | * | 2260 | J | * |
| 60-SB-B | 6-8 | 5/28/2013 | 11:00 | < 3.0 | | D | < 1.5 | | D | < 1.5 | | D | < 4.0 | | D | < 1.5 | | D | 1.3 | | J | 1.3 | | J | < 14 | | D | 637 | | * | 70 | | * | 983 | | * | 2250 | | * |
| 60-SB-C | 8-15.5 | 7/1/2013 | 16:40 | < 0.23 | | D | < 0.11 | | D | < 0.11 | | D | < 3.4 | | D | < 0.11 | | D | < 1.0 | | D | < 1.0 | | D | < 6.8 | | D | 299 | | * | 94 | | * | 467 | | * | 992 | | * |
| 61-SB-A | 2-4 | 5/21/2013 | 15:25 | < 6.5 | | D | < 3.2 | | D | < 3.2 | | D | < 3.2 | | D | < 3.2 | | D | < 5.0 | | D | < 5.0 | | D | < 40 | | D | 2940 | | * | 324 | | * | 3880 | | * | 8140 | | * |
| 61-SB-B | 6-8 | 5/21/2013 | 15:45 | < 6.7 | | D | < 3.3 | | D | < 3.3 | | D | < 3.3 | | D | < 3.3 | | D | < 10 | | D | < 10 | | D | < 50 | | D | 3230 | | * | 778 | | * | 3730 | | * | 9570 | | * |
| 61-SB-C | 8-9 | 5/21/2013 | 16:00 | < 6.5 | | D | < 3.2 | | D | < 3.2 | | D | < 3.2 | | D | < 3.2 | | D | < 5.0 | | D | < 5.0 | | D | < 60 | | D | 2310 | | * | 283 | | * | 3080 | | * | 7580 | | * |
| 62-SB-A | 4-6 | 5/21/2013 | 15:00 | < 5.6 | | D | < 2.8 | | D | < 2.8 | | D | < 2.8 | | D | < 2.8 | | D | < 5.0 | | D | < 5.0 | | D | < 100 | | D | 3110 | | * | 182 | | * | 4150 | | * | 10500 | | * |
| 62-SB-B | 6-8 | 5/21/2013 | 15:05 | < 6.2 | | D | < 3.1 | | D | < 3.1 | | D | < 3.1 | | D | < 3.1 | | D | < 5.0 | | D | < 5.0 | | D | < 20 | | D | 1700 | | * | 241 | | * | 1830 | | * | 4810 | | * |
| 62-SB-C | 8-9 | 8/1/2013 | 13:00 | < 1.2 | | D | < 0.59 | | D | < 0.59 | | D | < 4.7 | | D | < 0.59 | | D | < 1.2 | | D | < 1.2 | | D | < 21 | | D | 786 | | * | 124 | J | * | 1090 | | * | 2680 | | * |
| 63-SB-A | 2-4 | 5/21/2013 | 14:15 | < 12 | | D | < 6.2 | | D | < 6.2 | | D | < 6.2 | | D | < 6.2 | | D | < 6.2 | | D | < 6.2 | | D | < 100 | | D | 4750 | | * | 931 | | * | 6680 | | * | 16100 | | * |
| 63-SB-B | 4-5.3 | 5/21/2013 | 14:35 | < 6.4 | | D | < 3.2 | | D | < 3.2 | | D | < 3.2 | | D | < 3.2 | | D | < 5.0 | | D | < 5.0 | | D | < 75 | | D | 2850 | | * | 624 | | * | 3720 | | * | 9530 | | * |
| 63-SB-C | 6-8 | 5/28/2013 | 10:00 | < 3.0 | | D | < 1.5 | | D | < 1.5 | | D | < 13 | | D | < 1.5 | | D | 3.5 | | | 3.5 | | | 33 | | * | 1400 | | * | 318 | | * | 2200 | | * | 4870 | | * |
| 64-SB-A | 4-6 | 5/21/2013 | 12:15 | < 6.1 | | D | < 3.1 | | D | < 3.1 | | D | < 3.1 | | D | < 3.1 | | D | < 5.0 | | D | < 5.0 | | D | < 6.1 | | D | 1330 | | * | 457 | | * | 1440 | | * | 3700 | | * |
| 64-SB-B | 6-6.7 | 5/21/2013 | 12:35 | < 6.0 | | D | < 3.0 | | D | < 3.0 | | D | < 3.0 | | D | < 3.0 | | D | < 5.0 | | D | < 5.0 | | D | < 6.0 | | D | 1360 | | * | 553 | | * | 1450 | | * | 3820 | | * |
| 64-SB-C | 8-15.5 | 7/2/2013 | 8:45 | < 0.23 | | D | < 0.12 | | D | < 0.12 | | D | < 1.7 | | D | < 0.12 | | D | < 0.35 | | D | < 0.35 | | D | < 4.6 | | D | 203 | | * | 26 | | | 340 | | * | 784 | | |
| 65-SB-A | 6-8 | 5/28/2013 | 16:10 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |

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| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s ommercial u sur ace | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SB-B | 8-11.5 | 8/1/2013 | 11:30 | < 0.12 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.12 | | | < 2.4 | | | < 2.4 | J | | < 2.4 | | | 5.1 | | |
| 65-SB-C | 11.5-15 | 8/1/2013 | 11:40 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | J | | < 2.4 | | | 5.0 | | |
| 66-SB-A | 6-7 | 5/30/2013 | 15:30 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 66-SB-B | 2-4 | 5/31/2013 | 9:30 | < 0.15 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.15 | | | < 2.9 | | | < 2.9 | | | < 2.9 | | | < 2.9 | | |
| 66-SB-C | 4-5.5 | 5/31/2013 | 9:45 | < 0.17 | | | < 0.083 | | | 0.13 | | | < 0.083 | | | < 0.083 | | | < 0.083 | | | < 0.083 | | | < 0.17 | | | < 3.3 | | | < 3.3 | | | 4.4 | | | 6.6 | | |
| 67-SB-A | 4-6 | 5/30/2013 | 10:50 | < 0.13 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.13 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| 67-SB-AD | 4-6 | 5/30/2013 | 10:55 | < 0.13 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.13 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| 67-SB-B | 6-7 | 5/30/2013 | 11:20 | < 0.14 | | | < 0.072 | | | < 0.072 | | | < 0.072 | | | < 0.072 | | | < 0.072 | | | < 0.072 | | | < 0.14 | | | < 2.9 | | | < 2.9 | | | < 2.9 | | | < 2.9 | | |
| 67-SB-BD | 6-7 | 5/30/2013 | 11:25 | < 0.14 | | | < 0.071 | | | < 0.071 | | | < 0.071 | | | < 0.071 | | | < 0.071 | | | < 0.071 | | | < 0.14 | | | < 2.8 | | | < 2.8 | | | < 2.8 | | | < 2.8 | | |
| 67-SB-C | 8-16 | 7/2/2013 | 10:10 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 68-SB-A | 2-4 | 5/30/2013 | 12:45 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 68-SB-B | 4-6 | 6/6/2013 | 11:30 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | J | | < 2.4 | | | < 2.4 | J | | < 2.4 | J | |
| 68-SB-C | 6-8 | 6/6/2013 | 11:45 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.4 | J | | < 2.4 | | | < 2.4 | J | | < 2.4 | J | |
| 69-SB-A | 2-4 | 5/30/2013 | 13:10 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 69-SB-B | 4-6 | 6/6/2013 | 10:40 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | J | | < 2.3 | | | < 2.3 | J | | < 2.3 | J | |
| 69-SB-C | 8-10 | 7/2/2013 | 11:15 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 70-SB-A | 2-4 | 5/30/2013 | 14:45 | < 0.10 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.052 | | | < 0.10 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 70-SB-B | 4-6 | 6/6/2013 | 9:40 | < 0.13 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.13 | | | < 2.6 | J | | < 2.6 | | | < 2.6 | J | | < 2.6 | J | |
| 70-SB-C | 6-8 | 6/6/2013 | 10:00 | < 0.12 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.12 | | | < 2.5 | J | | < 2.5 | | | < 2.5 | J | | < 2.5 | J | |
| 71-SB-A | 2-4 | 5/30/2013 | 10:25 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 71-SB-AD | 2-4 | 5/30/2013 | 10:30 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| 71-SB-B | 6-8 | 6/3/2013 | 14:05 | < 0.13 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.13 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| 71-SB-C | 8-11.5 | 6/28/2013 | 13:30 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 72-SB-A | 4-6 | 5/29/2013 | 10:10 | < 0.13 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.13 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| 72-SB-B | 6-7.5 | 5/29/2013 | 10:20 | < 0.13 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.13 | | | < 2.6 | | | < 2.6 | | | < 2.6 | | | < 2.6 | | |
| 72-SB-C | 7.5-9.5 | 5/29/2013 | 10:50 | < 0.13 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.13 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| 73-SB-A | 2-3.2 | 5/22/2013 | 11:35 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | 0.070 | | | 0.070 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 73-SB-B | 7.5-8.5 | 8/12/2013 | 9:30 | < 0.65 | | D | < 0.32 | | D | < 0.32 | | D | < 3.0 | | D | < 0.32 | | D | 0.53 | | | 0.53 | | | < 5.0 | | D | 253 | J | * | 40 | | | 332 | J | * | 766 | J | * |
| 73-SB-C | 8-10.5 | 6/28/2013 | 14:30 | < 0.24 | | D | < 0.12 | | D | < 0.25 | | D | < 3.5 | | D | < 0.12 | | D | < 1.0 | | D | < 1.0 | | D | < 12 | | D | 530 | | * | 85 | | * | 876 | | * | 1870 | | * |
| 74-SB-A | 2-4 | 5/22/2013 | 15:00 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | 2.0 | | J | 3.8 | | |
| 74-SB-AD | 2-4 | 5/22/2013 | 15:10 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | 3.3 | | | 5.2 | | |
| 74-SB-B | 5.0-6.5 | 8/12/2013 | 11:10 | < 0.13 | | | < 0.064 | | | < 0.064 | | | < 0.10 | | D | 0.066 | | | < 0.20 | | D | 0.066 | | | < 0.13 | | D | 9.6 | J | | < 2.5 | | | 5.0 | J | | 22 | J | |
| 74-SB-C | 8-11.5 | 8/1/2013 | 13:30 | < 1.1 | | D | < 0.57 | | D | < 0.57 | | D | < 4.6 | | D | < 0.57 | | D | < 1.7 | | D | < 1.7 | | D | < 3.5 | | D | 244 | | * | 75 | J | * | 267 | | * | 743 | | * |
| 75-SB-A | 2-4 | 5/22/2013 | 13:55 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | 3.0 | | | 7.7 | | |
| 75-SB-B | 4-6 | 5/22/2013 | 14:55 | < 0.14 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.14 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | |
| 75-SB-C | 8-11.5 | 7/1/2013 | 11:05 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.70 | | D | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 3.0 | | D | 140 | | * | 5.1 | | | 159 | | * | 470 | | * |
| 76-SB-A | 2-4 | 5/23/2013 | 9:35 | < 0.13 | | | < 0.066 | | | < 0.066 | | | < 0.066 | | | < 0.066 | | | < 0.066 | | | < 0.066 | | | < 0.13 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | |
| 76-SB-B | 4-6 | 5/23/2013 | 9:50 | < 0.13 | | | < 0.065 | | | < 0.065 | | | < 0.065 | | | < 0.065 | | | < 0.065 | | | < 0.065 | | | < 0.13 | | | < 2.6 | | | < 2.6 | | | < 2.6 | | | < 2.6 | | |
| 76-SB-C | 6-7.4 | 5/23/2013 | 10:10 | < 0.13 | | | < 0.067 | | | < 0.067 | | | < 0.067 | | | < 0.067 | | | < 0.067 | | | < 0.067 | | | < 0.13 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | |
| 77-SB-A | 2-4 | 5/24/2013 | 11:55 | < 0.12 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | 0.073 | | | < 0.062 | | | 0.073 | | | 0.66 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| 77-SB-B | 4-6 | 5/24/2013 | 12:15 | < 0.14 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.14 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | |
| 77-SB-C | 8-15.5 | 7/1/2013 | 11:50 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | |
| 78-SB-A | 2-4 | 5/24/2013 | 11:50 | < 0.13 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.13 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| 78-SB-B | 4-5.5 | 5/24/2013 | 12:15 | < 0.14 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.14 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | |
| 78-SB-C | 6-8 | 6/5/2013 | 9:45 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 79-SB-B | 2-4 | 5/23/2013 | 11:05 | < 0.15 | | | < 0.074 | | | < 0.074 | | | < 0.074 | | | < 0.074 | | | < 0.074 | | | < 0.074 | | | < 0.15 | | | < 3.0 | | | < 3.0 | | | < 3.0 | | | 4.3 | | |
| 79-SB-C | 4-6 | 5/23/2013 | 11:25 | < 0.14 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.068 | | | < 0.14 | | | < 2.7 | | | < 2.7 | | | < 2.7 | | | 4.2 | | |
| 80-SB-A | 2-2.5 | 5/23/2013 | 10:15 | < 0.66 | | D | < 0.33 | | D | < 0.33 | | D | < 0.33 | | D | < 0.33 | | D | < 0.33 | | D | < 0.33 | | D | < 0.66 | | D | 15 | | | < 13 | | D | < 13 | | D | 27 | | |
| 80-SB-B | 2.5-3.5 | 5/23/2013 | 10:00 | < 6.5 | | D | < 3.3 | | D | < 3.3 | | D | < 25 | | D | 8.0 | | | < 10 | | D | 8.0 | | | < 75 | | D | 4150 | | * | 482 | | * | 5850 | | * | 14700 | | * |
| 80-SB-C | 3.5-5.8 | 5/23/2013 | 10:45 | < 6.6 | | D | < 3.3 | | D | < 3.3 | | D | < 3.3 | | D | < 5.0 | | D | < 5.0 | | D | < 10 | | D | < 40 | | D | 2200 | | * | 262 | | * | 2790 | | * | 7700 | | * |
| 81-SB-A | 2-4 | 5/14/2013 | 15:25 | < 0.44 | | D | < 0.22 | | D | < 0.22 | | D | 1.5 | | | < 0.22 | | D | 0.46 | | | 0.46 | | | 2.9 | | | 123 | | * | 17 | | | 127 | | * | 315 | | * |
| 81-SB-B | 5-6 | 6/11/2013 | 13:45 | < 1.3 | | D | < 0.63 | | D | < 0.63 | | D | < 19 | | D | < 0.63 | | D | < 8.0 | | D | < 8.0 | | D | < 5.0 | | D | 754 | | * | 994 | | * | 1350 | | * | 2650 | | * |
| 81-SB-C | 6-7 | 6/11/2013 | 14:10 | < 0.62 | | D | < 0.31 | | D | < 0.31 | | D | < 6.0 | | D | < 0.31 | | D | < 2.5 | | D | < 2.5 | | D | < 4.0 | | D | 343 | | * | 191 | | * | 605 | | * | 1060 | | * |
| 82-SB-A | 4-6 | 5/15/2013 | 9:35 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 82-SB-AD | 4-6 | 5/15/2013 | 9:36 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 82-SB-B | 5-6 | 6/11/2013 | 14:30 | < 0.57 | | D | < 0.29 | | D | < 0.29 | | D | < 1.0 | | D | < 0.29 | | D | < 0.29 | | D | < 0.29 | | D | < 0.80 | | D | 66 | | | 11 | | J | 88 | | | 177 | | * |
| 82-SB-C | 6-7 | 6/11/2013 | 14:50 | < 1.2 | | D | < 0.60 | | D | < 0.60 | | D | < 6.0 | | D | < 0.60 | | D | < 3.0 | | D | < 3.0 | | D | < 5.0 | | D | 356 | | * | 301 | | * | 570 | | * | 1150 | | * |
| 83-SB-A | 2-4 | 5/15/2013 | 9:15 | < 0.11 | | | < 0.054 | | | < 0.054 | | | < 0.054 | | | 0.076 | | | 0.062 | | | 0.14 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| 83-SB-B | 6-7 | 6/11/2013 | 15:20 | < 0.12 | | | < 0.062 | | | 0.076 | | | 1.1 | | | 5.7 | | | 5.0 | | | 11 | | | < 0.25 | | D | 23 | | | < 2.5 | | | 24 | | | 71 | | |
| 83-SB-C | 7-8 | 6/11/2013 | 15:50 | < 1.3 | | D | < 0.63 | | D | < 0.63 | | D | < 0.63 | | D | < 0.63 | | D | < 0.63 | | D | < 0.63 | | D | < 4.0 | | D | 148 | | * | < 25 | | D | 168 | | * | 520 | | * |
| 84-SB-A | 4-6 | 5/15/2013 | 11:05 | < 0.12 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.12 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| 84-SB-B | 7.5-8.5 | 6/12/2013 | 10:30 | < 0.12 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| 84-SB-C | 10.5-15.5 | 8/9/2013 | 9:10 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | J | | < 2.2 | | | < 2.2 | J | | < 2.2 | J | |
| 85-SB-A | 2-4 | 5/15/2013 | 11:50 | < 2.1 | | D | < 1.0 | | D | < 1.0 | | D | < 2.0 | | D | < 1.0 | | D | < 1.0 | | D | < 1.0 | | D | < 14 | | D | 690 | | * | < 42 | | D | 859 | | * | 2220 | | * |
| 85-SB-B | 5.5-6.5 | 6/12/2013 | 11:20 | < 0.62 | | D | < 0.31 | | D | < 0.31 | | D | < 0.70 | | D | 0.79 | | | 0.77 | | | 1.6 | | | < 5.0 | | D | 184 | | * | 14 | | | 239 | | * | 581 | | * |
| 85-SB-C | 6.5-7.5 | 6/12/2013 | 11:40 | < 0.67 | | D | < 0.33 | | D | < 0.33 | | D | < 3.0 | | D | 2.1 | | | 1.7 | | | 3.8 | | | < 9.0 | | D | 367 | | * | 42 | | | 482 | | * | 1160 | | * |
| 86-SB-A | 2-4 | 5/15/2013 | 14:50 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |

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| 86-SB-B | 5.5-6.5 | 6/12/2013 | 15:50 | < 0.12 | < 0.062 | < 0.062 | < 0.062 | < 0.062 | < 0.062 | < 0.062 | < 0.12 | < 2.5 | < 2.5 | < 2.5 | < 2.5 |
| 86-SB-C | 6.5-7.0 | 6/12/2013 | 16:05 | < 0.12 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| 87-SB-A | 2-4 | 5/28/2013 | 10:50 | < 0.12 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.12 | < 2.3 | < 2.3 | < 2.3 | < 2.3 |
| 87-SB-B | 4-6 | 5/28/2013 | 11:15 | < 0.13 | < 0.063 | < 0.063 | < 0.063 | < 0.063 | < 0.063 | < 0.063 | < 0.13 | < 2.5 | < 2.5 | < 2.5 | < 2.5 |
| 87-SB-C | 6.5-7.2 | 5/28/2013 | 11:40 | < 0.12 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| 88-SB-A | 2-3.8 | 5/24/2013 | 14:45 | < 0.12 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| 88-SB-AD | 2-3.8 | 5/24/2013 | 14:50 | < 0.12 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| 88-SB-B | 3.8-4.2 | 5/24/2013 | 15:20 | < 0.12 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.12 | < 2.3 | < 2.3 | < 2.3 | < 2.3 |
| 88-SB-C | 8-11.5 | 7/2/2013 | 7:35 | < 0.11 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.11 | < 2.3 | < 2.3 | < 2.3 | < 2.3 |
| 89-SB-A | 2-4 | 5/24/2013 | 10:15 | < 0.14 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.14 | < 2.9 | < 2.9 | < 2.9 | < 2.9 |
| 89-SB-B | 4-5.9 | 5/24/2013 | 10:50 | < 0.14 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.14 | < 2.9 | < 2.9 | < 2.9 | < 2.9 |
| 89-SB-C | 8-11.5 | 7/1/2013 | 12:40 | < 0.12 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| 90-SB-A | 2-4 | 5/24/2013 | 10:00 | < 0.12 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.12 | < 2.3 | < 2.3 | < 2.3 | < 2.3 |
| 90-SB-B | 4-6 | 5/24/2013 | 10:25 | < 0.13 | < 0.064 | < 0.064 | < 0.064 | < 0.064 | < 0.064 | < 0.064 | < 0.13 | < 2.6 | < 2.6 | < 2.6 | < 2.6 |
| 90-SB-C | 6-7 | 5/24/2013 | 11:00 | < 0.12 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.12 | < 2.3 | < 2.3 | < 2.3 | < 2.3 |
| 91-SB-A | 2-4 | 5/23/2013 | 13:45 | < 0.11 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.11 | < 2.3 | < 2.3 | < 2.3 | < 2.3 |
| 91-SB-B | 4-6 | 6/4/2013 | 11:10 | < 0.12 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| 91-SB-C | 8-14.5 | 7/1/2013 | 13:40 | < 0.11 | < 0.057 | < 0.057 | < 0.23 D | < 0.057 | < 0.057 | < 0.057 | < 1.7 D | 44 | < 2.3 | 51 | 142 * |
| 92-SB-A | 2-3.1 | 5/23/2013 | 13:00 | < 0.10 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.10 | < 2.1 | < 2.1 | < 2.1 | < 2.1 |
| 92-SB-B | 4-6 | 6/4/2013 | 11:50 | < 0.12 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.12 | < 2.3 | < 2.3 | < 2.3 | < 2.3 |
| 92-SB-C | 8-10.5 | 7/1/2013 | 14:30 | < 0.11 | < 0.055 | < 0.055 | < 1.1 D | < 0.055 | < 0.33 D | < 0.33 D | < 4.4 D | 172 * | 6.4 | 246 * | 561 * |
| 93-SB-A | 2-3.1 | 5/3/2013 | 12:10 | < 0.10 | < 0.051 | < 0.051 | < 0.051 | < 0.051 | < 0.051 | < 0.051 | < 0.10 | < 2.1 | < 2.1 | < 2.1 | < 2.1 |
| 93-SB-B | 4-6 | 6/5/2013 | 15:15 | < 0.12 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| 93-SB-C | 6.5-8 | 6/5/2013 | 15:30 | < 0.12 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| 94-SB-A | 2-4 | 5/24/2013 | 9:15 | < 0.13 | < 0.067 | < 0.067 | < 0.067 | < 0.067 | < 0.067 | < 0.067 | < 0.13 | < 2.7 | < 2.7 | < 2.7 | < 2.7 |
| 94-SB-B | 4-6 | 6/5/2013 | 10:30 | < 0.12 | < 0.062 | < 0.062 | < 0.062 | < 0.062 | < 0.062 | < 0.062 | < 0.12 | < 2.5 | < 2.5 | < 2.5 | < 2.5 |
| 94-SB-C | 6-8 | 6/5/2013 | 10:45 | < 0.12 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| 95-SB-A | 4-6 | 5/23/2013 | 15:45 | < 0.13 | < 0.063 | < 0.063 | < 0.063 | < 0.063 | < 0.063 | < 0.063 | < 0.13 | 2.6 | < 2.5 | < 2.5 | 7.9 |
| 95-SB-B | 6-8 | 5/23/2013 | 16:05 | < 0.14 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.072 | < 0.50 D | 6.8 | < 2.9 | 2.8 J | 35 |
| 95-SB-C | 8-11 | 7/1/2013 | 15:10 | < 0.11 | < 0.056 | < 0.056 | < 0.22 D | < 0.056 | < 0.11 D | < 0.11 D | < 1.7 D | 61 | 2.3 | 80 | 219 * |
| 96-SB-A | 2-2.6 | 5/23/2013 | 15:15 | < 0.10 | < 0.051 | < 0.051 | < 0.051 | < 0.051 | < 0.051 | < 0.051 | < 0.10 | < 2.1 | < 2.1 | < 2.1 | < 2.1 |
| 96-SB-B | 4-6 | 6/5/2013 | 12:45 | < 0.12 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| 96-SB-C | 6-8 | 6/5/2013 | 13:00 | < 0.12 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.50 D | 10 | < 2.4 | 7.3 | 48 |
| 97-SB-A | 2-4 | 5/14/2013 | 16:10 | < 0.10 | < 0.051 | < 0.051 | < 0.051 | < 0.051 | < 0.051 | < 0.051 | < 0.10 | < 2.1 | < 2.1 | 3.1 | 4.1 |
| 97-SB-B | 4-6 | 6/10/2013 | 10:50 | < 0.11 | < 0.056 | < 0.056 | < 0.11 D | < 0.056 | < 0.056 | < 0.056 | < 0.90 D | 26 | < 2.3 | 30 | 88 |
| 97-SB-BD | 4-6 | 6/10/2013 | 10:35 | < 0.11 | < 0.056 | < 0.056 | < 0.11 D | < 0.056 | < 0.056 | < 0.056 | < 0.56 D | 22 | 2.5 | 26 | 73 |
| 97-SB-C | 6-7 | 6/10/2013 | 11:15 | < 0.12 | < 0.060 | < 0.060 | < 0.12 D | < 0.060 | < 0.060 | < 0.060 | < 0.60 D | 20 | < 2.4 | 23 | 66 |
| 98-SB-A | 2-4 | 5/14/2013 | 10:15 | < 0.11 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.11 | < 2.3 | < 2.3 | < 2.3 | < 2.3 |
| 98-SB-B | 3.5-4.5 | 6/11/2013 | 10:35 | < 0.13 | < 0.064 | < 0.064 | < 0.064 | < 0.064 | < 0.064 | < 0.064 | < 0.13 | < 2.6 | < 2.6 | < 2.6 | < 2.6 |
| 98-SB-C | 4.5-5.5 | 6/11/2013 | 10:45 | < 0.11 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.11 | 5.5 | < 2.3 | 4.7 | 15 |
| 99-SB-A | 2-4 | 5/14/2013 | 10:20 | < 1.1 D | < 0.55 D | < 0.55 D | 56 J * | < 0.55 D | 11 J | 11 J | 25 J * | 1820 J * | 1800 J * | 3250 J * | 6700 J * |
| 99-SB-B | 5.5-6 | 6/11/2013 | 11:40 | < 0.57 D | < 0.28 D | < 0.28 D | < 1.1 D | < 0.28 D | < 0.50 D | < 0.50 D | < 0.57 D | 55 | 62 * | 79 | 183 * |
| 99-SB-C | 6-7 | 6/11/2013 | 12:00 | < 0.58 D | < 0.29 D | < 0.29 D | < 1.2 D | < 0.29 D | < 0.29 D | < 0.29 D | < 0.58 D | 47 | 47 | 66 | 152 * |
| 100-SB-A | 2-3 | 5/15/2013 | 14:55 | < 0.10 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.10 | < 2.1 | < 2.1 | < 2.1 | 11 |
| 100-SB-B | 5.5-6.5 | 6/12/2013 | 9:15 | < 0.12 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| 100-SB-C | 6.5-7.5 | 6/12/2013 | 9:35 | < 0.14 | < 0.068 | < 0.068 | < 0.068 | < 0.068 | < 0.068 | < 0.068 | < 0.14 | < 2.7 | < 2.7 | < 2.7 | < 2.7 |
| 100-SB-CD | 6.5-7.5 | 6/12/2013 | 9:40 | < 0.13 | < 0.066 | < 0.066 | < 0.066 | < 0.066 | < 0.066 | < 0.066 | < 0.13 | < 2.6 | < 2.6 | < 2.6 | < 2.6 |
| 101-SB-A | 2-3 | 5/15/2013 | 16:20 | < 0.10 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.10 | < 2.1 | < 2.1 | < 2.1 | < 2.1 |
| 101-SB-B | 6.6-7.2 | 6/12/2013 | 13:55 | < 0.12 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| 101-SB-C | 7.2-8.2 | 6/12/2013 | 14:10 | < 0.11 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.11 | < 2.3 | < 2.3 | < 2.3 | < 2.3 |
| 102-SB-A | 2-3.3 | 5/28/2013 | 14:50 | < 0.10 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.10 | < 2.1 | < 2.1 | < 2.1 | < 2.1 |
| 102-SB-B | 5.7-11 | 8/2/2013 | 9:10 | < 0.12 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.12 | < 2.4 | < 2.4 J | < 2.4 J | < 2.4 |
| 102-SB-C | 11-15 | 8/2/2013 | 9:20 | < 0.12 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.12 | < 2.5 | < 2.5 J | < 2.5 J | < 2.5 |
| 103-SB-A | 2-3 | 5/28/2013 | 13:30 | < 0.10 | < 0.051 | < 0.051 | < 0.051 | < 0.051 | < 0.051 | < 0.051 | < 0.10 | < 2.1 | < 2.1 | < 2.1 | < 2.1 |
| 103-SB-B | 8-11.5 | 8/2/2013 | 10:00 | < 0.12 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.059 | < 0.12 | < 2.4 | < 2.4 J | < 2.4 J | < 2.4 |
| 103-SB-C | 11.5-14 | 8/2/2013 | 10:10 | < 0.11 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.11 | < 2.3 | < 2.3 J | < 2.3 J | < 2.3 |
| 104-SB-A | 2-4 | 5/3/2013 | 10:40 | < 0.10 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.10 | < 2.1 | < 2.1 | < 2.1 | < 2.1 |
| 104-SB-B | 4-6 | 6/5/2013 | 14:30 | < 0.11 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.057 | < 0.11 | < 2.3 | < 2.3 | < 2.3 | < 2.3 |
| 104-SB-C | 6.5-8 | 6/5/2013 | 14:45 | < 0.12 | < 0.062 | < 0.062 | < 0.062 | < 0.062 | < 0.062 | < 0.062 | < 0.12 | < 2.5 | < 2.5 | < 2.5 | < 2.5 |
| 105-SB-A | 2-4 | 5/3/2013 | 10:15 | < 0.10 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.10 | < 2.1 | < 2.1 | < 2.1 | < 2.1 |
| 105-SB-B | 6-8 | 6/5/2013 | 13:40 | < 0.13 | < 0.063 | < 0.063 | < 0.063 | < 0.063 | < 0.063 | < 0.063 | < 0.13 | < 2.5 | < 2.5 | < 2.5 | < 2.5 |
| 105-SB-C | 8-11 | 7/1/2013 | 15:55 | < 0.12 | < 0.062 | < 0.062 | < 0.062 | < 0.062 | < 0.062 | < 0.062 | < 0.12 | < 2.5 | < 2.5 | < 2.5 | < 2.5 |
| 106-SB-A | 2-4 | 4/26/2013 | 9:30 | < 0.13 | < 0.065 | < 0.065 | < 0.065 | < 0.065 | < 0.065 | < 0.065 | < 0.13 | < 2.6 | < 2.6 | < 2.6 | < 2.6 |
| 106-SB-B | 4-6 | 4/26/2013 | 10:00 | < 0.13 | < 0.065 | < 0.065 | < 0.065 | < 0.065 | < 0.065 | < 0.065 | < 0.13 | < 2.6 | < 2.6 | < 2.6 | < 2.6 |
| 106-SB-C | 6-6.8 | 4/26/2013 | 10:35 | < 0.20 | < 0.098 | < 0.098 | < 0.098 | < 0.098 | < 0.098 | < 0.098 | < 0.20 | < 3.9 | < 3.9 | < 3.9 | < 3.9 |
| 107-SB-A | 2-4 | 4/26/2013 | 11:20 | < 0.19 | < 0.093 | < 0.093 | < 0.093 | < 0.093 | < 0.093 | < 0.093 | < 0.19 | < 3.7 | < 3.7 | < 3.7 | < 3.7 |
| 107-SB-B | 4-6 | 4/26/2013 | 11:35 | < 0.18 | < 0.089 | < 0.089 | < 0.089 | < 0.089 | < 0.089 | < 0.089 | < 0.18 | < 3.6 | < 3.6 | < 3.6 | < 3.6 |

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| 107-SB-C | 6-8 | 4/26/2013 | 11:55 | < 0.18 | < 0.092 | < 0.092 | < 0.092 | < 0.092 | < 0.092 | < 0.092 | < 0.18 | < 3.7 | < 3.7 | < 3.7 | < 3.7 |
| 108-SB-A | 2-4 | 5/14/2013 | 11:50 | < 0.11 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.056 | < 0.11 | < 2.3 | < 2.3 | < 2.3 | < 2.3 |
| 108-SB-B | 4-4.5 | 6/10/2013 | 12:05 | < 0.12 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.12 | < 2.3 | < 2.3 | < 2.3 | < 2.3 |
| 108-SB-C | 6-7 | 6/10/2013 | 14:30 | < 0.12 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.060 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |
| 109-SB-A | 4-5 | 5/14/2013 | 12:20 | < 0.10 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.052 | < 0.10 | < 2.1 | < 2.1 | < 2.1 | < 2.1 |
| 109-SB-B | 4-6 | 6/10/2013 | 15:10 | < 0.12 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.12 | < 2.3 | < 2.3 | < 2.3 | < 2.3 |
| 109-SB-C | 5-7 | 6/11/2013 | 10:20 | < 0.12 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.061 | < 0.12 | < 2.4 | < 2.4 | < 2.4 | < 2.4 |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

**(1) - EPA RSL Version used for screening level development: January 2015**
**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| et od | | | | | | | H | | | H | | | H | | | H | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | H | | | H | | | H | | | H | | | H | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | |
| s ommercial u sur ace | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-SB-A | 4-4.8 | 5/17/2013 | 11:10 | | | | < 11 | | | < 11 | | | 16 | | | 19 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0060 | | | < 0.0038 | | | < 0.0038 | | |
| 1-SB-B | 8-11 | 8/8/2013 | 13:10 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0040 | | | < 0.0040 | J | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| 1-SB-C | 11-15 | 8/8/2013 | 13:15 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0038 | | | < 0.0038 | J | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 2-SB-A | 2-4 | 5/17/2013 | 12:00 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | |
| 2-SB-B | 8-11.5 | 8/8/2013 | 11:20 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0038 | | | < 0.0038 | J | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 2-SB-C | 11.5-15.5 | 8/8/2013 | 11:30 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0038 | | | < 0.0038 | J | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 3-SB-A | 4-5.4 | 5/17/2013 | 13:35 | | | | 48 | | | 16 | | | 78 | | | 222 | | | < 0.0074 | | | < 0.0074 | | | < 0.0074 | | | < 0.0074 | | | 0.012 | | | 0.017 | | | 0.021 | | |
| 3-SB-B | 7.5-8.0 | 8/8/2013 | 10:00 | | | | 52 | | | 18 | | | 39 | | | 131 | | | < 0.0044 | | | < 0.0044 | J | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | |
| 3-SB-C | 8.0-11.5 | 8/8/2013 | 10:30 | | | | 481 | | * | 565 | | * | 210 | | | 1320 | | | 2.3 | U | | 0.17 | J | | < 0.019 | | | 0.051 | | | < 0.019 | | | < 0.019 | | | < 0.019 | | |
| 4-SB-A | 6-8 | 5/7/2013 | 11:20 | | | | 3980 | | * | 5330 | | * | 1380 | | | 11900 | | | 54 | | | 2.3 | | | < 0.043 | | | 0.56 | | | 0.22 | | * | 0.14 | | * | 0.16 | | |
| 4-SB-B | 8-10.5 | 6/6/2013 | 10:20 | | | | 2990 | | * | 3950 | | * | 1140 | | | 8560 | | | 41 | | | 1.5 | | | < 0.035 | | | 0.78 | | | 0.16 | U | | 0.086 | U | * | 0.15 | U | |
| 5-SB-A | 6-8 | 5/7/2013 | 10:00 | | | | 496 | | * | 906 | | * | 186 | | | 1740 | | | 9.7 | | | 0.26 | | | < 0.044 | | | 0.11 | | | 0.048 | | | < 0.044 | | | < 0.044 | | |
| 5-SB-B | 8-12 | 6/6/2013 | 9:00 | | | | 2510 | | * | 3440 | | * | 905 | | | 7380 | | | 26 | | | 0.96 | | | < 0.037 | | | 0.58 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | |
| 5-SB-C | 12-15 | 6/6/2013 | 9:15 | | | | 852 | | * | 947 | | * | 441 | | | 2390 | | | 5.8 | | | 0.17 | | | < 0.038 | | | 0.18 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | |
| 6-SB-A | 4-6 | 5/9/2013 | 12:00 | | | | 485 | | * | 1650 | | * | 109 | | | 2370 | | | 3.5 | | | 0.14 | | | < 0.0043 | | | 0.0065 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | |
| 6-SB-B | 8-12 | 8/2/2013 | 10:50 | | | | 4510 | | * | 5690 | | * | 1670 | | | 12900 | | | 49 | J | | 2.1 | J | | < 0.037 | | | 0.71 | J | | 0.15 | J | | 0.093 | J | * | 0.11 | J | |
| 6-SB-C | 12-16 | 8/2/2013 | 11:10 | | | | 940 | | * | 981 | | * | 479 | | | 2560 | | | 5.8 | | | 0.22 | | | < 0.0037 | | | 0.12 | J | | 0.018 | | | < 0.0037 | | | < 0.0037 | | |
| 6-SB-CD | 12-16 | 8/2/2013 | 11:15 | | | | 1220 | | * | 1280 | | * | 595 | | | 3260 | | | 5.3 | | | 0.20 | | | < 0.0037 | | | 0.10 | J | | 0.027 | | | < 0.0037 | | | < 0.0037 | | |
| 7-SB-A | 6-8 | 5/6/2013 | 14:20 | | | | 648 | | * | 1310 | | * | 269 | | | 2410 | | | < 0.039 | | | 0.094 | | | < 0.039 | | | 0.12 | | | 0.050 | | | < 0.039 | | | < 0.039 | | |
| 7-SB-B | 8-9.5 | 5/6/2013 | 14:30 | | | | 893 | | * | 887 | | * | 422 | | | 2410 | | | 6.3 | | | 0.29 | | | < 0.088 | | | 0.24 | | | 0.12 | | | < 0.088 | | | < 0.088 | | |
| 7-SB-C | 12-14 | 6/6/2013 | 14:30 | | | | 1460 | | * | 1240 | | * | 695 | | | 3630 | | | 5.0 | | | 0.24 | | | < 0.042 | | | 0.25 | | | < 0.042 | | | < 0.042 | | | < 0.042 | | |
| 8-SB-A | 2-4 | 5/6/2013 | 15:30 | | | | 822 | | * | 928 | | * | 388 | | | 2380 | | | 6.5 | | | 0.98 | | | < 0.083 | | | 0.55 | | | 0.16 | | | < 0.083 | | | < 0.083 | | |
| 8-SB-B | 7.8-8.8 | 7/11/2013 | 13:45 | | | | 329 | | | 356 | | * | 161 | | | 928 | | | 1.5 | | | 0.091 | | | < 0.0037 | | | 0.049 | | | 0.010 | | | 0.0059 | | | < 0.0037 | | |
| 8-SB-C | 8.8-15 | 7/31/2013 | 11:10 | | | | 402 | | * | 607 | | * | 262 | | | 1320 | | | 1.9 | J | | 0.16 | J | | < 0.0038 | | | 0.051 | J | | 0.013 | J | | 0.0043 | | | < 0.0038 | | |
| 9-SB-A | 2-4 | 5/16/2013 | 14:30 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 9-SB-B | 8-9 | 7/11/2013 | 12:23 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0042 | | | 0.0055 | | | < 0.0038 | | |
| 9-SB-C | 8-11 | 8/1/2013 | 10:00 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0037 | J | | < 0.0037 | J | | < 0.0037 | | | < 0.0037 | J | | < 0.0037 | J | | < 0.0037 | | | < 0.0037 | | |
| 10-SB-A | 4-6 | 4/24/2013 | 11:40 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | 0.013 | U | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | 0.011 | | | 0.0073 | | | 0.015 | | |
| 10-SB-B | 8-12 | 7/30/2013 | 15:25 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0039 | J | | 0.0059 | J | | < 0.0039 | | | 0.018 | J | | 0.025 | J | | 0.035 | | * | 0.038 | | |
| 10-SB-C | 12-16 | 7/30/2013 | 16:20 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0041 | J | | < 0.0041 | J | | < 0.0041 | | | < 0.0041 | J | | 0.0090 | J | | 0.011 | | | 0.011 | | |
| 11-SB-A | 4-6 | 5/16/2013 | 15:10 | | | | 2480 | | * | 3900 | | * | 899 | | | 8060 | | | 8.2 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | |
| 11-SB-B | 8-10 | 6/27/2013 | 8:50 | | | | 1280 | | * | 730 | | * | 997 | | | 3700 | | | 0.61 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | |
| 12-SB-A | 2-4 | 5/7/2013 | 14:40 | | | | 1640 | | * | 1440 | | * | 1110 | | | 5130 | | | 1.6 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | |
| 12-SB-B | 8-9 | 7/11/2013 | 9:50 | | | | 726 | | * | 941 | | * | 380 | | | 2270 | | | 6.8 | | | 0.22 | | | < 0.019 | | | 0.066 | | | < 0.019 | | | < 0.019 | | | < 0.019 | | |
| 12-SB-C | 12-15 | 7/31/2013 | 7:30 | | | | 435 | | * | 576 | | * | 265 | | | 1400 | | | 0.68 | J | | 0.038 | J | | < 0.0038 | | | 0.0067 | J | | < 0.0038 | J | | < 0.0038 | | | < 0.0038 | | |
| 13-SB-A | 6-6.6 | 5/7/2013 | 13:05 | | | | 1630 | | * | 2890 | | * | 677 | | | 5960 | | | 22 | | | 0.54 | | | < 0.085 | | | < 0.085 | | | 0.098 | | | < 0.085 | | | < 0.085 | | |
| 13-SB-B | 8-11.5 | 7/31/2013 | 8:20 | | | | 1960 | | * | 2570 | | * | 742 | | | 5640 | | | 16 | J | | 0.62 | J | | < 0.0041 | | | 0.11 | J | | 0.021 | J | | < 0.0041 | | | < 0.0041 | | |
| 13-SB-C | 11.5-14.5 | 7/31/2013 | 8:30 | | | | 1640 | | * | 2350 | | * | 688 | | | 4980 | | | 16 | J | | 0.61 | J | | < 0.0041 | | | 0.11 | J | | < 0.0041 | J | | < 0.0041 | | | < 0.0041 | | |
| 14-SB-A | 6-8 | 4/29/2013 | 11:55 | | | | 1320 | | * | 1770 | | * | 550 | | | 4080 | | | 28 | | | 0.97 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | |
| 14-SB-B | 6-12 | 6/6/2013 | 12:15 | | | | 1350 | | * | 1890 | | * | 607 | | | 4080 | | | 25 | | | 0.63 | | | < 0.035 | | | 0.35 | | | < 0.035 | | | < 0.035 | | | < 0.035 | | |
| 14-SB-C | 12-15 | 6/6/2013 | 12:30 | | | | 1470 | | * | 1080 | | * | 801 | | | 3500 | | | 11 | | | 0.35 | | | < 0.036 | | | 0.47 | | | 0.11 | U | | 0.074 | U | * | 0.10 | U | |
| 15-SB-A | 4-6 | 5/8/2013 | 15:45 | | | | 4410 | | * | 7020 | | * | 1350 | | | 14000 | | | 127 | | | 4.7 | | | < 0.074 | | | 0.87 | | | 0.19 | | | 0.11 | | * | 0.15 | | |
| 15-SB-AD | 4-6 | 5/8/2013 | 15:47 | | | | 4980 | | * | 7490 | | * | 1460 | | | 15300 | | | 95 | | | 3.6 | | | < 0.072 | | | 0.97 | | | 0.13 | | | < 0.072 | | | 0.098 | | |
| 15-SB-B | 7.8-8.8 | 7/12/2013 | 10:25 | | | | 1020 | | * | 1460 | | * | 440 | | | 3130 | | | 6.5 | | | 0.36 | | | < 0.0040 | | | 0.071 | | | 0.014 | | | 0.018 | | | 0.019 | | |
| 15-SB-C | 8-14 | 8/2/2013 | 11:40 | | | | 1730 | | * | 2320 | | * | 684 | | | 4950 | | | 9.9 | | | 0.32 | | | < 0.0042 | | | 0.084 | J | | 0.021 | | | < 0.0042 | | | < 0.0042 | | |
| 16-SB-A | 4-6 | 5/9/2013 | 16:15 | | | | 296 | | | 711 | | * | 127 | | | 1290 | | | 7.0 | | | 0.25 | | | < 0.0042 | | | 0.052 | | | 0.016 | | | 0.012 | | | 0.015 | | |
| 16-SB-B | 8-9.5 | 5/9/2013 | 16:55 | | | | 1100 | | * | 1640 | | * | 487 | | | 3470 | | | 15 | | | 0.45 | | | < 0.0042 | | | 0.092 | | | 0.034 | | | 0.018 | | | 0.023 | | |
| 16-SB-C | 8-13 | 8/2/2013 | 12:25 | | | | 4660 | | * | 5700 | | * | 1960 | | | 13500 | | | 55 | | | 1.3 | | | < 0.019 | | | 0.44 | J | | < 0.019 | | | < 0.019 | | | < 0.019 | | |
| 17-SB-A | 4-6 | 5/10/2013 | 12:00 | | | | 653 | | * | 2920 | | * | 113 | | | 3770 | | | < 0.044 | | | 0.078 | | | < 0.044 | | | < 0.044 | | | < 0.044 | | | < 0.044 | | | < 0.044 | | |
| 17-SB-B | 6-8 | 5/10/2013 | 12:50 | | | | 16500 | | * | 21900 | | * | 8020 | | | 49600 | | | 103 | J | | 4.1 | J | | < 0.084 | | | 0.84 | J | | 0.28 | J | * | < 0.084 | | | 0.18 | J | |
| 17-SB-C | 8-9.2 | 5/10/2013 | 13:33 | | | | 14400 | | * | 18600 | | * | 7030 | | | 43000 | | | 140 | | | 5.1 | | | < 0.17 | | | 4.4 | | | 0.59 | | * | < 0.17 | | | 0.33 | | * |
| 18-SB-A | 2-4 | 5/8/2013 | 11:33 | | | | 2480 | | * | 3050 | | * | 1500 | | | 8260 | | | 0.56 | | | 0.36 | | | < 0.041 | | | 0.44 | | | 0.20 | | | < 0.041 | | | < 0.041 | | |
| 18-SB-B | 7.7-8.5 | 7/12/2013 | 11:15 | | | | 1590 | | * | 1840 | | * | 913 | | | 4790 | | | 1.2 | | | 0.31 | | | < 0.021 | | | 0.45 | | | 0.091 | | | 0.051 | | * | < 0.021 | | |
| 18-SB-C | 8-11.5 | 8/2/2013 | 13:10 | | | | 1470 | | * | 1680 | | * | 679 | | | 4120 | | | 0.88 | | | 0.38 | | | < 0.059 | | | 0.18 | J | | < 0.059 | | | < 0.059 | | | < 0.059 | | |
| 18-SB-CD | 8-11.5 | 8/2/2013 | 13:15 | | | | 2070 | | * | 2470 | | * | 1070 | | | 6070 | | | 0.96 | | | 0.49 | | | < 0.063 | | | 0.58 | J | | < 0.063 | | | < 0.063 | | | < 0.063 | | |
| 19-SB-A | 4-4.8 | 5/2/2013 | 12:30 | | | | 1280 | | * | 1400 | | * | 556 | | | 3550 | | | 5.8 | J | | 0.19 | J | | < 0.077 | | | 0.22 | J | | < 0.077 | | | < 0.077 | | | < 0.077 | | |
| 19-SB-B | 6.5-8.0 | 8/9/2013 | 9:55 | | | | 2040 | | * | 2390 | | * | 927 | | | 5700 | | | 4.9 | U | | 0.28 | J | | < 0.021 | | | 0.15 | | | 0.030 | | | < 0.021 | | | < 0.021 | | |
| 19-SB-C | 8.0-15.5 | 8/9/2013 | 10:55 | | | | < 11 | | | < 11 | | | < 11 | | | 33 | | | 0.022 | | | < 0.0037 | J | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 20-SB-A | 4-6 | 4/24/2013 | 9:50 | | | | 279 | | | < 12 | | | 375 | | | 886 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | |
| 20-SB-B | 6-8 | 4/24/2013 | 10:00 | | | | 29 | | | < 12 | | | 42 | | | 112 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | |
| 20-SB-C | 9-15 | 8/1/2013 | 9:00 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0039 | J | | < 0.0039 | J | | < 0.0039 | | | < 0.0039 | J | | < 0.0039 | J | | < 0.0039 | | | < 0.0039 | | |
| 21-SB-A | 4-6 | 5/13/2013 | 11:00 | | | | < 12 | | | < 12 | | | < 12 | | | 41 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0054 | | | < 0.0038 | | | < 0.0038 | | |
| 21-SB-B | 7-8 | 6/11/2013 | 10:10 | | | | < 11 | | | < 11 | | | 12 | | | 37 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 21-SB-C | 8-11.5 | 6/27/2013 | 11:00 | | | | 984 | | * | 1200 | | * | 601 | | | 3160 | | | < 0.0037 | | | 0.086 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 22-SB-A | 6-8 | 5/16/2013 | 11:32 | | | | 1480 | | * | 2830 | | * | 620 | | | 5490 | | | 5.9 | | | 0.17 | | | < 0.020 | | | 0.074 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | |

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| 22-SB-B | 8-10 | 5/16/2013 | 11:58 | | | | 2290 | | * | 3930 | | * | 853 | | | 7870 | | | 17 | | | 0.54 | | | < 0.061 | | | 0.25 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | |
| 22-SB-C | 10-10.5 | 5/16/2013 | 12:20 | | | | 2060 | | * | 2970 | | * | 893 | | | 6750 | | | 13 | | | 0.40 | | | < 0.063 | | | 0.21 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | |
| 23-SB-A | 6-8 | 5/16/2013 | 11:50 | | | | 5320 | | * | 6400 | | * | 3180 | | | 17500 | | | 35 | | | 1.5 | | | < 0.060 | | | 0.80 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | |
| 23-SB-B | 8-10 | 5/16/2013 | 12:20 | | | | 12200 | | * | 16100 | | * | 7200 | | | 40800 | | | 60 | | | 3.4 | | | < 0.066 | | | 1.3 | | | < 0.066 | | | < 0.066 | | | < 0.066 | | |
| 23-SB-C | 10.5-11.5 | 5/16/2013 | 13:00 | | | | 2920 | | * | 3550 | | * | 1860 | | | 9680 | | | 13 | | | 1.2 | | | < 0.060 | | | 0.37 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | |
| 25-SB-A | 2-4 | 4/29/2013 | 15:30 | | | | 1200 | | * | 1480 | | * | 1040 | | | 4440 | | | 6.2 | | | 0.17 | | | < 0.038 | | | 0.084 | | | 0.059 | | | < 0.038 | | | < 0.038 | | |
| 25-SB-AD | 2-4 | 4/29/2013 | 15:32 | | | | 832 | | * | 1010 | | * | 717 | | | 3050 | | | 5.4 | | | 0.14 | | | < 0.037 | | | 0.075 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | |
| 25-SB-B | 7-8 | 8/8/2013 | 9:15 | | | | 734 | | * | 882 | | * | 294 | | | 2000 | | | 5.5 | | | 0.25 | J | | < 0.019 | | | 0.080 | | | < 0.019 | | | < 0.019 | | | < 0.019 | | |
| 25-SB-C | 8-11.5 | 7/31/2013 | 9:20 | | | | 549 | | * | 536 | | * | 195 | | | 1370 | | | 1.4 | J | | 0.15 | J | | < 0.0037 | | | 0.021 | J | | 0.0073 | J | | < 0.0037 | | | < 0.0037 | | |
| 26-SB-A | 6-8 | 4/30/2013 | 12:25 | | | | 2260 | | * | 3620 | | * | 967 | | | 7860 | | | 35 | J | | 1.2 | J | | < 0.021 | | | 0.25 | J | | 0.20 | J | | 0.11 | J | * | 0.14 | J | |
| 26-SB-B | 8.1-11 | 7/31/2013 | 12:10 | | | | 6850 | | * | 10100 | | * | 2760 | | | 21000 | | | 66 | J | | 3.3 | J | | < 0.064 | | | 0.77 | J | | 0.30 | J | * | < 0.064 | | | < 0.064 | | |
| 26-SB-C | 11-14.5 | 7/31/2013 | 12:30 | | | | 1620 | | * | 1940 | | * | 606 | | | 4420 | | | 18 | J | | 0.91 | J | | < 0.0039 | | | 0.22 | J | | 0.030 | J | | 0.018 | | | 0.022 | | |
| 27-SB-A | 6-7 | 4/30/2013 | 10:10 | | | | 6790 | | * | 7200 | | * | 3140 | | | 19200 | | | 59 | J | | 2.7 | J | | < 0.043 | | | 0.97 | J | | 0.20 | J | | 0.16 | J | * | 0.20 | J | * |
| 27-SB-B | 7.5-8.5 | 7/9/2013 | 14:33 | | | | 1820 | | * | 1750 | | * | 957 | | | 4950 | | | 9.5 | | | 0.89 | | | < 0.0038 | | | 2.6 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 27-SB-C | 8-13 | 7/31/2013 | 13:10 | | | | 3760 | | * | 2720 | | * | 1680 | | | 8650 | | | 13 | J | | 0.72 | J | | < 0.0038 | | | 0.57 | J | | 0.027 | J | | < 0.0038 | | | < 0.0038 | | |
| 28-SB-A | 6-7.3 | 4/30/2013 | 15:00 | | | | 668 | | * | 631 | | * | 387 | | | 1910 | | | 9.2 | | | 0.54 | | | < 0.0042 | | | 0.30 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | |
| 28-SB-B | 7.3-8.5 | 7/9/2013 | 15:30 | | | | 685 | | * | 486 | | * | 364 | | | 1710 | | | 2.5 | | | 0.16 | | | < 0.0040 | | | 0.11 | | | 0.033 | | | < 0.0040 | | | < 0.0040 | | |
| 28-SB-C | 8-11.5 | 7/31/2013 | 13:55 | | | | 1230 | | * | 1220 | | * | 722 | | | 3430 | | | 5.2 | J | | 0.26 | J | | < 0.0038 | | | 0.14 | J | | < 0.0038 | J | | < 0.0038 | | | < 0.0038 | | |
| 29-SB-A | 6-6.7 | 5/1/2013 | 15:20 | | | | 511 | | * | 520 | | * | 363 | | | 1540 | | | 0.99 | | | < 0.042 | | | < 0.042 | | | < 0.042 | | | < 0.042 | | | < 0.042 | | | < 0.042 | | |
| 29-SB-B | 6.7-8 | 6/11/2013 | 12:15 | | | | 366 | | | 378 | | * | 268 | | | 1130 | | | 0.10 | | | 0.011 | | | < 0.0040 | | | 0.0094 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| 29-SB-C | 8-11.5 | 6/28/2013 | 12:30 | | | | 91 | | | 86 | | | 75 | | | 286 | | | 0.026 | | | < 0.0040 | | | < 0.0040 | | | 0.012 | | | < 0.0040 | | | 0.0082 | | | < 0.0040 | | |
| 30-SB-A | 4-6 | 5/1/2013 | 10:00 | | | | 6250 | | * | 8500 | | * | 3320 | | | 21000 | | | 17 | | | < 0.17 | | | < 0.17 | | | < 0.17 | | | 0.67 | | * | 0.47 | | * | 0.59 | | * |
| 30-SB-B | 8-9.9 | 5/1/2013 | 10:50 | | | | 1620 | | * | 2700 | | * | 1090 | | | 6260 | | | 6.0 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | |
| 30-SB-C | 9.9-15 | 8/1/2013 | 8:00 | | | | 166 | | | 217 | | * | 100 | | | 536 | | | 0.42 | J | | < 0.0038 | J | | < 0.0038 | | | 0.0064 | J | | 0.0098 | J | | 0.0071 | | | 0.0099 | | |
| 31-SB-A | 6-7.5 | 5/2/2013 | 11:50 | | | | 2640 | | * | 3810 | | * | 1370 | | | 8830 | | | 2.8 | | | 0.12 | | | < 0.041 | | | 0.15 | | | < 0.041 | | | < 0.041 | | | < 0.041 | | |
| 31-SB-B | 5.5-7 | 8/7/2013 | 9:40 | | | | 3940 | | * | 6000 | | * | 1900 | | | 12400 | | | 1.2 | U | | 0.25 | J | | < 0.081 | | | 0.15 | | | < 0.081 | | | < 0.081 | | | < 0.081 | | |
| 31-SB-C | 8-11.5 | 6/28/2013 | 10:00 | | | | 223 | | | 320 | | * | 120 | | | 710 | | | 0.48 | U | | 0.014 | | | < 0.0038 | | | 0.012 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 32-SB-A | 2-4 | 5/2/2013 | 9:30 | 8150 | | * | 2750 | | * | 1350 | | * | 2110 | | | 7390 | | | 0.16 | | | < 0.031 | | | < 0.031 | | | < 0.031 | | | < 0.031 | | | < 0.031 | | | < 0.031 | | |
| 32-SB-B | 5-7.5 | 6/6/2013 | 16:25 | 147 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-BD | 5-7.5 | 6/6/2013 | 16:30 | 257 | | * | 75 | | | 46 | | | 51 | | | 198 | | | 0.025 | | | < 0.0087 | | | < 0.0087 | | | < 0.0087 | | | < 0.0087 | | | < 0.0087 | | | < 0.0087 | | |
| 32-SB-C | 8-12 | 6/6/2013 | 16:00 | 146 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-A | 4-6 | 5/2/2013 | 13:55 | 21600 | | * | 6770 | | * | 4450 | | * | 5310 | | | 19900 | | | 4.0 | | | < 0.089 | | | < 0.089 | | | < 0.089 | | | < 0.089 | | | < 0.089 | | | < 0.089 | | |
| 33-SB-B | 8-9 | 5/2/2013 | 14:30 | 6260 | | * | 2020 | | * | 1600 | | * | 1290 | | | 5840 | | | 0.39 | | | < 0.024 | | | < 0.024 | | | 0.12 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | |
| 33-SB-C | 12-16 | 6/6/2013 | 17:35 | 2690 | | * | 729 | | * | 706 | | * | 589 | | | 2210 | | | 0.16 | | | 0.025 | | | < 0.016 | | | 0.048 | | | 0.020 | U | | < 0.016 | | | < 0.016 | | |
| 34-SB-A | 6-8 | 6/10/2013 | 12:45 | 6450 | | * | 1130 | | * | 4820 | | * | 256 | | | 6500 | | | 1.8 | U | | 0.088 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | |
| 34-SB-AD | 6-8 | 6/10/2013 | 12:50 | 6020 | | * | 1110 | | * | 4270 | | * | 217 | | | 5910 | | | 1.7 | U | | 0.081 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | |
| 34-SB-B | 8-11.5 | 6/28/2013 | 11:10 | 1370 | | * | 217 | | | 801 | | * | 66 | | | 1150 | | | 0.33 | | | < 0.0083 | | | < 0.0083 | | | < 0.0083 | | | < 0.0083 | | | < 0.0083 | | | < 0.0083 | | |
| 34-SB-C | 11.5-15 | 6/28/2013 | 11:20 | 56 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-A | 4-6 | 5/6/2013 | 11:20 | 1520 | | * | 327 | | | 617 | | * | 122 | | | 1160 | | | 0.40 | | | < 0.0076 | | | < 0.0076 | | | < 0.0076 | | | < 0.0076 | | | < 0.0076 | | | < 0.0076 | | |
| 35-SB-B | 8.5-11 | 6/7/2013 | 9:10 | 5210 | | * | 1200 | | * | 3240 | | * | 363 | | | 4990 | | | 2.4 | | | 0.10 | | | < 0.024 | | | 0.082 | | | 0.069 | U | | 0.098 | U | * | 0.091 | U | |
| 35-SB-C | 15-20 | 6/7/2013 | 9:25 | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36-SB-A | 2-4 | 5/13/2013 | 12:15 | | | | 60 | | | < 12 | | | < 12 | | | 81 | | | 0.016 | U | | 0.026 | | | < 0.0039 | | | 0.082 | | | 0.065 | | | 0.076 | | * | 0.059 | | |
| 36-SB-B | 6-8 | 5/13/2013 | 12:30 | | | | 54 | | | < 12 | | | < 12 | | | 72 | | | 0.010 | U | | 0.030 | | | < 0.0081 | | | 0.093 | | | 0.13 | | | 0.12 | | * | 0.18 | | |
| 36-SB-C | 8-10 | 5/13/2013 | 13:00 | | | | < 13 | | | < 13 | | | < 13 | | | < 13 | | | 0.0041 | U | | 0.010 | | | < 0.0041 | | | 0.034 | | | 0.047 | | | 0.034 | | * | 0.047 | | |
| 37-SB-A | 2-4 | 5/13/2013 | 15:00 | | | | 15 | | | < 12 | | | < 12 | | | 45 | | | 0.0074 | U | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | |
| 37-SB-B | 8-11.5 | 6/27/2013 | 11:35 | | | | 451 | | * | 664 | | * | 319 | | | 1630 | | | < 0.037 | | | 0.091 | | | < 0.037 | | | 0.12 | | | 0.094 | | | 0.072 | | * | 0.11 | | |
| 37-SB-C | 11.5-15.5 | 6/27/2013 | 12:25 | | | | 243 | | | 269 | | * | 153 | | | 768 | | | 0.093 | | | 0.050 | | | < 0.0038 | | | 0.043 | | | < 0.0038 | | | 0.0073 | | | < 0.0038 | | |
| 37-SB-CD | 11.5-15.5 | 6/27/2013 | 12:30 | | | | 221 | | | 252 | | * | 160 | | | 737 | | | 0.094 | | | 0.052 | | | < 0.0038 | | | 0.058 | | | < 0.0038 | | | 0.0071 | | | < 0.0038 | | |
| 38-SB-A | 2-4 | 5/16/2013 | 9:10 | | | | 281 | | | < 65 | | | 386 | | | 1240 | | | 0.069 | | | < 0.036 | | | 0.13 | | | 0.044 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | |
| 38-SB-B | 6-8 | 6/7/2013 | 13:50 | | | | 585 | | * | 153 | | | 398 | | | 1470 | | | 0.032 | | | < 0.0078 | | | 0.17 | | | 0.065 | | | 0.046 | | | 0.050 | | * | 0.074 | | |
| 38-SB-C | 8-10 | 6/27/2013 | 10:10 | | | | 1550 | | * | 1440 | | * | 927 | | | 4550 | | | 3.4 | | | 0.40 | | | < 0.037 | | | 0.33 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | |
| 39-SB-A | 2-4 | 4/26/2013 | 15:20 | | | | 6560 | | * | 8460 | | * | 7700 | | | 27600 | | | 32 | J | | 2.3 | J | | < 0.14 | | | 1.7 | J | | 2.5 | J | * | 2.4 | J | * | 2.5 | J | * |
| 39-SB-B | 8-11.5 | 6/27/2013 | 14:15 | | | | 20500 | | * | 35000 | | * | 18800 | | | 85900 | | | 182 | | | 7.6 | | | < 0.080 | | | 2.3 | | | < 0.080 | | | 0.44 | | * | < 0.080 | | |
| 39-SB-C | 11.5-15.5 | 6/27/2013 | 13:35 | | | | 3200 | | * | 5230 | | * | 2130 | | | 12000 | | | 18 | | | 0.69 | | | < 0.037 | | | 0.32 | | | 0.13 | | | 0.072 | | * | 0.10 | | |
| 40-SB-A | 6-7.5 | 4/29/2013 | 15:15 | | | | 3500 | | * | 5060 | | * | 2070 | | | 12000 | | | 7.5 | J | | 2.9 | J | | < 0.020 | | | 4.5 | J | | 1.2 | J | * | 0.71 | J | * | 1.0 | J | * |
| 40-SB-B | 8-11.5 | 6/28/2013 | 7:15 | | | | 3160 | | * | 6450 | | * | 1370 | | | 11800 | | | 2.7 | | | 0.72 | | | < 0.036 | | | 1.1 | | | 0.40 | | * | 0.18 | | * | 0.30 | | * |
| 40-SB-C | 11.5-19.5 | 6/28/2013 | 8:05 | | | | < 12 | | | 18 | | | < 12 | | | 48 | | | 0.028 | | | < 0.0039 | | | < 0.0039 | | | 0.011 | | | 0.013 | | | 0.011 | | | 0.0050 | | |
| 41-SB-A | 6-6.6 | 4/30/2013 | 13:40 | | | | 7270 | | * | 11500 | | * | 3160 | | | 24800 | | | 69 | J | | 2.8 | J | | < 0.047 | | | 1.4 | J | | 0.93 | J | * | 0.34 | J | * | 0.41 | J | * |
| 41-SB-B | 8-9.2 | 7/10/2013 | 14:00 | | | | 931 | | * | 1490 | | * | 373 | | | 3020 | | | 7.5 | | | 0.22 | | | < 0.019 | | | 0.13 | | | 0.14 | | | 0.12 | | * | 0.16 | | |
| 41-SB-C | 12-16 | 8/1/2013 | 15:55 | | | | 951 | | * | 1730 | | * | 378 | | | 3150 | | | 4.1 | J | | 0.17 | J | | < 0.0040 | | | 0.13 | J | | 0.030 | J | | 0.022 | | * | 0.038 | | |
| 41-SB-CD | 12-16 | 8/1/2013 | 15:59 | | | | 865 | | * | 1590 | | * | 411 | | | 2980 | | | 9.7 | J | | 0.37 | J | | < 0.019 | | | 0.23 | J | | 0.082 | J | | 0.049 | | * | 0.070 | | |
| 42-SB-A | 6-7 | 4/30/2013 | 10:25 | | | | 1620 | | * | 1540 | | * | 892 | | | 4720 | | | < 0.042 | | | 0.19 | | | < 0.042 | | | 0.20 | | | < 0.042 | | | < 0.042 | | | < 0.042 | | |
| 42-SB-B | 7.2-82 | 7/10/2013 | 10:55 | | | | 5020 | | * | 8990 | | * | 2050 | | | 17200 | | | 27 | | | 1.5 | | | < 0.041 | | | 1.2 | | | 1.2 | | * | 0.76 | | * | 1.1 | | * |
| 42-SB-C | 8-11.5 | 7/31/2013 | 15:15 | | | | 2320 | | * | 4580 | | * | 1130 | | | 8310 | | | 6.9 | J | | 0.45 | J | | < 0.0041 | | | 0.35 | J | | 0.12 | J | | 0.12 | | * | 0.18 | | |
| 43-SB-A | 2-4 | 4/30/2013 | 14:45 | | | | 3140 | | * | 2590 | | * | 3360 | | | 11700 | | | 33 | | | < 0.61 | | | < 0.61 | | | < 0.61 | | | 1.1 | | * | < 0.61 | | | < 0.61 | | |

| . | | | I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ale il o out a ota u sur ace oil am ling H, | | | | H Hscr | | | I | | | I H I | | | I H I | | | H H | | | H H | | | H H | | | H H | | | H | | | H | | | | | | H | | |
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| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | |
| s ommercial u sur ace | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 43-SB-B | 6-8 | 7/10/2013 | 11:22 | | | | 914 | | * | 1220 | | * | 612 | | | 3020 | | | 0.30 | | | 0.15 | | | < 0.0038 | | | 0.17 | | | 0.070 | | | < 0.0038 | | | < 0.0038 | | |
| 43-SB-C | 8.3-11.5 | 7/31/2013 | 14:40 | | | | 713 | | * | 922 | | * | 490 | | | 2290 | | | 0.26 | J | | 0.11 | J | | < 0.0037 | | | 0.078 | J | | < 0.0037 | J | | 0.019 | | | 0.020 | | |
| 44-SB-A | 2-4 | 5/1/2013 | 13:25 | | | | 3380 | | * | 1950 | | * | 6110 | | | 15300 | | | 0.19 | | | < 0.17 | | | < 0.17 | | | < 0.17 | | | 0.26 | | * | < 0.17 | | | 0.27 | | * |
| 44-SB-B | 2-4 | 5/1/2013 | 12:25 | | | | 3850 | | * | 3790 | | * | 2700 | | | 11800 | | | 24 | | | 0.55 | | | < 0.085 | | | 0.36 | | | < 0.085 | | | < 0.085 | | | < 0.085 | | |
| 44-SB-C | 4-6 | 5/1/2013 | 12:30 | | | | 283 | | | 190 | | | 279 | | | 1000 | | | 0.74 | | | < 0.040 | | | < 0.040 | | | < 0.040 | | | < 0.040 | | | < 0.040 | | | < 0.040 | | |
| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | | | | 11200 | | * | 9410 | | * | 8130 | | | 33000 | | | 49 | J | | 1.1 | J | | < 0.17 | | | 0.86 | J | | < 0.17 | | | < 0.17 | | | < 0.17 | | |
| 45-SB-B | 4-4.9 | 5/1/2013 | 11:35 | | | | 1510 | | * | 1120 | | * | 1370 | | | 4820 | | | 3.8 | | | < 0.043 | | | < 0.043 | | | 0.044 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | |
| 45-SB-C | 8-11.5 | 8/9/2013 | 14:10 | | | | 86 | | | 97 | | | 69 | | | 272 | | | 0.015 | U | | < 0.0040 | J | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| 46-SB-A | 4-6 | 5/1/2013 | 15:05 | | | | 4580 | | * | 4500 | | * | 2920 | | | 14100 | | | 0.22 | | | < 0.076 | | | < 0.076 | | | < 0.076 | | | 0.22 | | * | 0.18 | | * | 0.25 | | * |
| 46-SB-B | 5-6.2 | 8/6/2013 | 11:25 | | | | 3540 | | * | 3840 | | * | 2460 | | | 10400 | | | 0.29 | U | | 0.12 | J | | < 0.079 | | | 0.14 | | | < 0.079 | | | < 0.079 | | | < 0.079 | | |
| 46-SB-BD | 5-6.2 | 8/6/2013 | 11:30 | | | | 5070 | | * | 6050 | | * | 3800 | | | 15800 | | | 0.37 | U | | 0.31 | J | | < 0.080 | | | 0.21 | | | < 0.080 | | | < 0.080 | | | < 0.080 | | |
| 46-SB-C | 8-11.5 | 6/28/2013 | 8:50 | | | | 114 | | | 95 | | | 98 | | | 355 | | | < 0.0038 | | | 0.016 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 47-SB-A | 6-7.7 | 5/2/2013 | 9:45 | 15300 | | * | 5050 | | * | 3800 | | * | 3290 | | | 14100 | | | < 0.085 | | | 0.14 | | | < 0.085 | | | 0.17 | | | < 0.085 | | | < 0.085 | | | < 0.085 | | |
| 47-SB-B | 5-7 | 8/6/2013 | 14:25 | 2650 | | * | 1080 | | * | 281 | | * | 1220 | | | 3140 | | | < 0.041 | | | < 0.041 | J | | < 0.041 | | | < 0.041 | | | < 0.041 | | | < 0.041 | | | < 0.041 | | |
| 47-SB-BD | 5-7 | 8/6/2013 | 14:30 | 2560 | | * | 905 | | * | 271 | | * | 793 | | | 2300 | | | < 0.084 | | | < 0.084 | J | | < 0.084 | | | < 0.084 | | | < 0.084 | | | < 0.084 | | | < 0.084 | | |
| 47-SB-C | 8-10 | 6/27/2013 | 16:50 | 170 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-A | 4-6 | 4/25/2013 | 14:00 | 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-B | 6-8 | 4/25/2013 | 14:35 | < 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-C | 8-9.2 | 4/25/2013 | 15:00 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-CD | 8-9.2 | 4/25/2013 | 15:03 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SB-A | 6-7.2 | 4/25/2013 | 12:30 | 23400 | | * | 7680 | | * | 7500 | | * | 5430 | | | 23000 | | | 16 | J | | 0.59 | J | | < 0.087 | | | 0.69 | J | | 0.27 | J | * | < 0.087 | | | < 0.087 | | |
| 49-SB-B | 8-11.5 | 6/27/2013 | 15:15 | 1320 | | * | 438 | | * | 300 | | * | 351 | | | 1290 | | | 0.070 | | | 0.0093 | | | < 0.0078 | | | 0.040 | | | 0.11 | | | 0.056 | | * | 0.052 | | |
| 49-SB-C | 11.5-14.5 | 6/27/2013 | 16:00 | 42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SB-A | 6-8 | 4/25/2013 | 10:40 | 745 | | * | 137 | | | 495 | | * | 58 | | | 704 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | 0.010 | | | < 0.0042 | | |
| 50-SB-B | 8-11.5 | 7/31/2013 | 9:55 | 166 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SB-C | 11.5-14 | 7/31/2013 | 10:10 | < 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SB-A | 4-6 | 4/24/2013 | 15:00 | 4340 | | * | 1170 | | * | 1710 | | * | 531 | | | 4210 | | | < 0.050 | | | < 0.050 | | | < 0.050 | | | < 0.050 | | | 0.18 | | | 0.21 | | * | 0.28 | | * |
| 51-SB-B | 8-9 | 6/7/2013 | 10:45 | 1930 | | * | 367 | | | 1260 | | * | 61 | | | 1750 | | | < 0.0081 | | | 0.047 | | | < 0.0081 | | | 0.035 | | | 0.087 | | | 0.10 | | * | 0.098 | | |
| 51-SB-C | 9-12 | 6/7/2013 | 11:00 | 140 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-A | 4-6 | 5/17/2013 | 15:20 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-B | 6-8 | 5/17/2013 | 16:05 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-C | 8-10 | 5/17/2013 | 16:40 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SB-A | 2-2.9 | 5/21/2013 | 11:00 | | | | 38 | | | 35 | | | 70 | | | 348 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | |
| 53-SB-B | 6-8 | 5/23/2013 | 11:30 | | | | 47 | | | 110 | | | 35 | | | 228 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | 0.0054 | U | | < 0.0040 | | | < 0.0040 | | |
| 53-SB-C | 10-12 | 6/5/2013 | 15:10 | | | | 160 | | | 278 | | * | 91 | | | 624 | | | < 0.0083 | | | < 0.0083 | | | < 0.0083 | | | < 0.0083 | | | < 0.0083 | | | < 0.0083 | | | 0.011 | U | |
| 54-SB-A | 6-7 | 5/20/2013 | 14:05 | | | | 2490 | | * | 6580 | | * | 608 | | | 9950 | | | 13 | | | 0.35 | | | < 0.041 | | | 0.14 | | | 0.077 | | | 0.042 | | * | 0.065 | | |
| 54-SB-B | 8-8.5 | 5/23/2013 | 15:45 | | | | 2590 | | * | 7540 | | * | 736 | | | 11700 | | | 26 | | | 0.39 | | | < 0.081 | | | 0.31 | | | 0.16 | U | | < 0.081 | | | 0.12 | U | |
| 54-SB-C | 7-10 | 6/5/2013 | 16:40 | | | | 788 | | * | 2390 | | * | 155 | | | 3410 | | | 7.5 | U | | < 0.033 | | | < 0.033 | | | < 0.033 | | | 0.038 | U | | < 0.033 | | | < 0.033 | | |
| 55-SB-A | 4-5.75 | 5/21/2013 | 10:00 | | | | 1130 | | * | 6000 | | * | 74 | | | 7270 | | | 0.34 | | | < 0.039 | | | < 0.039 | | | 0.082 | | | 0.049 | | | < 0.039 | | | < 0.039 | | |
| 55-SB-B | 5.5-7.5 | 8/8/2013 | 15:25 | | | | 3620 | | * | 14500 | | * | 259 | | | 18600 | | | 1.0 | | | 0.61 | J | | < 0.038 | | | 0.30 | | | 0.090 | | | 0.064 | | * | 0.084 | | |
| 55-SB-C | 6-8 | 6/5/2013 | 17:40 | | | | 779 | | * | 2920 | | * | 49 | | | 3810 | | | 0.37 | | | < 0.033 | | | < 0.033 | | | < 0.033 | | | 0.047 | U | | < 0.033 | | | < 0.033 | | |
| 56-SB-A | 6-8 | 5/20/2013 | 14:30 | | | | 3010 | | * | 9560 | | * | 497 | | | 13400 | | | 16 | | | 0.60 | | | < 0.043 | | | 0.25 | | | 0.14 | | | 0.076 | | * | 0.12 | | |
| 56-SB-B | 6.5-8.5 | 8/12/2013 | 10:40 | | | | 7300 | | * | 19600 | | * | 1100 | | | 28600 | | | 32 | | | 1.9 | J | | < 0.042 | | | 1.1 | | | 0.36 | | * | 0.28 | | * | 0.33 | | * |
| 56-SB-C | 8-10 | 6/5/2013 | 18:25 | | | | 2030 | | * | 5750 | | * | 380 | | | 8380 | | | 9.5 | | | < 0.033 | | | < 0.033 | | | 0.52 | | | 0.14 | U | | 0.064 | U | * | 0.094 | U | |
| 57-SB-A | 4-6 | 5/21/2013 | 12:00 | | | | 153 | | | 689 | | * | 77 | | | 966 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | 0.0095 | | | 0.030 | | * | 0.036 | | |
| 57-SB-B | 6-8 | 5/21/2013 | 12:35 | | | | 1180 | | * | 5180 | | * | 197 | | | 6670 | | | 0.36 | | | < 0.040 | | | < 0.040 | | | 0.11 | | | 0.097 | | | 0.11 | | * | 0.11 | | |
| 57-SB-C | 8-12 | 7/2/2013 | 9:25 | | | | 747 | | * | 2060 | | * | 142 | | | 3020 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | 0.072 | | | 0.029 | | | 0.022 | | * | 0.025 | | |
| 58-SB-A | 6-8 | 5/22/2013 | 10:40 | | | | 957 | | * | 2450 | | * | 340 | | | 3910 | | | 2.6 | | | < 0.040 | | | < 0.040 | | | 0.086 | | | 0.17 | U | | 0.23 | | * | 0.33 | | * |
| 58-SB-B | 10-10.8 | 5/22/2013 | 11:40 | | | | 1510 | | * | 4210 | | * | 504 | | | 6450 | | | 1.8 | | | 0.24 | | | < 0.044 | | | 0.20 | | | 0.13 | U | | 0.078 | U | * | 0.13 | U | |
| 58-SB-C | 10.8-14 | 8/1/2013 | 12:15 | | | | 2630 | | * | 6740 | | * | 766 | | | 10500 | | | 3.2 | J | | 0.41 | J | | < 0.045 | | | 0.18 | J | | 0.13 | J | | 0.10 | | * | 0.17 | | |
| 59-SB-A | 4-6 | 5/22/2013 | 13:15 | | | | < 11 | | | < 11 | | | < 11 | | | 30 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | |
| 59-SB-B | 6-8 | 5/28/2013 | 11:40 | | | | 468 | | * | 660 | | * | 296 | | | 1530 | | | < 0.021 | | | < 0.021 | | | < 0.021 | | | < 0.021 | | | 0.027 | | | 0.025 | | * | 0.026 | | |
| 59-SB-C | 8-8.7 | 5/28/2013 | 15:00 | | | | 609 | | * | 836 | | * | 419 | | | 2040 | | | < 0.019 | | | < 0.019 | | | < 0.019 | | | < 0.019 | | | 0.034 | | | 0.033 | | * | 0.043 | | |
| 60-SB-A | 4-5.3 | 5/22/2013 | 9:45 | | | | 875 | | * | 2360 | | * | 242 | | | 3580 | | | 0.20 | | | 0.077 | | | < 0.039 | | | 0.087 | | | 0.055 | U | | < 0.039 | | | < 0.039 | | |
| 60-SB-B | 6-8 | 5/28/2013 | 11:00 | | | | 446 | | * | 1200 | | * | 94 | | | 1780 | | | 4.2 | | | 0.095 | | | < 0.0040 | | | 0.059 | | | 0.011 | | | 0.0045 | | | 0.0068 | | |
| 60-SB-C | 8-15.5 | 7/1/2013 | 16:40 | | | | 377 | | | 947 | | * | 96 | | | 1460 | | | 3.1 | | | 0.059 | | | < 0.0038 | | | 0.039 | | | 0.011 | | | 0.0061 | | | 0.0096 | | |
| 61-SB-A | 2-4 | 5/21/2013 | 15:25 | | | | 325 | | | 1510 | | * | 17 | | | 1900 | | | 0.21 | | | 0.053 | | | < 0.0043 | | | 0.045 | | | 0.022 | | | 0.024 | | * | 0.022 | | |
| 61-SB-B | 6-8 | 5/21/2013 | 15:45 | | | | 3110 | | * | 12900 | | * | 146 | | | 16500 | | | 19 | | | < 0.089 | | | < 0.089 | | | < 0.089 | | | 0.091 | | | < 0.089 | | | < 0.089 | | |
| 61-SB-C | 8-9 | 5/21/2013 | 16:00 | | | | 1650 | | * | 6800 | | * | 65 | | | 8680 | | | 16 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | 0.046 | | | < 0.043 | | | < 0.043 | | |
| 62-SB-A | 4-6 | 5/21/2013 | 15:00 | | | | 2240 | | * | 9110 | | * | 109 | | | 11600 | | | 3.9 | | | < 0.037 | | | < 0.037 | | | 0.094 | | | 0.075 | | | 0.062 | | * | 0.057 | | |
| 62-SB-B | 6-8 | 5/21/2013 | 15:05 | | | | 3080 | | * | 13000 | | * | 161 | | | 16500 | | | 13 | | | < 0.041 | | | < 0.041 | | | 0.17 | | | 0.19 | | | 0.12 | | * | 0.16 | | |
| 62-SB-C | 8-9 | 8/1/2013 | 13:00 | | | | 581 | | * | 2130 | | * | 70 | | | 2820 | | | 2.3 | J | | 0.089 | J | | 0.23 | | | 0.037 | J | | 0.033 | J | | 0.028 | | * | 0.036 | | |
| 63-SB-A | 2-4 | 5/21/2013 | 14:15 | | | | 5610 | | * | 18500 | | * | 921 | | | 25600 | | | 54 | | | 0.70 | | | < 0.083 | | | 0.33 | | | 0.28 | | * | 0.17 | | * | 0.20 | | * |
| 63-SB-B | 4-5.3 | 5/21/2013 | 14:35 | | | | 2770 | | * | 11400 | | * | 378 | | | 14800 | | | 25 | | | 0.47 | | | < 0.043 | | | 0.22 | | | 0.24 | | * | 0.14 | | * | 0.21 | | * |
| 63-SB-C | 6-8 | 5/28/2013 | 10:00 | | | | 1490 | | * | 5000 | | * | 182 | | | 6780 | | | 24 | | | 0.46 | | | < 0.040 | | | 0.39 | | | 0.18 | | | 0.11 | | * | 0.11 | | |

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| raction | | | | H | | | H | | | H | | | H | | | H | | | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | |
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| 64-SB-A | 4-6 | 5/21/2013 | 12:15 | | | | 3120 | | * | 10100 | | * | 788 | | | 14300 | | | 1.7 | | | 0.45 | | | < 0.041 | | | 0.19 | | | 0.082 | | | < 0.041 | | | < 0.041 | | |
| 64-SB-B | 6-6.7 | 5/21/2013 | 12:35 | | | | 2980 | | * | 9720 | | * | 695 | | | 13700 | | | 0.98 | | | 0.26 | | | < 0.040 | | | 0.11 | | | 0.059 | | | 0.061 | | * | 0.068 | | |
| 64-SB-C | 8-15.5 | 7/2/2013 | 8:45 | | | | 159 | | | 390 | | * | 50 | | | 615 | | | 0.091 | | | < 0.0039 | | | < 0.0039 | | | 0.0099 | | | 0.0069 | | | < 0.0039 | | | < 0.0039 | | |
| 65-SB-A | 6-8 | 5/28/2013 | 16:10 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0087 | | | 0.0082 | | | 0.011 | | |
| 65-SB-B | 8-11.5 | 8/1/2013 | 11:30 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | 0.019 | J | | < 0.0040 | J | | < 0.0040 | | | < 0.0040 | J | | 0.013 | J | | 0.015 | | | 0.026 | | |
| 65-SB-C | 11.5-15 | 8/1/2013 | 11:40 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | 0.012 | J | | < 0.0039 | J | | < 0.0039 | | | < 0.0039 | J | | < 0.0039 | J | | < 0.0039 | | | < 0.0039 | | |
| 66-SB-A | 6-7 | 5/30/2013 | 15:30 | < 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66-SB-B | 2-4 | 5/31/2013 | 9:30 | 246 | | * | 56 | | | < 15 | | | 159 | | | 263 | J | | 0.036 | | | < 0.0097 | | | < 0.0097 | | | 0.035 | | | 0.19 | J | | 0.33 | | * | 0.29 | J | * |
| 66-SB-C | 4-5.5 | 5/31/2013 | 9:45 | 718 | | * | 352 | | | 47 | | | 389 | | | 883 | J | | 0.23 | | | 0.33 | | | 0.12 | | | 0.30 | | | 1.2 | J | * | 0.91 | | * | 0.87 | J | * |
| 67-SB-A | 4-6 | 5/30/2013 | 10:50 | | | | 19 | | | < 13 | | | 28 | | | 70 | J | | 0.0098 | | | < 0.0042 | | | 0.021 | | | 0.012 | | | 0.044 | J | | 0.081 | | * | 0.084 | J | |
| 67-SB-AD | 4-6 | 5/30/2013 | 10:55 | | | | 13 | | | < 13 | | | 22 | | | 56 | J | | 0.0097 | | | < 0.0042 | | | 0.025 | | | 0.025 | | | 0.083 | J | | 0.13 | | * | 0.15 | J | |
| 67-SB-B | 6-7 | 5/30/2013 | 11:20 | | | | 27 | | | < 14 | | | 48 | | | 103 | J | | 0.011 | | | < 0.0048 | | | 0.040 | | | 0.025 | | | 0.10 | J | | 0.16 | | * | 0.16 | J | |
| 67-SB-BD | 6-7 | 5/30/2013 | 11:25 | | | | 91 | | | < 14 | | | 157 | | | 310 | J | | 0.016 | | | < 0.0047 | | | 0.051 | | | 0.021 | | | 0.079 | J | | 0.18 | | * | 0.18 | J | |
| 67-SB-C | 8-16 | 7/2/2013 | 10:10 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0079 | | | 0.011 | | | 0.0095 | | |
| 68-SB-A | 2-4 | 5/30/2013 | 12:45 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-B | 4-6 | 6/6/2013 | 11:30 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-C | 6-8 | 6/6/2013 | 11:45 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-A | 2-4 | 5/30/2013 | 13:10 | | | | < 10 | | | < 10 | | | < 10 | | | 12 | J | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | 0.0062 | | | 0.017 | J | | 0.023 | | * | 0.026 | J | |
| 69-SB-B | 4-6 | 6/6/2013 | 10:40 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 69-SB-C | 8-10 | 7/2/2013 | 11:15 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 70-SB-A | 2-4 | 5/30/2013 | 14:45 | < 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-B | 4-6 | 6/6/2013 | 9:40 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-C | 6-8 | 6/6/2013 | 10:00 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-A | 2-4 | 5/30/2013 | 10:25 | 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-AD | 2-4 | 5/30/2013 | 10:30 | 55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-B | 6-8 | 6/3/2013 | 14:05 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-C | 8-11.5 | 6/28/2013 | 13:30 | < 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-A | 4-6 | 5/29/2013 | 10:10 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-B | 6-7.5 | 5/29/2013 | 10:20 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-C | 7.5-9.5 | 5/29/2013 | 10:50 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-A | 2-3.2 | 5/22/2013 | 11:35 | 531 | | * | 113 | | | 15 | | | 128 | | | 465 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | 0.15 | U | | 0.12 | U | * | 0.20 | U | |
| 73-SB-B | 7.5-8.5 | 8/12/2013 | 9:30 | 1550 | | * | 329 | | | 919 | | * | 55 | | | 1340 | | | 0.67 | | | 0.035 | J | | < 0.0086 | | | 0.022 | | | < 0.0086 | | | < 0.0086 | | | < 0.0086 | | |
| 73-SB-C | 8-10.5 | 6/28/2013 | 14:30 | 1690 | | * | 318 | | | 1100 | | * | 38 | | | 1470 | | | < 0.0079 | | | 0.027 | | | < 0.0079 | | | 0.018 | | | < 0.0079 | | | < 0.0079 | | | < 0.0079 | | |
| 74-SB-A | 2-4 | 5/22/2013 | 15:00 | 647 | | * | 111 | | | 34 | | | 210 | | | 539 | | | < 0.076 | | | 0.18 | | | < 0.076 | | | 0.58 | | | 1.2 | | * | 1.0 | | * | 1.8 | | * |
| 74-SB-AD | 2-4 | 5/22/2013 | 15:10 | 718 | | * | 157 | | | 31 | | | 228 | | | 641 | | | < 0.038 | | | 0.14 | | | < 0.038 | | | 0.50 | | | 1.1 | | * | 0.89 | | * | 1.6 | | * |
| 74-SB-B | 5.0-6.5 | 8/12/2013 | 11:10 | 652 | | * | 221 | | | 65 | | | 340 | | | 798 | | | 0.014 | U | | 0.12 | J | | < 0.0085 | | | 0.34 | | | 0.64 | | * | 0.79 | | * | 0.84 | | * |
| 74-SB-C | 8-11.5 | 8/1/2013 | 13:30 | 932 | | * | 280 | | | 489 | | * | 106 | | | 912 | | | 0.038 | J | | 0.0092 | J | | < 0.0076 | | | 0.017 | J | | 0.061 | J | | 0.077 | | * | 0.077 | | |
| 75-SB-A | 2-4 | 5/22/2013 | 13:55 | | | | 53 | | | 79 | | | 82 | | | 271 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | | 0.065 | U | | 0.075 | U | * | 0.086 | U | |
| 75-SB-B | 4-6 | 5/22/2013 | 14:55 | | | | 233 | | | 88 | | | 313 | | | 940 | | | < 0.045 | | | 0.065 | | | < 0.045 | | | 0.24 | | | 0.32 | | * | 0.43 | | * | 0.45 | | * |
| 75-SB-C | 8-11.5 | 7/1/2013 | 11:05 | | | | 452 | | * | 1000 | | * | 239 | | | 1730 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | 0.044 | | | 0.027 | | * | 0.032 | | |
| 76-SB-A | 2-4 | 5/23/2013 | 9:35 | | | | < 13 | | | < 13 | | | 25 | | | 30 | | | 0.020 | | | < 0.0044 | | | 0.012 | | | 0.0086 | | | 0.036 | | | 0.059 | | * | 0.072 | | |
| 76-SB-B | 4-6 | 5/23/2013 | 9:50 | | | | < 13 | | | < 13 | | | 18 | | | 23 | | | 0.0093 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | 0.013 | U | | 0.015 | U | | 0.020 | U | |
| 76-SB-C | 6-7.4 | 5/23/2013 | 10:10 | | | | < 13 | | | < 13 | | | < 13 | | | < 13 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | |
| 77-SB-A | 2-4 | 5/24/2013 | 11:55 | 826 | | * | 149 | | | < 75 | | | 176 | | | 495 | | | 0.40 | | | 1.9 | | | 0.13 | | | 5.9 | | | 5.5 | U | * | 5.9 | U | * | 5.6 | U | * |
| 77-SB-B | 4-6 | 5/24/2013 | 12:15 | 128 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-C | 8-15.5 | 7/1/2013 | 11:50 | < 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-A | 2-4 | 5/24/2013 | 11:50 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-B | 4-5.5 | 5/24/2013 | 12:15 | < 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-C | 6-8 | 6/5/2013 | 9:45 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79-SB-B | 2-4 | 5/23/2013 | 11:05 | | | | < 14 | | | 29 | | | 50 | | | 102 | | | 0.014 | | | < 0.0049 | | | < 0.0049 | | | 0.0057 | | | 0.028 | | | 0.043 | | * | 0.062 | | |
| 79-SB-C | 4-6 | 5/23/2013 | 11:25 | | | | < 14 | | | < 14 | | | 17 | | | 34 | | | 0.011 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | 0.0090 | U | | 0.0081 | U | | 0.013 | U | |
| 80-SB-A | 2-2.5 | 5/23/2013 | 10:15 | | | | 16 | | | 30 | | | 33 | | | 91 | | | 0.14 | | | < 0.0044 | | | < 0.0044 | | | 0.0072 | | | 0.019 | U | | 0.023 | | * | 0.035 | | |
| 80-SB-B | 2.5-3.5 | 5/23/2013 | 10:00 | | | | 1320 | | * | 3450 | | * | 297 | | | 5470 | | | 13 | J | | 0.41 | J | | < 0.087 | | | 0.11 | J | | 0.092 | U | | < 0.087 | | | < 0.087 | | |
| 80-SB-C | 3.5-5.8 | 5/23/2013 | 10:45 | | | | 1250 | | * | 3220 | | * | 240 | | | 4850 | | | 21 | | | 0.53 | | | < 0.044 | | | 0.093 | | | < 0.044 | | | < 0.044 | | | < 0.044 | | |
| 81-SB-A | 2-4 | 5/14/2013 | 15:25 | | | | 1660 | | * | 713 | | * | 1030 | | | 3690 | | | 0.15 | U | | 0.16 | | | < 0.037 | | | 0.72 | | | 0.34 | | * | 0.47 | | * | 0.55 | | * |
| 81-SB-B | 5-6 | 6/11/2013 | 13:45 | | | | 776 | | * | 2120 | | * | 335 | | | 3360 | | | 3.8 | | | < 0.0042 | | | < 0.0042 | | | 0.029 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | |
| 81-SB-C | 6-7 | 6/11/2013 | 14:10 | | | | < 75 | | | 127 | | | < 75 | | | 303 | | | 1.6 | U | | < 0.0041 | | | < 0.0041 | | | 0.011 | | | 0.0064 | U | | < 0.0041 | | | < 0.0041 | | |
| 82-SB-A | 4-6 | 5/15/2013 | 9:35 | | | | < 11 | | | < 11 | | | < 11 | | | 34 | J | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 82-SB-AD | 4-6 | 5/15/2013 | 9:36 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | J | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | |
| 82-SB-B | 5-6 | 6/11/2013 | 14:30 | | | | 68 | | | 118 | | | 46 | | | 252 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 82-SB-C | 6-7 | 6/11/2013 | 14:50 | | | | 346 | | | 613 | | * | 243 | | | 1300 | | | 0.14 | | | < 0.0040 | | | < 0.0040 | | | 0.014 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| 83-SB-A | 2-4 | 5/15/2013 | 9:15 | | | | < 11 | | | < 11 | | | < 11 | | | 26 | J | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | |
| 83-SB-B | 6-7 | 6/11/2013 | 15:20 | | | | 94 | | | 141 | | | 86 | | | 343 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | |
| 83-SB-C | 7-8 | 6/11/2013 | 15:50 | | | | 882 | | * | 1230 | | * | 427 | | | 2670 | | | < 0.0042 | | | 0.20 | | | < 0.0042 | | | 0.11 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | |
| 84-SB-A | 4-6 | 5/15/2013 | 11:05 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | J | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | |

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| ale il o out a ota u sur ace oil am ling H, | | | | H Hscr | | | I | | | I H I | | | I H I | | | H H | | | H H H | | | H H | | | H H | | | H | | | H | | | H | | | H | | | H | | |
| et od | | | | | | | H | | | H | | | H | | | H | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | H | | | H | | | H | | | H | | | H | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | |
| s ommercial u sur ace | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 84-SB-B | 7.5-8.5 | 6/12/2013 | 10:30 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | |
| 84-SB-C | 10.5-15.5 | 8/9/2013 | 9:10 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0037 | | | < 0.0037 | J | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 85-SB-A | 2-4 | 5/15/2013 | 11:50 | | | | 840 | | * | 3470 | | * | 340 | | | 4730 | J | | < 0.017 | | | < 0.017 | | | 0.30 | | | < 0.017 | | | < 0.017 | | | < 0.017 | | | < 0.017 | | |
| 85-SB-B | 5.5-6.5 | 6/12/2013 | 11:20 | | | | 267 | | | 575 | | * | 105 | | | 968 | | | < 0.0041 | | | 0.041 | | | < 0.0041 | | | 0.018 | | | 0.0041 | U | | < 0.0041 | | | < 0.0041 | | |
| 85-SB-C | 6.5-7.5 | 6/12/2013 | 11:40 | | | | 298 | | | 706 | | * | 127 | | | 1160 | | | < 0.0044 | | | 0.071 | | | < 0.0044 | | | 0.031 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | |
| 86-SB-A | 2-4 | 5/15/2013 | 14:50 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | J | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | 0.012 | | | 0.0088 | | | 0.0091 | | |
| 86-SB-B | 5.5-6.5 | 6/12/2013 | 15:50 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | 0.0096 | U | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | |
| 86-SB-C | 6.5-7.0 | 6/12/2013 | 16:05 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | 0.013 | U | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | |
| 87-SB-A | 2-4 | 5/28/2013 | 10:50 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87-SB-B | 4-6 | 5/28/2013 | 11:15 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87-SB-C | 6.5-7.2 | 5/28/2013 | 11:40 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-A | 2-3.8 | 5/24/2013 | 14:45 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-AD | 2-3.8 | 5/24/2013 | 14:50 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-B | 3.8-4.2 | 5/24/2013 | 15:20 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-C | 8-11.5 | 7/2/2013 | 7:35 | < 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-A | 2-4 | 5/24/2013 | 10:15 | 127 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-B | 4-5.9 | 5/24/2013 | 10:50 | 132 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-C | 8-11.5 | 7/1/2013 | 12:40 | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-A | 2-4 | 5/24/2013 | 10:00 | 66 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-B | 4-6 | 5/24/2013 | 10:25 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-C | 6-7 | 5/24/2013 | 11:00 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-A | 2-4 | 5/23/2013 | 13:45 | | | | < 11 | | | < 11 | | | < 11 | | | 12 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0055 | U | | 0.0046 | U | | 0.0082 | U | |
| 91-SB-B | 4-6 | 6/4/2013 | 11:10 | | | | < 12 | | | < 12 | | | 28 | | | 33 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | 0.014 | U | | 0.019 | | | 0.024 | | |
| 91-SB-C | 8-14.5 | 7/1/2013 | 13:40 | | | | 31 | | | 158 | | | 32 | | | 231 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0046 | | | < 0.0038 | | | < 0.0038 | | |
| 92-SB-A | 2-3.1 | 5/23/2013 | 13:00 | | | | < 10 | | | < 10 | | | < 10 | | | < 10 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | |
| 92-SB-B | 4-6 | 6/4/2013 | 11:50 | | | | < 12 | | | < 12 | | | 14 | | | 35 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | |
| 92-SB-C | 8-10.5 | 7/1/2013 | 14:30 | | | | 43 | | | 212 | | * | 24 | | | 288 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | |
| 93-SB-A | 2-3.1 | 5/3/2013 | 12:10 | | | | < 10 | | | < 10 | | | < 10 | | | < 10 | | | < 0.0068 | | | < 0.0068 | | | < 0.0068 | | | < 0.0068 | | | < 0.0068 | | | < 0.0068 | | | < 0.0068 | | |
| 93-SB-B | 4-6 | 6/5/2013 | 15:15 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-C | 6.5-8 | 6/5/2013 | 15:30 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-A | 2-4 | 5/24/2013 | 9:15 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-B | 4-6 | 6/5/2013 | 10:30 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-C | 6-8 | 6/5/2013 | 10:45 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95-SB-A | 4-6 | 5/23/2013 | 15:45 | | | | 14 | | | < 13 | | | 197 | | | 257 | | | 0.023 | | | 0.046 | | | 0.0054 | | | 0.10 | | | 0.25 | | * | 0.36 | U | * | 0.40 | U | * |
| 95-SB-B | 6-8 | 5/23/2013 | 16:05 | | | | 68 | | | 187 | | | 229 | | | 518 | | | < 0.0048 | | | < 0.0048 | | | < 0.0048 | | | 0.0055 | | | 0.013 | U | | 0.015 | U | | 0.023 | U | |
| 95-SB-C | 8-11 | 7/1/2013 | 15:10 | | | | 252 | | | 849 | | * | 203 | | | 1350 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | 0.0062 | | | 0.0057 | | | 0.0064 | | |
| 96-SB-A | 2-2.6 | 5/23/2013 | 15:15 | | | | < 10 | | | < 10 | | | < 10 | | | < 10 | | | < 0.0034 | | | < 0.0034 | | | < 0.0034 | | | < 0.0034 | | | < 0.0034 | | | < 0.0034 | | | < 0.0034 | | |
| 96-SB-B | 4-6 | 6/5/2013 | 12:45 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | |
| 96-SB-C | 6-8 | 6/5/2013 | 13:00 | | | | 18 | | | 39 | | | 23 | | | 94 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | |
| 97-SB-A | 2-4 | 5/14/2013 | 16:10 | | | | < 10 | | | < 10 | | | < 10 | | | 11 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | 0.0049 | | | 0.0040 | | | 0.0066 | | |
| 97-SB-B | 4-6 | 6/10/2013 | 10:50 | | | | < 11 | | | 43 | | | < 11 | | | 44 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 97-SB-BD | 4-6 | 6/10/2013 | 10:35 | | | | < 11 | | | 43 | | | < 11 | | | 44 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 97-SB-C | 6-7 | 6/10/2013 | 11:15 | | | | < 12 | | | 35 | | | < 12 | | | 36 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| 98-SB-A | 2-4 | 5/14/2013 | 10:15 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0064 | | | 0.0044 | | | 0.0051 | | |
| 98-SB-B | 3.5-4.5 | 6/11/2013 | 10:35 | | | | < 13 | | | < 13 | | | < 13 | | | < 13 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | |
| 98-SB-C | 4.5-5.5 | 6/11/2013 | 10:45 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 99-SB-A | 2-4 | 5/14/2013 | 10:20 | | | | 332 | | | 1940 | | * | 32 | | | 2400 | | | 4.8 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | |
| 99-SB-B | 5.5-6 | 6/11/2013 | 11:40 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | 0.074 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 99-SB-C | 6-7 | 6/11/2013 | 12:00 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | 0.015 | U | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 100-SB-A | 2-3 | 5/15/2013 | 14:55 | | | | 96 | | | 147 | | | 105 | | | 348 | J | | 0.0059 | U | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | |
| 100-SB-B | 5.5-6.5 | 6/12/2013 | 9:15 | | | | < 12 | | | 21 | | | 16 | | | 38 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| 100-SB-C | 6.5-7.5 | 6/12/2013 | 9:35 | | | | < 14 | | | < 14 | | | < 14 | | | < 14 | | | 0.017 | U | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | |
| 100-SB-CD | 6.5-7.5 | 6/12/2013 | 9:40 | | | | < 13 | | | < 13 | | | < 13 | | | < 13 | | | 0.0095 | U | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | |
| 101-SB-A | 2-3 | 5/15/2013 | 16:20 | | | | < 10 | | | < 10 | | | < 10 | | | < 10 | J | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | 0.0038 | | | 0.011 | | | 0.0085 | | | 0.014 | | |
| 101-SB-B | 6.6-7.2 | 6/12/2013 | 13:55 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| 101-SB-C | 7.2-8.2 | 6/12/2013 | 14:10 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 102-SB-A | 2-3.3 | 5/28/2013 | 14:50 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-B | 5.7-11 | 8/2/2013 | 9:10 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-C | 11-15 | 8/2/2013 | 9:20 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-A | 2-3 | 5/28/2013 | 13:30 | < 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-B | 8-11.5 | 8/2/2013 | 10:00 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-C | 11.5-14 | 8/2/2013 | 10:10 | < 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-A | 2-4 | 5/3/2013 | 10:40 | < 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-B | 4-6 | 6/5/2013 | 14:30 | < 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-C | 6.5-8 | 6/5/2013 | 14:45 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | |
| s ommercial u sur ace | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 105-SB-A | 2-4 | 5/3/2013 | 10:15 | < 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-B | 6-8 | 6/5/2013 | 13:40 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-C | 8-11 | 7/1/2013 | 15:55 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-A | 2-4 | 4/26/2013 | 9:30 | | | | < 13 | | | < 13 | | | 13 | | | 17 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | 0.020 | | | 0.022 | | * | 0.027 | | |
| 106-SB-B | 4-6 | 4/26/2013 | 10:00 | | | | < 13 | | | < 13 | | | 17 | | | 21 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | 0.0079 | | | 0.0093 | | | 0.011 | | |
| 106-SB-C | 6-6.8 | 4/26/2013 | 10:35 | | | | < 15 | | | < 15 | | | 72 | | | 102 | | | < 0.0049 | | | < 0.0049 | | | < 0.0049 | | | < 0.0049 | | | 0.010 | | | 0.0094 | | | 0.016 | | |
| 107-SB-A | 2-4 | 4/26/2013 | 11:20 | | | | < 14 | | | < 14 | | | 42 | | | 69 | | | < 0.0048 | | | < 0.0048 | | | < 0.0048 | | | < 0.0048 | | | 0.018 | | | 0.027 | | * | 0.036 | | |
| 107-SB-B | 4-6 | 4/26/2013 | 11:35 | | | | < 14 | | | < 14 | | | 35 | | | 44 | | | < 0.0046 | | | < 0.0046 | | | < 0.0046 | | | < 0.0046 | | | 0.0090 | | | 0.0088 | | | 0.013 | | |
| 107-SB-C | 6-8 | 4/26/2013 | 11:55 | | | | < 14 | | | < 14 | | | 32 | | | 40 | | | 0.0052 | U | | < 0.0047 | | | < 0.0047 | | | < 0.0047 | | | 0.025 | | | 0.028 | | * | 0.040 | | |
| 108-SB-A | 2-4 | 5/14/2013 | 11:50 | | | | < 11 | | | 12 | | | < 11 | | | 13 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | |
| 108-SB-B | 4-4.5 | 6/10/2013 | 12:05 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | |
| 108-SB-C | 6-7 | 6/10/2013 | 14:30 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| 109-SB-A | 4-5 | 5/14/2013 | 12:20 | | | | 25 | | | < 10 | | | 77 | | | 142 | | | 0.0034 | U | | < 0.0033 | | | 0.0099 | | | < 0.0033 | | | 0.010 | | | < 0.0033 | | | 0.0053 | | |
| 109-SB-B | 4-6 | 6/10/2013 | 15:10 | | | | < 12 | | | < 12 | | | 18 | | | 44 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | |
| 109-SB-C | 5-7 | 6/11/2013 | 10:20 | | | | 36 | | | 16 | | | 99 | | | 174 | | | < 0.020 | | | < 0.020 | | | 0.029 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s ommercial u sur ace | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-SB-A | 4-4.8 | 5/17/2013 | 11:10 | < 0.0038 | | | < 0.0038 | | | 0.0062 | | | < 0.0038 | | | 0.0042 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0078 | | |
| 1-SB-B | 8-11 | 8/8/2013 | 13:10 | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| 1-SB-C | 11-15 | 8/8/2013 | 13:15 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 2-SB-A | 2-4 | 5/17/2013 | 12:00 | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | |
| 2-SB-B | 8-11.5 | 8/8/2013 | 11:20 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 2-SB-C | 11.5-15.5 | 8/8/2013 | 11:30 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0083 | | | < 0.0038 | | |
| 3-SB-A | 4-5.4 | 5/17/2013 | 13:35 | 0.031 | | | 0.012 | | | 0.023 | | | < 0.0074 | | | 0.013 | | | < 0.0074 | | | 0.034 | | | < 0.0074 | | | < 0.0074 | | | 0.016 | | |
| 3-SB-B | 7.5-8.0 | 8/8/2013 | 10:00 | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | |
| 3-SB-C | 8.0-11.5 | 8/8/2013 | 10:30 | < 0.019 | | | < 0.019 | | | < 0.019 | | | < 0.019 | | | 0.022 | | | 0.41 | | | < 0.019 | | | 0.95 | | | 0.61 | | | 0.065 | | |
| 4-SB-A | 6-8 | 5/7/2013 | 11:20 | < 0.043 | | | 0.048 | | | 0.19 | | | < 0.043 | | | 0.40 | | | 5.6 | | | 0.14 | | | 26 | | * | 8.7 | | | 0.58 | | |
| 4-SB-B | 8-10.5 | 6/6/2013 | 10:20 | 0.044 | | | 0.047 | | | 0.20 | | | < 0.035 | | | 0.40 | | | 5.1 | | | 0.076 | U | | 19 | | * | 5.7 | U | | 0.53 | | |
| 5-SB-A | 6-8 | 5/7/2013 | 10:00 | < 0.044 | | | < 0.044 | | | < 0.044 | | | < 0.044 | | | < 0.044 | | | 0.80 | | | < 0.044 | | | 4.0 | | * | 1.6 | | | 0.082 | | |
| 5-SB-B | 8-12 | 6/6/2013 | 9:00 | < 0.037 | | | < 0.037 | | | 0.088 | U | | < 0.037 | | | 0.11 | U | | 2.8 | | | < 0.037 | | | 13 | | * | 3.8 | U | | 0.24 | | |
| 5-SB-C | 12-15 | 6/6/2013 | 9:15 | < 0.038 | | | < 0.038 | | | 0.048 | U | | < 0.038 | | | < 0.038 | | | 0.71 | | | < 0.038 | | | 2.4 | | | 1.1 | | | 0.080 | U | |
| 6-SB-A | 4-6 | 5/9/2013 | 12:00 | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | < 0.0043 | | | 0.0078 | | | 0.88 | | | < 0.0043 | | | 1.2 | | | 0.49 | | | 0.018 | | |
| 6-SB-B | 8-12 | 8/2/2013 | 10:50 | 0.060 | J | | 0.053 | J | | 0.20 | J | | 0.038 | J | * | 0.30 | J | | 5.1 | J | | 0.10 | J | | 24 | J | * | 7.6 | J | | 0.61 | J | |
| 6-SB-C | 12-16 | 8/2/2013 | 11:10 | < 0.0037 | | | < 0.0037 | | | 0.049 | | | < 0.0037 | | | 0.028 | | | 0.90 | J | | < 0.0037 | | | 2.4 | | | 1.1 | | | 0.14 | | |
| 6-SB-CD | 12-16 | 8/2/2013 | 11:15 | < 0.0037 | | | < 0.0037 | | | 0.060 | | | < 0.0037 | | | 0.043 | | | 0.68 | J | | < 0.0037 | | | 2.2 | | | 1.1 | | | 0.17 | | |
| 7-SB-A | 6-8 | 5/6/2013 | 14:20 | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | 0.28 | | | < 0.039 | | | 1.3 | | | 0.64 | | | 0.13 | | |
| 7-SB-B | 8-9.5 | 5/6/2013 | 14:30 | < 0.088 | | | < 0.088 | | | 0.070 | | J | < 0.088 | | | < 0.088 | | | 0.64 | | | < 0.088 | | | 2.0 | | | 1.5 | | | 0.27 | | |
| 7-SB-C | 12-14 | 6/6/2013 | 14:30 | < 0.042 | | | < 0.042 | | | 0.11 | U | | < 0.042 | | | 0.092 | U | | 0.72 | | | < 0.042 | | | 1.7 | | | 1.4 | | | 0.30 | | |
| 8-SB-A | 2-4 | 5/6/2013 | 15:30 | < 0.083 | | | < 0.083 | | | 0.16 | | | < 0.083 | | | < 0.083 | | | 2.4 | | | < 0.083 | | | 9.8 | | * | 4.7 | | | 0.44 | | |
| 8-SB-B | 7.8-8.8 | 7/11/2013 | 13:45 | < 0.0037 | | | < 0.0037 | | | 0.0077 | | | < 0.0037 | | | < 0.0037 | | | 0.20 | | | < 0.0037 | | | 0.48 | U | | 0.41 | | | 0.038 | | |
| 8-SB-C | 8.8-15 | 7/31/2013 | 11:10 | < 0.0038 | | | < 0.0038 | | | 0.020 | J | | < 0.0038 | | | 0.025 | J | | 0.40 | J | | < 0.0038 | | | 0.48 | U | | 0.65 | J | | 0.062 | J | |
| 9-SB-A | 2-4 | 5/16/2013 | 14:30 | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 9-SB-B | 8-9 | 7/11/2013 | 12:23 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0060 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0058 | | | 0.0047 | | |
| 9-SB-C | 8-11 | 8/1/2013 | 10:00 | < 0.0037 | | | < 0.0037 | | | < 0.0037 | J | | < 0.0037 | | | < 0.0037 | J | | < 0.0037 | J | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | J | | < 0.0037 | J | |
| 10-SB-A | 4-6 | 4/24/2013 | 11:40 | 0.012 | | | 0.0076 | | | 0.0066 | | | 0.011 | | | 0.0085 | | | 0.0048 | | | 0.015 | | | < 0.0040 | | | 0.020 | | | 0.0062 | | |
| 10-SB-B | 8-12 | 7/30/2013 | 15:25 | 0.023 | | | 0.016 | | | 0.022 | J | | 0.0070 | | | 0.068 | J | | 0.0053 | J | | 0.031 | | | 0.0046 | U | | 0.053 | J | | 0.063 | J | |
| 10-SB-C | 12-16 | 7/30/2013 | 16:20 | 0.0078 | | | 0.0057 | | | 0.0044 | J | | < 0.0041 | | | 0.019 | J | | < 0.0041 | J | | 0.012 | | | 0.0046 | U | | 0.023 | J | | 0.019 | J | |
| 11-SB-A | 4-6 | 5/16/2013 | 15:10 | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | 0.93 | | | < 0.039 | | | 2.2 | | | 1.4 | | | 0.12 | | |
| 11-SB-B | 8-10 | 6/27/2013 | 8:50 | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | 0.24 | | | < 0.036 | | | < 0.036 | | | 0.45 | | | 0.043 | | |
| 12-SB-A | 2-4 | 5/7/2013 | 14:40 | < 0.037 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | | 0.16 | | | < 0.037 | | | 0.76 | | | 0.27 | | | 0.059 | | |
| 12-SB-B | 8-9 | 7/11/2013 | 9:50 | < 0.019 | | | < 0.019 | | | < 0.019 | | | < 0.019 | | | < 0.019 | | | 0.44 | | | < 0.019 | | | 2.4 | U | | 0.64 | | | 0.058 | | |
| 12-SB-C | 12-15 | 7/31/2013 | 7:30 | < 0.0038 | | | < 0.0038 | | | 0.0079 | J | | < 0.0038 | | | < 0.0038 | J | | 0.10 | J | | < 0.0038 | | | 0.14 | | | 0.097 | J | | 0.013 | J | |
| 13-SB-A | 6-6.6 | 5/7/2013 | 13:05 | < 0.085 | | | < 0.085 | | | < 0.085 | | | < 0.085 | | | < 0.085 | | | 1.5 | | | < 0.085 | | | 9.1 | | * | 2.7 | | | 0.12 | | |
| 13-SB-B | 8-11.5 | 7/31/2013 | 8:20 | < 0.0041 | | | < 0.0041 | | | 0.047 | J | | < 0.0041 | | | < 0.0041 | J | | 1.5 | J | | < 0.0041 | | | 4.8 | | * | 2.3 | J | | 0.12 | J | |
| 13-SB-C | 11.5-14.5 | 7/31/2013 | 8:30 | < 0.0041 | | | < 0.0041 | | | < 0.0041 | J | | < 0.0041 | | | < 0.0041 | J | | 1.4 | J | | < 0.0041 | | | 5.0 | | * | 2.2 | J | | 0.12 | J | |
| 14-SB-A | 6-8 | 4/29/2013 | 11:55 | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | 0.093 | | | 2.4 | | | < 0.0036 | | | 12 | | * | 4.0 | | | 0.18 | | |
| 14-SB-B | 6-12 | 6/6/2013 | 12:15 | < 0.035 | | | < 0.035 | | | 0.070 | U | | < 0.035 | | | 0.087 | U | | 2.0 | | | < 0.035 | | | 10 | | * | 2.9 | | | 0.17 | U | |
| 14-SB-C | 12-15 | 6/6/2013 | 12:30 | 0.099 | | | 0.093 | | | 0.18 | | | 0.099 | | * | 0.43 | | | 1.2 | | | 0.13 | U | | 4.5 | | * | 2.5 | | | 0.38 | | |
| 15-SB-A | 4-6 | 5/8/2013 | 15:45 | < 0.074 | | | < 0.074 | | | 0.067 | | J | < 0.074 | | | 0.23 | | | 9.4 | | | 0.23 | | * | 55 | | * | 18 | | | 0.54 | | |
| 15-SB-AD | 4-6 | 5/8/2013 | 15:47 | < 0.072 | | | < 0.072 | | | < 0.072 | | | < 0.072 | | | 0.18 | | | 7.6 | | | 0.20 | | | 41 | | * | 15 | | | 0.44 | | |
| 15-SB-B | 7.8-8.8 | 7/12/2013 | 10:25 | 0.0073 | | | 0.0077 | | | 0.029 | | | < 0.0040 | | | < 0.0040 | | | 0.73 | | | < 0.0040 | | | 2.4 | | | 1.5 | | | 0.25 | | |
| 15-SB-C | 8-14 | 8/2/2013 | 11:40 | < 0.0042 | | | < 0.0042 | | | 0.040 | | | < 0.0042 | | | 0.065 | | | 1.3 | J | | < 0.0042 | | | 3.1 | U | | 1.5 | | | 0.21 | | |
| 16-SB-A | 4-6 | 5/9/2013 | 16:15 | < 0.0042 | | | 0.0038 | | J | 0.029 | | | < 0.0042 | | | 0.032 | | | 0.47 | | | 0.014 | | | 4.1 | | * | 1.0 | | | 0.067 | | |
| 16-SB-B | 8-9.5 | 5/9/2013 | 16:55 | < 0.0042 | | | 0.0050 | | | 0.046 | | | < 0.0042 | | | 0.065 | | | 1.0 | | | 0.014 | | | 6.6 | | * | 2.0 | | | 0.12 | | |
| 16-SB-C | 8-13 | 8/2/2013 | 12:25 | < 0.019 | | | < 0.019 | | | < 0.019 | | | < 0.019 | | | 0.29 | | | 3.9 | J | | < 0.019 | | | 20 | | * | 5.7 | | | 0.56 | | |
| 17-SB-A | 4-6 | 5/10/2013 | 12:00 | < 0.044 | | | < 0.044 | | | < 0.044 | | | < 0.044 | | | < 0.044 | | | 0.25 | | | < 0.044 | | | 0.79 | | | 0.26 | | | 0.044 | | |
| 17-SB-B | 6-8 | 5/10/2013 | 12:50 | < 0.084 | | | < 0.084 | | | 0.77 | J | | < 0.084 | | | 0.45 | J | | 8.5 | J | | < 0.084 | | | 43 | J | * | 16 | J | | 1.6 | J | |
| 17-SB-C | 8-9.2 | 5/10/2013 | 13:33 | < 0.17 | | | < 0.17 | | | 0.60 | | | < 0.17 | | | < 0.17 | | | 10 | | | < 0.17 | | | 58 | | * | 26 | | | 2.1 | | |
| 18-SB-A | 2-4 | 5/8/2013 | 11:33 | < 0.041 | | | < 0.041 | | | 0.22 | | | < 0.041 | | | 0.20 | | | 0.98 | | | < 0.041 | | | 3.0 | | | 2.4 | | | 0.43 | | |
| 18-SB-B | 7.7-8.5 | 7/12/2013 | 11:15 | < 0.021 | | | < 0.021 | | | 0.10 | | | < 0.021 | | | 0.19 | | | 0.76 | | | < 0.021 | | | 2.9 | U | | 1.9 | | | 0.35 | | |
| 18-SB-C | 8-11.5 | 8/2/2013 | 13:10 | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | 1.0 | J | | < 0.059 | | | 1.9 | | | 2.3 | | | 0.48 | | |
| 18-SB-CD | 8-11.5 | 8/2/2013 | 13:15 | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | 1.8 | J | | < 0.063 | | | 3.0 | | | 3.1 | | | 0.58 | | |
| 19-SB-A | 4-4.8 | 5/2/2013 | 12:30 | < 0.077 | | | < 0.077 | | | < 0.077 | | | < 0.077 | | | < 0.077 | | | 0.55 | J | | < 0.077 | | | 2.7 | J | | 1.2 | J | | 0.18 | J | |
| 19-SB-B | 6.5-8.0 | 8/9/2013 | 9:55 | < 0.021 | | | < 0.021 | | | 0.059 | | | < 0.021 | | | < 0.021 | | | 0.61 | | | < 0.021 | | | 2.1 | U | | 0.96 | | | 0.18 | | |
| 19-SB-C | 8.0-15.5 | 8/9/2013 | 10:55 | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | 0.0060 | | | < 0.0037 | | | 0.0099 | U | | 0.016 | | | < 0.0037 | | |
| 20-SB-A | 4-6 | 4/24/2013 | 9:50 | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | |
| 20-SB-B | 6-8 | 4/24/2013 | 10:00 | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | |
| 20-SB-C | 9-15 | 8/1/2013 | 9:00 | < 0.0039 | | | < 0.0039 | | | < 0.0039 | J | | < 0.0039 | | | < 0.0039 | J | | < 0.0039 | J | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | J | | < 0.0039 | J | |
| 21-SB-A | 4-6 | 5/13/2013 | 11:00 | 0.0045 | | | < 0.0038 | | | 0.0045 | | | < 0.0038 | | | 0.0066 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0042 | | | 0.0058 | | |
| 21-SB-B | 7-8 | 6/11/2013 | 10:10 | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 21-SB-C | 8-11.5 | 6/27/2013 | 11:00 | 0.0087 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | 0.039 | | | 0.18 | | | 0.017 | | | < 0.0037 | | | 0.017 | | | 0.062 | | |
| 22-SB-A | 6-8 | 5/16/2013 | 11:32 | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | 0.45 | | | < 0.020 | | | 1.7 | | | 0.41 | | | 0.071 | | |

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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 22-SB-B | 8-10 | 5/16/2013 | 11:58 | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | < 0.061 | | | 1.7 | | | < 0.061 | | | 3.2 | | | 1.4 | | | 0.25 | | |
| 22-SB-C | 10-10.5 | 5/16/2013 | 12:20 | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | 1.4 | | | < 0.063 | | | 2.3 | | | 1.2 | | | 0.22 | | |
| 23-SB-A | 6-8 | 5/16/2013 | 11:50 | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | 4.4 | | | < 0.060 | | | 14 | | * | 4.8 | | | 0.56 | | |
| 23-SB-B | 8-10 | 5/16/2013 | 12:20 | < 0.066 | | | < 0.066 | | | < 0.066 | | | < 0.066 | | | 0.25 | | | 10 | | | < 0.066 | | | 30 | | * | 12 | | | 1.1 | | |
| 23-SB-C | 10.5-11.5 | 5/16/2013 | 13:00 | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | 2.6 | | | < 0.060 | | | 4.9 | | * | 3.2 | | | 0.36 | | |
| 25-SB-A | 2-4 | 4/29/2013 | 15:30 | < 0.038 | | | < 0.038 | | | 0.070 | | | < 0.038 | | | < 0.038 | | | 0.36 | | | < 0.038 | | | 1.4 | | | 0.73 | | | 0.11 | | |
| 25-SB-AD | 2-4 | 4/29/2013 | 15:32 | < 0.037 | | | < 0.037 | | | 0.048 | | | < 0.037 | | | < 0.037 | | | 0.31 | | | < 0.037 | | | 0.83 | | | 0.60 | | | 0.078 | | |
| 25-SB-B | 7-8 | 8/8/2013 | 9:15 | < 0.019 | | | < 0.019 | | | < 0.019 | | | < 0.019 | | | 0.022 | | | 0.54 | | | < 0.019 | | | 1.8 | | | 0.72 | | | 0.042 | | |
| 25-SB-C | 8-11.5 | 7/31/2013 | 9:20 | < 0.0037 | | | < 0.0037 | | | 0.010 | J | | < 0.0037 | | | 0.011 | J | | 0.32 | J | | < 0.0037 | | | 0.16 | | | 0.33 | J | | 0.029 | J | |
| 26-SB-A | 6-8 | 4/30/2013 | 12:25 | 0.046 | J | | 0.059 | J | | 0.25 | J | | < 0.021 | | | 0.39 | J | | 3.1 | J | | 0.11 | J | | 19 | J | * | 4.6 | J | | 0.49 | J | |
| 26-SB-B | 8.1-11 | 7/31/2013 | 12:10 | < 0.064 | | | < 0.064 | | | 0.42 | J | | < 0.064 | | | 0.64 | J | | 7.7 | J | | < 0.064 | | | 17 | | * | 11 | J | | 1.1 | J | |
| 26-SB-C | 11-14.5 | 7/31/2013 | 12:30 | 0.011 | | | 0.014 | | | 0.090 | J | | < 0.0039 | | | < 0.0039 | J | | 1.8 | J | | 0.013 | | | 6.5 | U | * | 2.2 | J | | 0.19 | J | |
| 27-SB-A | 6-7 | 4/30/2013 | 10:10 | < 0.043 | | | 0.072 | J | | 0.45 | J | | < 0.043 | | | 0.56 | J | | 5.8 | J | | 0.15 | J | | 23 | J | * | 14 | J | | 0.98 | J | |
| 27-SB-B | 7.5-8.5 | 7/9/2013 | 14:33 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.13 | | | 1.5 | | | < 0.0038 | | | 3.4 | U | | 3.0 | | | 0.49 | | |
| 27-SB-C | 8-13 | 7/31/2013 | 13:10 | < 0.0038 | | | < 0.0038 | | | 0.15 | J | | < 0.0038 | | | < 0.0038 | J | | 1.8 | J | | < 0.0038 | | | 4.7 | | * | 3.6 | J | | 0.29 | J | |
| 28-SB-A | 6-7.3 | 4/30/2013 | 15:00 | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | 1.4 | | | < 0.0042 | | | 3.4 | | | 3.2 | | | 0.26 | | |
| 28-SB-B | 7.3-8.5 | 7/9/2013 | 15:30 | 0.0045 | | | < 0.0040 | | | 0.049 | | | < 0.0040 | | | 0.058 | | | 0.37 | | | < 0.0040 | | | 0.78 | U | | 0.98 | | | 0.10 | | |
| 28-SB-C | 8-11.5 | 7/31/2013 | 13:55 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | J | | < 0.0038 | | | < 0.0038 | J | | 0.65 | J | | < 0.0038 | | | 1.9 | | | 1.3 | J | | 0.13 | J | |
| 29-SB-A | 6-6.7 | 5/1/2013 | 15:20 | < 0.042 | | | < 0.042 | | | < 0.042 | | | < 0.042 | | | < 0.042 | | | 0.31 | | | < 0.042 | | | 0.61 | | | 0.57 | | | 0.095 | | |
| 29-SB-B | 6.7-8 | 6/11/2013 | 12:15 | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | 0.050 | | | < 0.0040 | | | 0.044 | | | 0.097 | | | 0.019 | U | |
| 29-SB-C | 8-11.5 | 6/28/2013 | 12:30 | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | 0.023 | | | < 0.0040 | | | 0.011 | U | | 0.020 | | | 0.013 | | |
| 30-SB-A | 4-6 | 5/1/2013 | 10:00 | < 0.17 | | | 0.25 | | | 0.51 | | | < 0.17 | | | 0.99 | | | 1.2 | | | 0.54 | | * | 6.7 | | * | 2.7 | | | 1.1 | | |
| 30-SB-B | 8-9.9 | 5/1/2013 | 10:50 | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | 0.32 | | | < 0.043 | | | 2.0 | | | 0.64 | | | 0.063 | | |
| 30-SB-C | 9.9-15 | 8/1/2013 | 8:00 | 0.0044 | | | 0.0038 | | | 0.0096 | J | | < 0.0038 | | | 0.017 | J | | 0.037 | J | | 0.0095 | | | 0.091 | | | 0.074 | J | | 0.022 | J | |
| 31-SB-A | 6-7.5 | 5/2/2013 | 11:50 | < 0.041 | | | < 0.041 | | | 0.14 | | | < 0.041 | | | 0.13 | | | 0.75 | | | < 0.041 | | | 1.9 | | | 1.4 | | | 0.19 | | |
| 31-SB-B | 5.5-7 | 8/7/2013 | 9:40 | < 0.081 | | | < 0.081 | | | 0.18 | | | < 0.081 | | | < 0.081 | | | 1.5 | | | < 0.081 | | | 6.4 | | * | 2.2 | | | 0.41 | | |
| 31-SB-C | 8-11.5 | 6/28/2013 | 10:00 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.014 | | | 0.093 | | | < 0.0038 | | | 0.14 | | | 0.086 | | | 0.019 | | |
| 32-SB-A | 2-4 | 5/2/2013 | 9:30 | < 0.031 | | | < 0.031 | | | < 0.031 | | | < 0.031 | | | < 0.031 | | | 0.085 | | | < 0.031 | | | 0.059 | | | 0.22 | | | 0.18 | | |
| 32-SB-B | 5-7.5 | 6/6/2013 | 16:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-BD | 5-7.5 | 6/6/2013 | 16:30 | < 0.0087 | | | < 0.0087 | | | < 0.0087 | | | < 0.0087 | | | < 0.0087 | | | 0.024 | | | < 0.0087 | | | < 0.0087 | | | 0.039 | U | | < 0.0087 | | |
| 32-SB-C | 8-12 | 6/6/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-A | 4-6 | 5/2/2013 | 13:55 | < 0.089 | | | < 0.089 | | | < 0.089 | | | < 0.089 | | | < 0.089 | | | 1.2 | | | < 0.089 | | | 0.94 | | | 2.3 | | | 1.0 | | |
| 33-SB-B | 8-9 | 5/2/2013 | 14:30 | < 0.024 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | | 0.24 | | | 0.29 | | | < 0.024 | | | 0.12 | | | 0.27 | | | 0.22 | | |
| 33-SB-C | 12-16 | 6/6/2013 | 17:35 | < 0.016 | | | < 0.016 | | | 0.054 | U | | < 0.016 | | | < 0.016 | | | 0.10 | | | < 0.016 | | | 0.058 | | | 0.12 | | | 0.096 | | |
| 34-SB-A | 6-8 | 6/10/2013 | 12:45 | < 0.024 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | | 0.37 | | | < 0.024 | | | 3.0 | | | 0.31 | | | 0.032 | U | |
| 34-SB-AD | 6-8 | 6/10/2013 | 12:50 | < 0.024 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | | < 0.024 | | | 0.43 | | | < 0.024 | | | 3.1 | | | 0.22 | | | 0.028 | U | |
| 34-SB-B | 8-11.5 | 6/28/2013 | 11:10 | < 0.0083 | | | < 0.0083 | | | < 0.0083 | | | < 0.0083 | | | < 0.0083 | | | 0.085 | | | < 0.0083 | | | 0.49 | | | 0.066 | | | < 0.0083 | | |
| 34-SB-C | 11.5-15 | 6/28/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-A | 4-6 | 5/6/2013 | 11:20 | 0.046 | | | < 0.0076 | | | < 0.0076 | | | < 0.0076 | | | 0.037 | | | 0.10 | | | 0.033 | | | 0.25 | | | 0.11 | | | 0.063 | | |
| 35-SB-B | 8.5-11 | 6/7/2013 | 9:10 | 0.060 | | | 0.034 | | | 0.085 | U | | < 0.024 | | | 0.14 | | | 0.50 | | | 0.052 | U | | 1.8 | | | 0.53 | | | 0.19 | | |
| 35-SB-C | 15-20 | 6/7/2013 | 9:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36-SB-A | 2-4 | 5/13/2013 | 12:15 | 0.048 | | | 0.052 | | | 0.067 | | | 0.0096 | | | 0.17 | | | 0.032 | | | 0.048 | | | 0.013 | U | | 0.19 | | | 0.17 | | |
| 36-SB-B | 6-8 | 5/13/2013 | 12:30 | 0.082 | | | 0.094 | | | 0.13 | | | 0.018 | | | 0.35 | | | 0.030 | | | 0.18 | | | 0.012 | U | | 0.34 | | | 0.33 | | |
| 36-SB-C | 8-10 | 5/13/2013 | 13:00 | 0.022 | | | 0.028 | | | 0.039 | | | 0.0051 | | | 0.10 | | | 0.014 | | | 0.049 | | | 0.0042 | U | | 0.096 | | | 0.099 | | |
| 37-SB-A | 2-4 | 5/13/2013 | 15:00 | 0.016 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | 0.0076 | | | < 0.0041 | | | 0.013 | | | 0.0042 | U | | 0.0069 | | | 0.015 | | |
| 37-SB-B | 8-11.5 | 6/27/2013 | 11:35 | 0.077 | | | 0.048 | | | 0.13 | | | < 0.037 | | | 0.16 | | | 0.29 | | | 0.14 | | | < 0.037 | | | 0.49 | | | 0.22 | | |
| 37-SB-C | 11.5-15.5 | 6/27/2013 | 12:25 | 0.0086 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.036 | | | 0.13 | | | 0.016 | | | < 0.0038 | | | 0.22 | | | 0.050 | | |
| 37-SB-CD | 11.5-15.5 | 6/27/2013 | 12:30 | 0.013 | | | < 0.0038 | | | 0.040 | | | < 0.0038 | | | 0.043 | | | 0.15 | | | 0.018 | | | < 0.0038 | | | 0.26 | | | 0.058 | | |
| 38-SB-A | 2-4 | 5/16/2013 | 9:10 | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | 0.042 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | 0.039 | | | 0.10 | | |
| 38-SB-B | 6-8 | 6/7/2013 | 13:50 | 0.23 | | | 0.034 | | | 0.071 | | | 0.084 | | * | 0.055 | | | 0.037 | | | 0.29 | | * | 0.020 | | | 0.063 | | | 0.070 | | |
| 38-SB-C | 8-10 | 6/27/2013 | 10:10 | < 0.037 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | | 0.32 | | | 0.82 | | | 0.094 | | | 1.6 | | | 0.76 | | | 0.36 | | |
| 39-SB-A | 2-4 | 4/26/2013 | 15:20 | 0.80 | J | | 0.91 | J | | 2.5 | J | | < 0.14 | | | 5.6 | J | | 5.0 | J | | 1.4 | J | * | 10 | J | * | 11 | J | | 4.7 | J | |
| 39-SB-B | 8-11.5 | 6/27/2013 | 14:15 | 0.38 | | | < 0.080 | | | 2.5 | | | < 0.080 | | | 3.1 | | | 18 | | | 0.51 | | * | 72 | | * | 25 | | | 3.9 | | |
| 39-SB-C | 11.5-15.5 | 6/27/2013 | 13:35 | 0.046 | | | 0.050 | | | 0.18 | | | < 0.037 | | | 0.29 | | | 2.2 | | | 0.077 | | | 8.6 | U | * | 2.3 | | | 0.40 | | |
| 40-SB-A | 6-7.5 | 4/29/2013 | 15:15 | 0.23 | J | | 0.37 | J | | 2.3 | J | | 0.093 | J | * | 3.3 | J | | 5.2 | J | | 0.23 | J | * | 4.8 | J | * | 9.3 | J | | 4.2 | J | |
| 40-SB-B | 8-11.5 | 6/28/2013 | 7:15 | 0.065 | | | 0.11 | | | 0.55 | | | < 0.036 | | | 1.1 | | | 1.9 | | | 0.11 | | | 3.4 | U | | 3.0 | | | 0.91 | | |
| 40-SB-C | 11.5-19.5 | 6/28/2013 | 8:05 | < 0.0039 | | | < 0.0039 | | | 0.0071 | | | < 0.0039 | | | 0.0090 | | | 0.021 | | | 0.010 | | | 0.014 | U | | 0.036 | | | 0.0088 | | |
| 41-SB-A | 6-6.6 | 4/30/2013 | 13:40 | 0.14 | J | | 0.30 | J | | 2.3 | J | | < 0.047 | | | 1.0 | J | | 5.2 | J | | 0.27 | J | * | 29 | J | * | 7.7 | J | | 1.3 | J | |
| 41-SB-B | 8-9.2 | 7/10/2013 | 14:00 | 0.044 | | | 0.063 | | | 0.19 | | | < 0.019 | | | 0.27 | | | 0.52 | | | 0.12 | | | 2.2 | U | | 0.77 | | | 0.28 | | |
| 41-SB-C | 12-16 | 8/1/2013 | 15:55 | 0.010 | | | 0.014 | | | 0.086 | J | | < 0.0040 | | | 0.072 | J | | 0.45 | J | | 0.022 | | | 1.3 | U | | 0.63 | J | | 0.11 | J | |
| 41-SB-CD | 12-16 | 8/1/2013 | 15:59 | 0.027 | | | 0.029 | | | 0.17 | J | | < 0.019 | | | 0.19 | J | | 1.3 | J | | 0.053 | | | 3.1 | U | | 1.4 | J | | 0.28 | J | |
| 42-SB-A | 6-7 | 4/30/2013 | 10:25 | < 0.042 | | | < 0.042 | | | < 0.042 | | | < 0.042 | | | 0.21 | | | 0.70 | | | < 0.042 | | | < 0.042 | | | 0.12 | | | 0.57 | | |
| 42-SB-B | 7.2-82 | 7/10/2013 | 10:55 | 0.18 | | | 0.40 | | | 1.1 | | | < 0.041 | | | 2.5 | | | 3.7 | | | 0.57 | | * | 11 | | * | 6.0 | | | 2.3 | | |
| 42-SB-C | 8-11.5 | 7/31/2013 | 15:15 | 0.048 | | | 0.12 | | | 0.25 | J | | 0.011 | | | 0.61 | J | | 1.2 | J | | 0.059 | | | 2.7 | | | 1.5 | J | | 0.65 | J | |
| 43-SB-A | 2-4 | 4/30/2013 | 14:45 | < 0.61 | | | < 0.61 | | | 2.8 | | | < 0.61 | | | 1.4 | | | 3.8 | | | < 0.61 | | | 13 | | * | 9.7 | | | 2.4 | | |

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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 43-SB-B | 6-8 | 7/10/2013 | 11:22 | 0.011 | | | < 0.0038 | | | 0.12 | | | < 0.0038 | | | 0.11 | | | 0.46 | | | < 0.0038 | | | 0.54 | U | | 0.71 | | | 0.16 | | |
| 43-SB-C | 8.3-11.5 | 7/31/2013 | 14:40 | 0.0079 | | | 0.0096 | | | < 0.0037 | J | | < 0.0037 | | | < 0.0037 | J | | 0.31 | J | | 0.015 | | | 0.36 | | | 0.49 | J | | 0.096 | J | |
| 44-SB-A | 2-4 | 5/1/2013 | 13:25 | < 0.17 | | | < 0.17 | | | < 0.17 | | | < 0.17 | | | < 0.17 | | | < 0.17 | | | < 0.17 | | | < 0.17 | | | 0.30 | | | 0.38 | | |
| 44-SB-B | 2-4 | 5/1/2013 | 12:25 | < 0.085 | | | < 0.085 | | | < 0.085 | | | < 0.085 | | | < 0.085 | | | 2.2 | | | < 0.085 | | | 7.2 | | * | 5.2 | | | 0.91 | | |
| 44-SB-C | 4-6 | 5/1/2013 | 12:30 | < 0.040 | | | < 0.040 | | | < 0.040 | | | < 0.040 | | | < 0.040 | | | 0.078 | | | < 0.040 | | | 0.15 | | | 0.18 | | | 0.049 | | |
| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | < 0.17 | | | < 0.17 | | | < 0.17 | | | < 0.17 | | | < 0.17 | | | 5.4 | J | | < 0.17 | | | 12 | J | * | 13 | J | | 2.1 | J | |
| 45-SB-B | 4-4.9 | 5/1/2013 | 11:35 | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | 0.38 | | | < 0.043 | | | 0.64 | | | 1.2 | | | 0.27 | | |
| 45-SB-C | 8-11.5 | 8/9/2013 | 14:10 | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | 0.0040 | | | 0.013 | | | < 0.0040 | | | < 0.0040 | | | 0.011 | | | 0.010 | | |
| 46-SB-A | 4-6 | 5/1/2013 | 15:05 | 0.20 | | | 0.15 | | | 0.32 | | | 0.17 | | * | < 0.076 | | | 0.61 | | | 0.43 | | * | 0.41 | | | 0.70 | | | 0.39 | | |
| 46-SB-B | 5-6.2 | 8/6/2013 | 11:25 | < 0.079 | | | < 0.079 | | | < 0.079 | | | < 0.079 | | | < 0.079 | | | 1.0 | | | < 0.079 | | | 0.56 | | | 0.29 | | | 0.48 | | |
| 46-SB-BD | 5-6.2 | 8/6/2013 | 11:30 | < 0.080 | | | < 0.080 | | | < 0.080 | | | < 0.080 | | | < 0.080 | | | 1.5 | | | < 0.080 | | | 0.80 | | | 0.40 | | | 0.69 | | |
| 46-SB-C | 8-11.5 | 6/28/2013 | 8:50 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.016 | | | 0.076 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.037 | | |
| 47-SB-A | 6-7.7 | 5/2/2013 | 9:45 | < 0.085 | | | < 0.085 | | | 0.22 | | | < 0.085 | | | < 0.085 | | | 0.64 | | | < 0.085 | | | 0.42 | | | 1.2 | | | 0.28 | | |
| 47-SB-B | 5-7 | 8/6/2013 | 14:25 | < 0.041 | | | < 0.041 | | | < 0.041 | | | < 0.041 | | | < 0.041 | | | < 0.041 | | | < 0.041 | | | < 0.041 | | | < 0.041 | | | 0.070 | | |
| 47-SB-BD | 5-7 | 8/6/2013 | 14:30 | < 0.084 | | | < 0.084 | | | < 0.084 | | | < 0.084 | | | < 0.084 | | | < 0.084 | | | < 0.084 | | | < 0.084 | | | < 0.084 | | | < 0.084 | | |
| 47-SB-C | 8-10 | 6/27/2013 | 16:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-A | 4-6 | 4/25/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-B | 6-8 | 4/25/2013 | 14:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-C | 8-9.2 | 4/25/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-CD | 8-9.2 | 4/25/2013 | 15:03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SB-A | 6-7.2 | 4/25/2013 | 12:30 | < 0.087 | | | < 0.087 | | | 0.72 | J | | < 0.087 | | | < 0.087 | | | 2.4 | J | | < 0.087 | | | 4.1 | J | * | 5.4 | J | | 1.1 | J | |
| 49-SB-B | 8-11.5 | 6/27/2013 | 15:15 | 0.033 | | | 0.045 | | | 0.063 | | | < 0.0078 | | | 0.12 | | | 0.028 | | | 0.046 | | | 0.033 | U | | 0.11 | | | 0.14 | | |
| 49-SB-C | 11.5-14.5 | 6/27/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SB-A | 6-8 | 4/25/2013 | 10:40 | 0.0076 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | 0.011 | | | 0.023 | | | 0.017 | | | < 0.0042 | | | 0.023 | | | 0.012 | | |
| 50-SB-B | 8-11.5 | 7/31/2013 | 9:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SB-C | 11.5-14 | 7/31/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SB-A | 4-6 | 4/24/2013 | 15:00 | 0.089 | | | 0.070 | | | 0.12 | | | < 0.050 | | | 0.26 | | | 0.25 | | | 0.22 | | * | 0.96 | | | 0.41 | | | 0.30 | | |
| 51-SB-B | 8-9 | 6/7/2013 | 10:45 | 0.051 | | | 0.049 | | | 0.086 | | | 0.016 | | | 0.23 | | | < 0.0081 | | | 0.051 | | | < 0.0081 | | | 0.17 | | | 0.19 | | |
| 51-SB-C | 9-12 | 6/7/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-A | 4-6 | 5/17/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-B | 6-8 | 5/17/2013 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-C | 8-10 | 5/17/2013 | 16:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SB-A | 2-2.9 | 5/21/2013 | 11:00 | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | | < 0.0069 | | |
| 53-SB-B | 6-8 | 5/23/2013 | 11:30 | < 0.0040 | | | < 0.0040 | | | 0.0050 | U | | < 0.0040 | | | 0.0053 | U | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | 0.0098 | U | |
| 53-SB-C | 10-12 | 6/5/2013 | 15:10 | 0.011 | U | | < 0.0083 | | | 0.014 | U | | < 0.0083 | | | 0.016 | U | | < 0.0083 | | | < 0.0083 | | | < 0.0083 | | | < 0.0083 | | | 0.019 | U | |
| 54-SB-A | 6-7 | 5/20/2013 | 14:05 | < 0.041 | | | < 0.041 | | | 0.080 | | | < 0.041 | | | 0.16 | | | 2.0 | | | 0.075 | | | 6.1 | U | * | 1.3 | | | 0.17 | | |
| 54-SB-B | 8-8.5 | 5/23/2013 | 15:45 | < 0.081 | | | < 0.081 | | | 0.12 | U | | < 0.081 | | | 0.25 | U | | 2.3 | | | < 0.081 | | | 9.0 | | * | 1.5 | | | 0.28 | U | |
| 54-SB-C | 7-10 | 6/5/2013 | 16:40 | < 0.033 | | | < 0.033 | | | < 0.033 | | | < 0.033 | | | 0.057 | U | | 0.68 | | | < 0.033 | | | 2.5 | | | 0.36 | | | 0.060 | U | |
| 55-SB-A | 4-5.75 | 5/21/2013 | 10:00 | < 0.039 | | | < 0.039 | | | < 0.039 | | | < 0.039 | | | 0.071 | | | 1.9 | | | < 0.039 | | | 1.3 | | | 0.55 | | | 0.077 | | |
| 55-SB-B | 5.5-7.5 | 8/8/2013 | 15:25 | 0.040 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | 0.25 | | | 3.5 | | | 0.066 | | | 3.0 | | | 1.6 | | | 0.25 | | |
| 55-SB-C | 6-8 | 6/5/2013 | 17:40 | < 0.033 | | | < 0.033 | | | < 0.033 | | | < 0.033 | | | 0.057 | U | | 0.83 | | | < 0.033 | | | 0.78 | | | 0.30 | | | 0.052 | U | |
| 56-SB-A | 6-8 | 5/20/2013 | 14:30 | < 0.043 | | | 0.042 | | J | 0.14 | | | < 0.043 | | | 0.30 | | | 2.9 | | | 0.090 | | | 8.2 | U | * | 1.6 | | | 0.37 | | |
| 56-SB-B | 6.5-8.5 | 8/12/2013 | 10:40 | 0.077 | | | 0.14 | | | 0.48 | | | < 0.042 | | | 0.90 | | | 6.2 | | | 0.15 | | | 18 | | * | 4.7 | | | 1.0 | | |
| 56-SB-C | 8-10 | 6/5/2013 | 18:25 | 0.036 | U | | 0.064 | U | | 0.14 | U | | < 0.033 | | | 0.33 | | | 2.4 | | | < 0.033 | | | 5.8 | U | * | 1.5 | | | 0.32 | | |
| 57-SB-A | 4-6 | 5/21/2013 | 12:00 | 0.031 | | | 0.016 | | | 0.019 | | | < 0.0037 | | | 0.015 | | | < 0.0037 | | | 0.028 | | | 0.0090 | U | | < 0.0037 | | | 0.055 | | |
| 57-SB-B | 6-8 | 5/21/2013 | 12:35 | 0.092 | | | 0.092 | | | 0.13 | | | 0.075 | | * | 0.17 | | | 0.87 | | | 0.18 | | | 0.79 | | | 0.45 | | | 0.19 | | |
| 57-SB-C | 8-12 | 7/2/2013 | 9:25 | 0.0090 | | | 0.012 | | | 0.034 | | | < 0.0037 | | | 0.094 | | | 0.53 | | | 0.012 | | | 0.52 | | | 0.35 | | | 0.081 | | |
| 58-SB-A | 6-8 | 5/22/2013 | 10:40 | 0.12 | U | | 0.12 | U | | 0.21 | | | 0.048 | U | * | 0.20 | | | 0.46 | | | 0.20 | | | 1.8 | | | 0.63 | | | 0.19 | U | |
| 58-SB-B | 10-10.8 | 5/22/2013 | 11:40 | 0.044 | U | | 0.044 | U | | 0.12 | U | | < 0.044 | | | 0.48 | | | 1.3 | | | 0.10 | | | 2.1 | | | 1.6 | | | 0.43 | | |
| 58-SB-C | 10.8-14 | 8/1/2013 | 12:15 | 0.058 | | | 0.049 | | | 0.11 | J | | < 0.045 | | | 0.40 | J | | 1.6 | J | | 0.12 | | | 3.4 | | | 1.8 | J | | 0.38 | J | |
| 59-SB-A | 4-6 | 5/22/2013 | 13:15 | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | |
| 59-SB-B | 6-8 | 5/28/2013 | 11:40 | < 0.021 | | | < 0.021 | | | 0.030 | | | < 0.021 | | | < 0.021 | | | < 0.021 | | | 0.044 | | | < 0.021 | | | < 0.021 | | | 0.051 | | |
| 59-SB-C | 8-8.7 | 5/28/2013 | 15:00 | 0.025 | | | < 0.019 | | | 0.046 | | | < 0.019 | | | < 0.019 | | | < 0.019 | | | 0.049 | | | < 0.019 | | | < 0.019 | | | 0.090 | | |
| 60-SB-A | 4-5.3 | 5/22/2013 | 9:45 | < 0.039 | | | < 0.039 | | | 0.045 | U | | < 0.039 | | | 0.076 | U | | 0.56 | | | < 0.039 | | | 0.48 | | | 0.38 | | | 0.093 | U | |
| 60-SB-B | 6-8 | 5/28/2013 | 11:00 | < 0.0040 | | | < 0.0040 | | | 0.012 | | | < 0.0040 | | | 0.023 | | | 0.59 | | | 0.0076 | | | 1.7 | | | 0.29 | | | 0.026 | | |
| 60-SB-C | 8-15.5 | 7/1/2013 | 16:40 | < 0.0038 | | | < 0.0038 | | | 0.019 | | | < 0.0038 | | | 0.034 | | | 0.37 | | | 0.0058 | | | 1.1 | | | 0.31 | | | 0.037 | | |
| 61-SB-A | 2-4 | 5/21/2013 | 15:25 | 0.011 | | | 0.0077 | | | 0.019 | | | < 0.0043 | | | 0.045 | | | 0.41 | | | 0.015 | | | 0.52 | U | | 0.22 | | | 0.065 | | |
| 61-SB-B | 6-8 | 5/21/2013 | 15:45 | < 0.089 | | | < 0.089 | | | < 0.089 | | | < 0.089 | | | < 0.089 | | | 2.0 | | | < 0.089 | | | 8.4 | | * | 0.62 | | | < 0.089 | | |
| 61-SB-C | 8-9 | 5/21/2013 | 16:00 | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | 1.1 | | | < 0.043 | | | 6.4 | U | * | 0.44 | | | < 0.043 | | |
| 62-SB-A | 4-6 | 5/21/2013 | 15:00 | 0.042 | | | 0.067 | | | 0.091 | | | < 0.037 | | | 0.22 | | | 1.2 | | | 0.095 | | | 2.9 | | | 0.55 | | | 0.17 | | |
| 62-SB-B | 6-8 | 5/21/2013 | 15:05 | < 0.041 | | | 0.060 | | | 0.14 | | | < 0.041 | | | 0.49 | | | 2.2 | | | 0.10 | | | 7.6 | U | * | 1.3 | | | 0.38 | | |
| 62-SB-C | 8-9 | 8/1/2013 | 13:00 | 0.0072 | | | 0.018 | | | 0.048 | J | | < 0.0039 | | | 0.091 | J | | 0.42 | J | | 0.017 | | | 0.93 | | | 0.32 | J | | 0.091 | J | |
| 63-SB-A | 2-4 | 5/21/2013 | 14:15 | < 0.083 | | | < 0.083 | | | 0.20 | | | < 0.083 | | | 0.71 | | | 4.2 | | | 0.17 | | | 19 | U | * | 3.0 | | | 0.63 | | |
| 63-SB-B | 4-5.3 | 5/21/2013 | 14:35 | 0.047 | | | 0.077 | | | 0.18 | | | < 0.043 | | | 0.66 | | | 2.6 | | | 0.11 | | | 10 | U | * | 1.8 | | | 0.55 | | |
| 63-SB-C | 6-8 | 5/28/2013 | 10:00 | < 0.040 | | | 0.054 | | | 0.11 | | | < 0.040 | | | 0.65 | | | 2.3 | | | 0.091 | | | 9.4 | | * | 1.5 | | | 0.48 | | |

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| 64-SB-A | 4-6 | 5/21/2013 | 12:15 | < 0.041 | | | < 0.041 | | | 0.072 | | | < 0.041 | | | < 0.041 | | | 2.4 | | | < 0.041 | | | 4.3 | U | * | 1.8 | | | 0.28 | | |
| 64-SB-B | 6-6.7 | 5/21/2013 | 12:35 | 0.060 | | | 0.057 | | | 0.057 | | | 0.050 | | * | 0.15 | | | 1.5 | | | 0.13 | | | 2.6 | | | 1.1 | | | 0.17 | | |
| 64-SB-C | 8-15.5 | 7/2/2013 | 8:45 | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | 0.0097 | | | 0.12 | | | < 0.0039 | | | 0.14 | | | 0.12 | | | 0.016 | | |
| 65-SB-A | 6-8 | 5/28/2013 | 16:10 | 0.0072 | | | 0.0049 | | | 0.0067 | | | < 0.0038 | | | 0.0089 | | | < 0.0038 | | | 0.0098 | | | < 0.0038 | | | 0.0045 | | | 0.011 | | |
| 65-SB-B | 8-11.5 | 8/1/2013 | 11:30 | 0.011 | | | 0.0081 | | | 0.013 | J | | < 0.0040 | | | 0.023 | J | | < 0.0040 | J | | 0.019 | | | 0.0097 | U | | 0.024 | J | | 0.024 | J | |
| 65-SB-C | 11.5-15 | 8/1/2013 | 11:40 | < 0.0039 | | | < 0.0039 | | | < 0.0039 | J | | < 0.0039 | | | < 0.0039 | J | | < 0.0039 | J | | < 0.0039 | | | 0.0050 | U | | 0.011 | J | | < 0.0039 | J | |
| 66-SB-A | 6-7 | 5/30/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66-SB-B | 2-4 | 5/31/2013 | 9:30 | 0.19 | | | 0.099 | J | | 0.22 | J | | 0.047 | | * | 0.23 | J | | 0.019 | | | 0.20 | | * | < 0.0097 | | | 0.11 | J | | 0.32 | J | |
| 66-SB-C | 4-5.5 | 5/31/2013 | 9:45 | 0.68 | | | 0.41 | J | | 1.3 | J | | 0.22 | | * | 1.8 | J | | 0.28 | | | 0.61 | | * | 0.13 | | | 0.54 | J | | 2.5 | J | |
| 67-SB-A | 4-6 | 5/30/2013 | 10:50 | 0.069 | | | 0.032 | J | | 0.051 | J | | 0.027 | | * | 0.074 | J | | 0.0074 | | | 0.058 | | | < 0.0042 | | | 0.036 | J | | 0.092 | J | |
| 67-SB-AD | 4-6 | 5/30/2013 | 10:55 | 0.086 | | | 0.059 | J | | 0.097 | J | | 0.019 | | | 0.21 | J | | 0.015 | | | 0.092 | | | 0.012 | | | 0.12 | J | | 0.21 | J | |
| 67-SB-B | 6-7 | 5/30/2013 | 11:20 | 0.12 | | | 0.054 | J | | 0.11 | J | | 0.025 | | * | 0.18 | J | | 0.012 | | | 0.13 | | | < 0.0048 | | | 0.068 | J | | 0.21 | J | |
| 67-SB-BD | 6-7 | 5/30/2013 | 11:25 | 0.15 | | | 0.067 | J | | 0.087 | J | | 0.037 | | * | 0.14 | J | | 0.015 | | | 0.13 | | | < 0.0047 | | | 0.051 | J | | 0.17 | J | |
| 67-SB-C | 8-16 | 7/2/2013 | 10:10 | < 0.0038 | | | 0.0044 | | | < 0.0038 | | | < 0.0038 | | | 0.0047 | | | < 0.0038 | | | 0.0084 | | | < 0.0038 | | | < 0.0038 | | | 0.0081 | | |
| 68-SB-A | 2-4 | 5/30/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-B | 4-6 | 6/6/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-C | 6-8 | 6/6/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-A | 2-4 | 5/30/2013 | 13:10 | 0.015 | | | 0.0091 | J | | 0.016 | J | | 0.0055 | | | 0.019 | J | | < 0.0033 | | | 0.018 | | | < 0.0033 | | | 0.012 | J | | 0.027 | J | |
| 69-SB-B | 4-6 | 6/6/2013 | 10:40 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 69-SB-C | 8-10 | 7/2/2013 | 11:15 | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 70-SB-A | 2-4 | 5/30/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-B | 4-6 | 6/6/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-C | 6-8 | 6/6/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-A | 2-4 | 5/30/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-AD | 2-4 | 5/30/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-B | 6-8 | 6/3/2013 | 14:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-C | 8-11.5 | 6/28/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-A | 4-6 | 5/29/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-B | 6-7.5 | 5/29/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-C | 7.5-9.5 | 5/29/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-A | 2-3.2 | 5/22/2013 | 11:35 | 0.12 | U | | 0.090 | U | | 0.17 | U | | < 0.073 | | | 0.32 | U | | < 0.073 | | | 0.32 | | * | < 0.073 | | | 0.21 | | | 0.33 | U | |
| 73-SB-B | 7.5-8.5 | 8/12/2013 | 9:30 | < 0.0086 | | | < 0.0086 | | | < 0.0086 | | | < 0.0086 | | | 0.013 | | | 0.29 | | | < 0.0086 | | | 0.84 | | | 0.18 | | | 0.019 | | |
| 73-SB-C | 8-10.5 | 6/28/2013 | 14:30 | < 0.0079 | | | < 0.0079 | | | < 0.0079 | | | < 0.0079 | | | < 0.0079 | | | 0.21 | | | < 0.0079 | | | 0.24 | | | 0.11 | | | 0.0088 | | |
| 74-SB-A | 2-4 | 5/22/2013 | 15:00 | 0.76 | | | 0.90 | | | 1.2 | | | 0.17 | U | * | 3.4 | | | 0.19 | | | 1.2 | | * | < 0.076 | | | 1.9 | | | 2.8 | | |
| 74-SB-AD | 2-4 | 5/22/2013 | 15:10 | 0.62 | | | 0.77 | | | 1.0 | | | 0.15 | U | * | 2.8 | | | 0.18 | | | 1.4 | | * | 0.043 | U | | 1.6 | | | 2.3 | | |
| 74-SB-B | 5.0-6.5 | 8/12/2013 | 11:10 | 0.30 | | | 0.28 | | | 0.79 | | | < 0.0085 | | | 1.7 | | | 0.11 | | | 0.40 | | * | 0.035 | U | | 0.84 | | | 1.6 | | |
| 74-SB-C | 8-11.5 | 8/1/2013 | 13:30 | 0.035 | | | 0.033 | | | 0.10 | J | | 0.011 | | | 0.13 | J | | 0.11 | J | | 0.034 | | | 0.020 | U | B | 0.044 | J | | 0.14 | J | |
| 75-SB-A | 2-4 | 5/22/2013 | 13:55 | 0.064 | U | | 0.039 | U | | 0.053 | U | | < 0.037 | | | 0.079 | U | | < 0.037 | | | 0.10 | | | < 0.037 | | | 0.043 | | | 0.067 | U | |
| 75-SB-B | 4-6 | 5/22/2013 | 14:55 | 0.25 | | | 0.17 | U | | 0.27 | | | < 0.045 | | | 0.78 | | | 0.10 | | | 0.30 | | * | 0.046 | U | | 0.48 | | | 0.69 | | |
| 75-SB-C | 8-11.5 | 7/1/2013 | 11:05 | 0.010 | | | 0.0093 | | | 0.029 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | 0.020 | | | < 0.0039 | | | < 0.0039 | | | 0.15 | | |
| 76-SB-A | 2-4 | 5/23/2013 | 9:35 | 0.047 | | | 0.046 | | | 0.050 | | | 0.0089 | | | 0.081 | | | < 0.0044 | | | 0.057 | | | 0.0086 | U | | 0.027 | | | 0.081 | | |
| 76-SB-B | 4-6 | 5/23/2013 | 9:50 | 0.012 | U | | 0.011 | U | | 0.011 | U | | < 0.0043 | | | 0.015 | U | | < 0.0043 | | | 0.019 | | | < 0.0043 | | | 0.0088 | | | 0.016 | U | |
| 76-SB-C | 6-7.4 | 5/23/2013 | 10:10 | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | |
| 77-SB-A | 2-4 | 5/24/2013 | 11:55 | 3.6 | | | 2.7 | | * | 6.3 | U | | 1.3 | | * | 15 | U | | 1.8 | | | 6.2 | | * | 1.2 | | | 11 | | | 14 | U | |
| 77-SB-B | 4-6 | 5/24/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-C | 8-15.5 | 7/1/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-A | 2-4 | 5/24/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-B | 4-5.5 | 5/24/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-C | 6-8 | 6/5/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79-SB-B | 2-4 | 5/23/2013 | 11:05 | 0.031 | | | 0.023 | | | 0.032 | | | < 0.0049 | | | 0.059 | | | < 0.0049 | | | 0.042 | | | < 0.0049 | | | 0.026 | | | 0.057 | | |
| 79-SB-C | 4-6 | 5/23/2013 | 11:25 | 0.0079 | U | | 0.0052 | U | | 0.0081 | U | | < 0.0045 | | | 0.013 | U | | < 0.0045 | | | 0.012 | | | < 0.0045 | | | 0.0076 | | | 0.012 | U | |
| 80-SB-A | 2-2.5 | 5/23/2013 | 10:15 | 0.017 | U | | 0.012 | U | | 0.019 | U | | < 0.0044 | | | 0.026 | | | 0.021 | | | 0.020 | | | 0.028 | | | 0.022 | | | 0.027 | | |
| 80-SB-B | 2.5-3.5 | 5/23/2013 | 10:00 | < 0.087 | | | < 0.087 | | | < 0.087 | | | < 0.087 | | | < 0.087 | | | 1.6 | J | | < 0.087 | | | 3.9 | J | | 1.0 | J | | < 0.087 | | |
| 80-SB-C | 3.5-5.8 | 5/23/2013 | 10:45 | < 0.044 | | | < 0.044 | | | < 0.044 | | | < 0.044 | | | < 0.044 | | | 1.8 | | | < 0.044 | | | 6.1 | U | * | 1.2 | | | < 0.044 | | |
| 81-SB-A | 2-4 | 5/14/2013 | 15:25 | 0.34 | | | 0.29 | | | 0.78 | | | 0.046 | | * | 1.1 | | | 0.50 | | | 0.31 | | * | 0.31 | U | | 1.2 | | | 1.2 | | |
| 81-SB-B | 5-6 | 6/11/2013 | 13:45 | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | 0.19 | | | < 0.0042 | | | 0.49 | U | | 0.25 | | | 0.043 | | |
| 81-SB-C | 6-7 | 6/11/2013 | 14:10 | < 0.0041 | | | < 0.0041 | | | 0.010 | U | | < 0.0041 | | | < 0.0041 | | | 0.090 | | | < 0.0041 | | | 0.34 | | | 0.12 | | | 0.020 | U | |
| 82-SB-A | 4-6 | 5/15/2013 | 9:35 | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 82-SB-AD | 4-6 | 5/15/2013 | 9:36 | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | |
| 82-SB-B | 5-6 | 6/11/2013 | 14:30 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.017 | | | < 0.0038 | | | < 0.0038 | | | 0.017 | U | | 0.0039 | U | |
| 82-SB-C | 6-7 | 6/11/2013 | 14:50 | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | 0.11 | | | < 0.0040 | | | 0.16 | | | 0.19 | | | 0.016 | U | |
| 83-SB-A | 2-4 | 5/15/2013 | 9:15 | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | |
| 83-SB-B | 6-7 | 6/11/2013 | 15:20 | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | 0.011 | U | | 0.014 | U | |
| 83-SB-C | 7-8 | 6/11/2013 | 15:50 | < 0.0042 | | | < 0.0042 | | | 0.038 | | | < 0.0042 | | | < 0.0042 | | | 0.63 | | | < 0.0042 | | | 0.061 | | | 0.73 | U | | 0.13 | | |
| 84-SB-A | 4-6 | 5/15/2013 | 11:05 | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | |

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| 84-SB-B | 7.5-8.5 | 6/12/2013 | 10:30 | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | |
| 84-SB-C | 10.5-15.5 | 8/9/2013 | 9:10 | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 85-SB-A | 2-4 | 5/15/2013 | 11:50 | < 0.017 | | | < 0.017 | | | < 0.017 | | | < 0.017 | | | < 0.017 | | | < 0.017 | | | < 0.017 | | | 0.17 | | | < 0.017 | | | 0.11 | | |
| 85-SB-B | 5.5-6.5 | 6/12/2013 | 11:20 | < 0.0041 | | | < 0.0041 | | | 0.0071 | U | | < 0.0041 | | | 0.013 | U | | 0.21 | | | < 0.0041 | | | 0.21 | | | 0.26 | | | 0.025 | | |
| 85-SB-C | 6.5-7.5 | 6/12/2013 | 11:40 | < 0.0044 | | | < 0.0044 | | | 0.0090 | U | | < 0.0044 | | | 0.018 | U | | 0.35 | | | < 0.0044 | | | 0.50 | U | | 0.42 | U | | 0.041 | | |
| 86-SB-A | 2-4 | 5/15/2013 | 14:50 | 0.0073 | | | 0.010 | | | 0.013 | | | < 0.0037 | | | 0.021 | | | < 0.0037 | | | 0.012 | | | < 0.0037 | | | 0.0085 | | | 0.021 | | |
| 86-SB-B | 5.5-6.5 | 6/12/2013 | 15:50 | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | |
| 86-SB-C | 6.5-7.0 | 6/12/2013 | 16:05 | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | |
| 87-SB-A | 2-4 | 5/28/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87-SB-B | 4-6 | 5/28/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87-SB-C | 6.5-7.2 | 5/28/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-A | 2-3.8 | 5/24/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-AD | 2-3.8 | 5/24/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-B | 3.8-4.2 | 5/24/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-C | 8-11.5 | 7/2/2013 | 7:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-A | 2-4 | 5/24/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-B | 4-5.9 | 5/24/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-C | 8-11.5 | 7/1/2013 | 12:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-A | 2-4 | 5/24/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-B | 4-6 | 5/24/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-C | 6-7 | 5/24/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-A | 2-4 | 5/23/2013 | 13:45 | 0.0043 | U | | < 0.0038 | | | 0.0043 | U | | < 0.0038 | | | 0.0058 | U | | < 0.0038 | | | 0.0098 | | | < 0.0038 | | | < 0.0038 | | | 0.0055 | U | |
| 91-SB-B | 4-6 | 6/4/2013 | 11:10 | 0.015 | U | | 0.013 | U | | 0.018 | | | < 0.0033 | | | 0.044 | | | < 0.0033 | | | 0.022 | | | < 0.0033 | | | 0.027 | | | 0.044 | | |
| 91-SB-C | 8-14.5 | 7/1/2013 | 13:40 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0042 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0054 | | |
| 92-SB-A | 2-3.1 | 5/23/2013 | 13:00 | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | |
| 92-SB-B | 4-6 | 6/4/2013 | 11:50 | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | |
| 92-SB-C | 8-10.5 | 7/1/2013 | 14:30 | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | 0.0041 | | |
| 93-SB-A | 2-3.1 | 5/3/2013 | 12:10 | < 0.0068 | | | < 0.0068 | | | < 0.0068 | | | < 0.0068 | | | < 0.0068 | | | < 0.0068 | | | < 0.0068 | | | < 0.0068 | | | < 0.0068 | | | < 0.0068 | | |
| 93-SB-B | 4-6 | 6/5/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-C | 6.5-8 | 6/5/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-A | 2-4 | 5/24/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-B | 4-6 | 6/5/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-C | 6-8 | 6/5/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95-SB-A | 4-6 | 5/23/2013 | 15:45 | 0.23 | | | 0.22 | | | 0.34 | | | 0.075 | | * | 0.97 | U | | 0.061 | | | 0.26 | | * | 0.099 | | | 0.80 | | | 0.91 | U | |
| 95-SB-B | 6-8 | 5/23/2013 | 16:05 | 0.011 | U | | 0.0075 | U | | 0.014 | U | | < 0.0048 | | | 0.023 | U | | < 0.0048 | | | 0.017 | | | < 0.0048 | | | 0.013 | | | 0.022 | U | |
| 95-SB-C | 8-11 | 7/1/2013 | 15:10 | 0.0070 | | | < 0.0037 | | | 0.0075 | | | < 0.0037 | | | 0.0091 | | | < 0.0037 | | | 0.0038 | | | < 0.0037 | | | < 0.0037 | | | 0.018 | | |
| 96-SB-A | 2-2.6 | 5/23/2013 | 15:15 | < 0.0034 | | | < 0.0034 | | | < 0.0034 | | | < 0.0034 | | | < 0.0034 | | | < 0.0034 | | | < 0.0034 | | | < 0.0034 | | | < 0.0034 | | | < 0.0034 | | |
| 96-SB-B | 4-6 | 6/5/2013 | 12:45 | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | |
| 96-SB-C | 6-8 | 6/5/2013 | 13:00 | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | | < 0.0033 | | |
| 97-SB-A | 2-4 | 5/14/2013 | 16:10 | 0.0041 | | | 0.0039 | | | 0.0044 | | | < 0.0033 | | | 0.0045 | | | < 0.0033 | | | 0.012 | | | < 0.0033 | | | < 0.0033 | | | 0.0050 | | |
| 97-SB-B | 4-6 | 6/10/2013 | 10:50 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 97-SB-BD | 4-6 | 6/10/2013 | 10:35 | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| 97-SB-C | 6-7 | 6/10/2013 | 11:15 | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| 98-SB-A | 2-4 | 5/14/2013 | 10:15 | 0.0044 | | | < 0.0038 | | | 0.0041 | | | < 0.0038 | | | 0.0067 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0059 | | | 0.0074 | | |
| 98-SB-B | 3.5-4.5 | 6/11/2013 | 10:35 | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | |
| 98-SB-C | 4.5-5.5 | 6/11/2013 | 10:45 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 99-SB-A | 2-4 | 5/14/2013 | 10:20 | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | < 0.036 | | | 0.28 | | | < 0.036 | | | 3.4 | | | 0.16 | | | < 0.036 | | |
| 99-SB-B | 5.5-6 | 6/11/2013 | 11:40 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.016 | | | < 0.0038 | | | 0.070 | | | 0.016 | U | | < 0.0038 | | |
| 99-SB-C | 6-7 | 6/11/2013 | 12:00 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | 0.0048 | | | < 0.0038 | | | 0.011 | U | | 0.0064 | U | | < 0.0038 | | |
| 100-SB-A | 2-3 | 5/15/2013 | 14:55 | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | 0.041 | | |
| 100-SB-B | 5.5-6.5 | 6/12/2013 | 9:15 | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| 100-SB-C | 6.5-7.5 | 6/12/2013 | 9:35 | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | | < 0.0045 | | |
| 100-SB-CD | 6.5-7.5 | 6/12/2013 | 9:40 | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | | < 0.0044 | | |
| 101-SB-A | 2-3 | 5/15/2013 | 16:20 | 0.0094 | | | 0.012 | | | 0.012 | | | 0.0051 | | | 0.018 | | | < 0.0035 | | | 0.015 | | | < 0.0035 | | | 0.0048 | | | 0.017 | | |
| 101-SB-B | 6.6-7.2 | 6/12/2013 | 13:55 | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| 101-SB-C | 7.2-8.2 | 6/12/2013 | 14:10 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| 102-SB-A | 2-3.3 | 5/28/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-B | 5.7-11 | 8/2/2013 | 9:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-C | 11-15 | 8/2/2013 | 9:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-A | 2-3 | 5/28/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-B | 8-11.5 | 8/2/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-C | 11.5-14 | 8/2/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-A | 2-4 | 5/3/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-B | 4-6 | 6/5/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-C | 6.5-8 | 6/5/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 105-SB-A | 2-4 | 5/3/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-B | 6-8 | 6/5/2013 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-C | 8-11 | 7/1/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-A | 2-4 | 4/26/2013 | 9:30 | 0.012 | | | 0.012 | | | 0.015 | | | < 0.0043 | | | 0.036 | | | < 0.0043 | | | 0.028 | | | < 0.0043 | | | 0.014 | | | 0.030 | | |
| 106-SB-B | 4-6 | 4/26/2013 | 10:00 | < 0.0043 | | | 0.0046 | | | < 0.0043 | | | < 0.0043 | | | 0.010 | | | < 0.0043 | | | 0.017 | | | < 0.0043 | | | 0.0071 | | | 0.011 | | |
| 106-SB-C | 6-6.8 | 4/26/2013 | 10:35 | < 0.0049 | | | 0.0057 | | | 0.0059 | | | < 0.0049 | | | 0.013 | | | < 0.0049 | | | 0.017 | | | < 0.0049 | | | 0.0070 | | | 0.011 | | |
| 107-SB-A | 2-4 | 4/26/2013 | 11:20 | 0.016 | | | 0.011 | | | 0.014 | | | < 0.0048 | | | 0.022 | | | < 0.0048 | | | 0.028 | | | < 0.0048 | | | 0.013 | | | 0.023 | | |
| 107-SB-B | 4-6 | 4/26/2013 | 11:35 | 0.0058 | | | 0.0050 | | | < 0.0046 | | | < 0.0046 | | | 0.010 | | | < 0.0046 | | | 0.023 | | | < 0.0046 | | | 0.0065 | | | 0.011 | | |
| 107-SB-C | 6-8 | 4/26/2013 | 11:55 | 0.022 | | | 0.012 | | | 0.021 | | | < 0.0047 | | | 0.041 | | | < 0.0047 | | | 0.044 | | | < 0.0047 | | | 0.024 | | | 0.039 | | |
| 108-SB-A | 2-4 | 5/14/2013 | 11:50 | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | |
| 108-SB-B | 4-4.5 | 6/10/2013 | 12:05 | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | |
| 108-SB-C | 6-7 | 6/10/2013 | 14:30 | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| 109-SB-A | 4-5 | 5/14/2013 | 12:20 | 0.026 | | | < 0.0033 | | | 0.0063 | | | < 0.0033 | | | < 0.0033 | | | 0.0068 | | | < 0.0033 | | | < 0.0033 | | | 0.020 | | | 0.0048 | | |
| 109-SB-B | 4-6 | 6/10/2013 | 15:10 | 0.0051 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | |
| 109-SB-C | 5-7 | 6/11/2013 | 10:20 | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | |

**NOTES:**

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|---|---|
| 2.5 | **Exceeds Direct Contact Commercial RSL** |
| 3.1 | **Exceeds MDEQ Leaching to Groundwater Screening Level** |
| 22 | **Exceeds MDEQ - RBSLs Commercial Subsurface** |
| <0.53 | **Non-Detect Result that Exceeds an Associated Screening Level** |

**(1) - EPA RSL Version used for screening level development: January 2015**

**VQs - Validator Qualifiers**

**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**

**R - Rejected Data**

**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | | | | | . | | | . | | | . | | | . | | | . | | | . | | |
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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-SB-A | 4-4.8 | 5/17/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-SB-B | 8-11 | 8/8/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-SB-C | 11-15 | 8/8/2013 | 13:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SB-A | 2-4 | 5/17/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SB-B | 8-11.5 | 8/8/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SB-C | 11.5-15.5 | 8/8/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-SB-A | 4-5.4 | 5/17/2013 | 13:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-SB-B | 7.5-8.0 | 8/8/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-SB-C | 8.0-11.5 | 8/8/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-SB-A | 6-8 | 5/7/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-SB-B | 8-10.5 | 6/6/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-SB-A | 6-8 | 5/7/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-SB-B | 8-12 | 6/6/2013 | 9:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-SB-C | 12-15 | 6/6/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SB-A | 4-6 | 5/9/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SB-B | 8-12 | 8/2/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SB-C | 12-16 | 8/2/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SB-CD | 12-16 | 8/2/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-SB-A | 6-8 | 5/6/2013 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-SB-B | 8-9.5 | 5/6/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-SB-C | 12-14 | 6/6/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-SB-A | 2-4 | 5/6/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-SB-B | 7.8-8.8 | 7/11/2013 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-SB-C | 8.8-15 | 7/31/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-SB-A | 2-4 | 5/16/2013 | 14:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 9-SB-B | 8-9 | 7/11/2013 | 12:23 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 9-SB-C | 8-11 | 8/1/2013 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SB-A | 4-6 | 4/24/2013 | 11:40 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SB-B | 8-12 | 7/30/2013 | 15:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SB-C | 12-16 | 7/30/2013 | 16:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 11-SB-A | 4-6 | 5/16/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-SB-B | 8-10 | 6/27/2013 | 8:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SB-A | 2-4 | 5/7/2013 | 14:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SB-B | 8-9 | 7/11/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SB-C | 12-15 | 7/31/2013 | 7:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-SB-A | 6-6.6 | 5/7/2013 | 13:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-SB-B | 8-11.5 | 7/31/2013 | 8:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-SB-C | 11.5-14.5 | 7/31/2013 | 8:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-SB-A | 6-8 | 4/29/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-SB-B | 6-12 | 6/6/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-SB-C | 12-15 | 6/6/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SB-A | 4-6 | 5/8/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SB-AD | 4-6 | 5/8/2013 | 15:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SB-B | 7.8-8.8 | 7/12/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SB-C | 8-14 | 8/2/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-SB-A | 4-6 | 5/9/2013 | 16:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-SB-B | 8-9.5 | 5/9/2013 | 16:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-SB-C | 8-13 | 8/2/2013 | 12:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-SB-A | 4-6 | 5/10/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-SB-B | 6-8 | 5/10/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-SB-C | 8-9.2 | 5/10/2013 | 13:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SB-A | 2-4 | 5/8/2013 | 11:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SB-B | 7.7-8.5 | 7/12/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SB-C | 8-11.5 | 8/2/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SB-CD | 8-11.5 | 8/2/2013 | 13:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-SB-A | 4-4.8 | 5/2/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-SB-B | 6.5-8.0 | 8/9/2013 | 9:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-SB-C | 8.0-15.5 | 8/9/2013 | 10:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-SB-A | 4-6 | 4/24/2013 | 9:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 20-SB-B | 6-8 | 4/24/2013 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 20-SB-C | 9-15 | 8/1/2013 | 9:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SB-A | 4-6 | 5/13/2013 | 11:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SB-B | 7-8 | 6/11/2013 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SB-C | 8-11.5 | 6/27/2013 | 11:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 22-SB-A | 6-8 | 5/16/2013 | 11:32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-SB-B | 8-10 | 5/16/2013 | 11:58 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-SB-C | 10-10.5 | 5/16/2013 | 12:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| ale il o out a ota u sur ace oil am ling | | | | | | | | | | H H | | | H I H | | | | | | H | | | H I | | | H | | | H H | | | H I H H | | | H | | | H H | | | H | | | H | | |
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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| eac ing to round ater creening e el | | | | | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | | | | | | | . | | | . | | | . | | | . | | |
| s ommercial u sur ace | | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 23-SB-A | 6-8 | 5/16/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-SB-B | 8-10 | 5/16/2013 | 12:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-SB-C | 10.5-11.5 | 5/16/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-SB-A | 2-4 | 4/29/2013 | 15:30 | 0.47 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 25-SB-AD | 2-4 | 4/29/2013 | 15:32 | 0.92 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 25-SB-B | 7-8 | 8/8/2013 | 9:15 | 0.54 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | |
| 25-SB-C | 8-11.5 | 7/31/2013 | 9:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 26-SB-A | 6-8 | 4/30/2013 | 12:25 | 2.5 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 26-SB-B | 8.1-11 | 7/31/2013 | 12:10 | 9.7 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 26-SB-C | 11-14.5 | 7/31/2013 | 12:30 | 11 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 27-SB-A | 6-7 | 4/30/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-SB-B | 7.5-8.5 | 7/9/2013 | 14:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-SB-C | 8-13 | 7/31/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-SB-A | 6-7.3 | 4/30/2013 | 15:00 | 3.5 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 28-SB-B | 7.3-8.5 | 7/9/2013 | 15:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 28-SB-C | 8-11.5 | 7/31/2013 | 13:55 | 2.4 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 29-SB-A | 6-6.7 | 5/1/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SB-B | 6.7-8 | 6/11/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SB-C | 8-11.5 | 6/28/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SB-A | 4-6 | 5/1/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SB-B | 8-9.9 | 5/1/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SB-C | 9.9-15 | 8/1/2013 | 8:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SB-A | 6-7.5 | 5/2/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SB-B | 5.5-7 | 8/7/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SB-C | 8-11.5 | 6/28/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-A | 2-4 | 5/2/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-B | 5-7.5 | 6/6/2013 | 16:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-BD | 5-7.5 | 6/6/2013 | 16:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-C | 8-12 | 6/6/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-A | 4-6 | 5/2/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-B | 8-9 | 5/2/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-C | 12-16 | 6/6/2013 | 17:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-A | 6-8 | 6/10/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-AD | 6-8 | 6/10/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-B | 8-11.5 | 6/28/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-C | 11.5-15 | 6/28/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-A | 4-6 | 5/6/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-B | 8.5-11 | 6/7/2013 | 9:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-C | 15-20 | 6/7/2013 | 9:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36-SB-A | 2-4 | 5/13/2013 | 12:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 36-SB-B | 6-8 | 5/13/2013 | 12:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 36-SB-C | 8-10 | 5/13/2013 | 13:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 37-SB-A | 2-4 | 5/13/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37-SB-B | 8-11.5 | 6/27/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37-SB-C | 11.5-15.5 | 6/27/2013 | 12:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37-SB-CD | 11.5-15.5 | 6/27/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38-SB-A | 2-4 | 5/16/2013 | 9:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 38-SB-B | 6-8 | 6/7/2013 | 13:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 38-SB-C | 8-10 | 6/27/2013 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 39-SB-A | 2-4 | 4/26/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39-SB-B | 8-11.5 | 6/27/2013 | 14:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39-SB-C | 11.5-15.5 | 6/27/2013 | 13:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40-SB-A | 6-7.5 | 4/29/2013 | 15:15 | 0.035 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 40-SB-B | 8-11.5 | 6/28/2013 | 7:15 | 0.072 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 40-SB-C | 11.5-19.5 | 6/28/2013 | 8:05 | 0.037 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 41-SB-A | 6-6.6 | 4/30/2013 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41-SB-B | 8-9.2 | 7/10/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41-SB-C | 12-16 | 8/1/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41-SB-CD | 12-16 | 8/1/2013 | 15:59 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42-SB-A | 6-7 | 4/30/2013 | 10:25 | 0.044 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 42-SB-B | 7.2-82 | 7/10/2013 | 10:55 | 0.58 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | |
| 42-SB-C | 8-11.5 | 7/31/2013 | 15:15 | 0.19 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 43-SB-A | 2-4 | 4/30/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SB-B | 6-8 | 7/10/2013 | 11:22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SB-C | 8.3-11.5 | 7/31/2013 | 14:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44-SB-A | 2-4 | 5/1/2013 | 13:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 44-SB-B | 2-4 | 5/1/2013 | 12:25 | 0.38 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | . | | | . | | | . | | | . | | | . | | | . | | | | | | | | | . | | | . | | | . | | | . | | | . | | |
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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 44-SB-C | 4-6 | 5/1/2013 | 12:30 | 0.027 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | 0.72 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 45-SB-B | 4-4.9 | 5/1/2013 | 11:35 | 0.061 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 45-SB-C | 8-11.5 | 8/9/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46-SB-A | 4-6 | 5/1/2013 | 15:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 46-SB-B | 5-6.2 | 8/6/2013 | 11:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 46-SB-BD | 5-6.2 | 8/6/2013 | 11:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 46-SB-C | 8-11.5 | 6/28/2013 | 8:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 47-SB-A | 6-7.7 | 5/2/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SB-B | 5-7 | 8/6/2013 | 14:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SB-BD | 5-7 | 8/6/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SB-C | 8-10 | 6/27/2013 | 16:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-A | 4-6 | 4/25/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-B | 6-8 | 4/25/2013 | 14:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-C | 8-9.2 | 4/25/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-CD | 8-9.2 | 4/25/2013 | 15:03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SB-A | 6-7.2 | 4/25/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SB-B | 8-11.5 | 6/27/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SB-C | 11.5-14.5 | 6/27/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SB-A | 6-8 | 4/25/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SB-B | 8-11.5 | 7/31/2013 | 9:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SB-C | 11.5-14 | 7/31/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SB-A | 4-6 | 4/24/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SB-B | 8-9 | 6/7/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SB-C | 9-12 | 6/7/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-A | 4-6 | 5/17/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-B | 6-8 | 5/17/2013 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-C | 8-10 | 5/17/2013 | 16:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SB-A | 2-2.9 | 5/21/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SB-B | 6-8 | 5/23/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SB-C | 10-12 | 6/5/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SB-A | 6-7 | 5/20/2013 | 14:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SB-B | 8-8.5 | 5/23/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SB-C | 7-10 | 6/5/2013 | 16:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55-SB-A | 4-5.75 | 5/21/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55-SB-B | 5.5-7.5 | 8/8/2013 | 15:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55-SB-C | 6-8 | 6/5/2013 | 17:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SB-A | 6-8 | 5/20/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SB-B | 6.5-8.5 | 8/12/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SB-C | 8-10 | 6/5/2013 | 18:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57-SB-A | 4-6 | 5/21/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57-SB-B | 6-8 | 5/21/2013 | 12:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57-SB-C | 8-12 | 7/2/2013 | 9:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SB-A | 6-8 | 5/22/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SB-B | 10-10.8 | 5/22/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SB-C | 10.8-14 | 8/1/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59-SB-A | 4-6 | 5/22/2013 | 13:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59-SB-B | 6-8 | 5/28/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59-SB-C | 8-8.7 | 5/28/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60-SB-A | 4-5.3 | 5/22/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60-SB-B | 6-8 | 5/28/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60-SB-C | 8-15.5 | 7/1/2013 | 16:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SB-A | 2-4 | 5/21/2013 | 15:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SB-B | 6-8 | 5/21/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SB-C | 8-9 | 5/21/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62-SB-A | 4-6 | 5/21/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62-SB-B | 6-8 | 5/21/2013 | 15:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62-SB-C | 8-9 | 8/1/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SB-A | 2-4 | 5/21/2013 | 14:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SB-B | 4-5.3 | 5/21/2013 | 14:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SB-C | 6-8 | 5/28/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64-SB-A | 4-6 | 5/21/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64-SB-B | 6-6.7 | 5/21/2013 | 12:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64-SB-C | 8-15.5 | 7/2/2013 | 8:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SB-A | 6-8 | 5/28/2013 | 16:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SB-B | 8-11.5 | 8/1/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SB-C | 11.5-15 | 8/1/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| eac ing to round ater creening e el | | | | . | | | . | | | . | | | . | | | . | | | . | | | | | | | | | . | | | . | | | . | | | . | | | . | | |
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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 66-SB-A | 6-7 | 5/30/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66-SB-B | 2-4 | 5/31/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66-SB-C | 4-5.5 | 5/31/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-A | 4-6 | 5/30/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-AD | 4-6 | 5/30/2013 | 10:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-B | 6-7 | 5/30/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-BD | 6-7 | 5/30/2013 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-C | 8-16 | 7/2/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-A | 2-4 | 5/30/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-B | 4-6 | 6/6/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-C | 6-8 | 6/6/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-A | 2-4 | 5/30/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-B | 4-6 | 6/6/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-C | 8-10 | 7/2/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-A | 2-4 | 5/30/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-B | 4-6 | 6/6/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-C | 6-8 | 6/6/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-A | 2-4 | 5/30/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-AD | 2-4 | 5/30/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-B | 6-8 | 6/3/2013 | 14:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-C | 8-11.5 | 6/28/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-A | 4-6 | 5/29/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-B | 6-7.5 | 5/29/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-C | 7.5-9.5 | 5/29/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-A | 2-3.2 | 5/22/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-B | 7.5-8.5 | 8/12/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-C | 8-10.5 | 6/28/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-A | 2-4 | 5/22/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-AD | 2-4 | 5/22/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-B | 5.0-6.5 | 8/12/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-C | 8-11.5 | 8/1/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SB-A | 2-4 | 5/22/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SB-B | 4-6 | 5/22/2013 | 14:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SB-C | 8-11.5 | 7/1/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76-SB-A | 2-4 | 5/23/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76-SB-B | 4-6 | 5/23/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76-SB-C | 6-7.4 | 5/23/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-A | 2-4 | 5/24/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-B | 4-6 | 5/24/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-C | 8-15.5 | 7/1/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-A | 2-4 | 5/24/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-B | 4-5.5 | 5/24/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-C | 6-8 | 6/5/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79-SB-B | 2-4 | 5/23/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79-SB-C | 4-6 | 5/23/2013 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80-SB-A | 2-2.5 | 5/23/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80-SB-B | 2.5-3.5 | 5/23/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80-SB-C | 3.5-5.8 | 5/23/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81-SB-A | 2-4 | 5/14/2013 | 15:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81-SB-B | 5-6 | 6/11/2013 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81-SB-C | 6-7 | 6/11/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-A | 4-6 | 5/15/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-AD | 4-6 | 5/15/2013 | 9:36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-B | 5-6 | 6/11/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-C | 6-7 | 6/11/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83-SB-A | 2-4 | 5/15/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83-SB-B | 6-7 | 6/11/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83-SB-C | 7-8 | 6/11/2013 | 15:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SB-A | 4-6 | 5/15/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SB-B | 7.5-8.5 | 6/12/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SB-C | 10.5-15.5 | 8/9/2013 | 9:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85-SB-A | 2-4 | 5/15/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85-SB-B | 5.5-6.5 | 6/12/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85-SB-C | 6.5-7.5 | 6/12/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86-SB-A | 2-4 | 5/15/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86-SB-B | 5.5-6.5 | 6/12/2013 | 15:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86-SB-C | 6.5-7.0 | 6/12/2013 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| ale il o out a ota u sur ace oil am ling | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| eac ing to round ater creening e el | | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | | | | | | | . | | | . | | | . | | | . | | | |
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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 87-SB-A | 2-4 | 5/28/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87-SB-B | 4-6 | 5/28/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87-SB-C | 6.5-7.2 | 5/28/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-A | 2-3.8 | 5/24/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-AD | 2-3.8 | 5/24/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-B | 3.8-4.2 | 5/24/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-C | 8-11.5 | 7/2/2013 | 7:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-A | 2-4 | 5/24/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-B | 4-5.9 | 5/24/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-C | 8-11.5 | 7/1/2013 | 12:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-A | 2-4 | 5/24/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-B | 4-6 | 5/24/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-C | 6-7 | 5/24/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-A | 2-4 | 5/23/2013 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-B | 4-6 | 6/4/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-C | 8-14.5 | 7/1/2013 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92-SB-A | 2-3.1 | 5/23/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92-SB-B | 4-6 | 6/4/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92-SB-C | 8-10.5 | 7/1/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-A | 2-3.1 | 5/3/2013 | 12:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-B | 4-6 | 6/5/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-C | 6.5-8 | 6/5/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-A | 2-4 | 5/24/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-B | 4-6 | 6/5/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-C | 6-8 | 6/5/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95-SB-A | 4-6 | 5/23/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95-SB-B | 6-8 | 5/23/2013 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95-SB-C | 8-11 | 7/1/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96-SB-A | 2-2.6 | 5/23/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96-SB-B | 4-6 | 6/5/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96-SB-C | 6-8 | 6/5/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-A | 2-4 | 5/14/2013 | 16:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-B | 4-6 | 6/10/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-BD | 4-6 | 6/10/2013 | 10:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-C | 6-7 | 6/10/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98-SB-A | 2-4 | 5/14/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98-SB-B | 3.5-4.5 | 6/11/2013 | 10:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98-SB-C | 4.5-5.5 | 6/11/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99-SB-A | 2-4 | 5/14/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99-SB-B | 5.5-6 | 6/11/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99-SB-C | 6-7 | 6/11/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-A | 2-3 | 5/15/2013 | 14:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-B | 5.5-6.5 | 6/12/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-C | 6.5-7.5 | 6/12/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-CD | 6.5-7.5 | 6/12/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101-SB-A | 2-3 | 5/15/2013 | 16:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101-SB-B | 6.6-7.2 | 6/12/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101-SB-C | 7.2-8.2 | 6/12/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-A | 2-3.3 | 5/28/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-B | 5.7-11 | 8/2/2013 | 9:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-C | 11-15 | 8/2/2013 | 9:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-A | 2-3 | 5/28/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-B | 8-11.5 | 8/2/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-C | 11.5-14 | 8/2/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-A | 2-4 | 5/3/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-B | 4-6 | 6/5/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-C | 6.5-8 | 6/5/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-A | 2-4 | 5/3/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-B | 6-8 | 6/5/2013 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-C | 8-11 | 7/1/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-A | 2-4 | 4/26/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-B | 4-6 | 4/26/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-C | 6-6.8 | 4/26/2013 | 10:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107-SB-A | 2-4 | 4/26/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107-SB-B | 4-6 | 4/26/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107-SB-C | 6-8 | 4/26/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 108-SB-A | 2-4 | 5/14/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 108-SB-B | 4-4.5 | 6/10/2013 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 108-SB-C | 6-7 | 6/10/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109-SB-A | 4-5 | 5/14/2013 | 12:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109-SB-B | 4-6 | 6/10/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109-SB-C | 5-7 | 6/11/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

**(1) - EPA RSL Version used for screening level development: January 2015**
**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| 1-SB-A | 4-4.8 | 5/17/2013 | 11:10 | | | | | | | | | | | | | | |
| 1-SB-B | 8-11 | 8/8/2013 | 13:10 | | | | | | | | | | | | | | |
| 1-SB-C | 11-15 | 8/8/2013 | 13:15 | | | | | | | | | | | | | | |
| 2-SB-A | 2-4 | 5/17/2013 | 12:00 | | | | | | | | | | | | | | |
| 2-SB-B | 8-11.5 | 8/8/2013 | 11:20 | | | | | | | | | | | | | | |
| 2-SB-C | 11.5-15.5 | 8/8/2013 | 11:30 | | | | | | | | | | | | | | |
| 3-SB-A | 4-5.4 | 5/17/2013 | 13:35 | | | | | | | | | | | | | | |
| 3-SB-B | 7.5-8.0 | 8/8/2013 | 10:00 | | | | | | | | | | | | | | |
| 3-SB-C | 8.0-11.5 | 8/8/2013 | 10:30 | | | | | | | | | | | | | | |
| 4-SB-A | 6-8 | 5/7/2013 | 11:20 | | | | | | | | | | | | | | |
| 4-SB-B | 8-10.5 | 6/6/2013 | 10:20 | | | | | | | | | | | | | | |
| 5-SB-A | 6-8 | 5/7/2013 | 10:00 | | | | | | | | | | | | | | |
| 5-SB-B | 8-12 | 6/6/2013 | 9:00 | | | | | | | | | | | | | | |
| 5-SB-C | 12-15 | 6/6/2013 | 9:15 | | | | | | | | | | | | | | |
| 6-SB-A | 4-6 | 5/9/2013 | 12:00 | | | | | | | | | | | | | | |
| 6-SB-B | 8-12 | 8/2/2013 | 10:50 | | | | | | | | | | | | | | |
| 6-SB-C | 12-16 | 8/2/2013 | 11:10 | | | | | | | | | | | | | | |
| 6-SB-CD | 12-16 | 8/2/2013 | 11:15 | | | | | | | | | | | | | | |
| 7-SB-A | 6-8 | 5/6/2013 | 14:20 | | | | | | | | | | | | | | |
| 7-SB-B | 8-9.5 | 5/6/2013 | 14:30 | | | | | | | | | | | | | | |
| 7-SB-C | 12-14 | 6/6/2013 | 14:30 | | | | | | | | | | | | | | |
| 8-SB-A | 2-4 | 5/6/2013 | 15:30 | | | | | | | | | | | | | | |
| 8-SB-B | 7.8-8.8 | 7/11/2013 | 13:45 | | | | | | | | | | | | | | |
| 8-SB-C | 8.8-15 | 7/31/2013 | 11:10 | | | | | | | | | | | | | | |
| 9-SB-A | 2-4 | 5/16/2013 | 14:30 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 9-SB-B | 8-9 | 7/11/2013 | 12:23 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 9-SB-C | 8-11 | 8/1/2013 | 10:00 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 10-SB-A | 4-6 | 4/24/2013 | 11:40 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 10-SB-B | 8-12 | 7/30/2013 | 15:25 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 10-SB-C | 12-16 | 7/30/2013 | 16:20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 11-SB-A | 4-6 | 5/16/2013 | 15:10 | | | | | | | | | | | | | | |
| 11-SB-B | 8-10 | 6/27/2013 | 8:50 | | | | | | | | | | | | | | |
| 12-SB-A | 2-4 | 5/7/2013 | 14:40 | | | | | | | | | | | | | | |
| 12-SB-B | 8-9 | 7/11/2013 | 9:50 | | | | | | | | | | | | | | |
| 12-SB-C | 12-15 | 7/31/2013 | 7:30 | | | | | | | | | | | | | | |
| 13-SB-A | 6-6.6 | 5/7/2013 | 13:05 | | | | | | | | | | | | | | |
| 13-SB-B | 8-11.5 | 7/31/2013 | 8:20 | | | | | | | | | | | | | | |
| 13-SB-C | 11.5-14.5 | 7/31/2013 | 8:30 | | | | | | | | | | | | | | |
| 14-SB-A | 6-8 | 4/29/2013 | 11:55 | | | | | | | | | | | | | | |
| 14-SB-B | 6-12 | 6/6/2013 | 12:15 | | | | | | | | | | | | | | |
| 14-SB-C | 12-15 | 6/6/2013 | 12:30 | | | | | | | | | | | | | | |
| 15-SB-A | 4-6 | 5/8/2013 | 15:45 | | | | | | | | | | | | | | |
| 15-SB-AD | 4-6 | 5/8/2013 | 15:47 | | | | | | | | | | | | | | |
| 15-SB-B | 7.8-8.8 | 7/12/2013 | 10:25 | | | | | | | | | | | | | | |
| 15-SB-C | 8-14 | 8/2/2013 | 11:40 | | | | | | | | | | | | | | |
| 16-SB-A | 4-6 | 5/9/2013 | 16:15 | | | | | | | | | | | | | | |
| 16-SB-B | 8-9.5 | 5/9/2013 | 16:55 | | | | | | | | | | | | | | |
| 16-SB-C | 8-13 | 8/2/2013 | 12:25 | | | | | | | | | | | | | | |
| 17-SB-A | 4-6 | 5/10/2013 | 12:00 | | | | | | | | | | | | | | |
| 17-SB-B | 6-8 | 5/10/2013 | 12:50 | | | | | | | | | | | | | | |
| 17-SB-C | 8-9.2 | 5/10/2013 | 13:33 | | | | | | | | | | | | | | |
| 18-SB-A | 2-4 | 5/8/2013 | 11:33 | | | | | | | | | | | | | | |
| 18-SB-B | 7.7-8.5 | 7/12/2013 | 11:15 | | | | | | | | | | | | | | |
| 18-SB-C | 8-11.5 | 8/2/2013 | 13:10 | | | | | | | | | | | | | | |
| 18-SB-CD | 8-11.5 | 8/2/2013 | 13:15 | | | | | | | | | | | | | | |
| 19-SB-A | 4-4.8 | 5/2/2013 | 12:30 | | | | | | | | | | | | | | |
| 19-SB-B | 6.5-8.0 | 8/9/2013 | 9:55 | | | | | | | | | | | | | | |
| 19-SB-C | 8.0-15.5 | 8/9/2013 | 10:55 | | | | | | | | | | | | | | |
| 20-SB-A | 4-6 | 4/24/2013 | 9:50 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 20-SB-B | 6-8 | 4/24/2013 | 10:00 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 20-SB-C | 9-15 | 8/1/2013 | 9:00 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 21-SB-A | 4-6 | 5/13/2013 | 11:00 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 21-SB-B | 7-8 | 6/11/2013 | 10:10 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 21-SB-C | 8-11.5 | 6/27/2013 | 11:00 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 22-SB-A | 6-8 | 5/16/2013 | 11:32 | | | | | | | | | | | | | | |
| 22-SB-B | 8-10 | 5/16/2013 | 11:58 | | | | | | | | | | | | | | |
| 22-SB-C | 10-10.5 | 5/16/2013 | 12:20 | | | | | | | | | | | | | | |

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| 23-SB-A | 6-8 | 5/16/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-SB-B | 8-10 | 5/16/2013 | 12:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-SB-C | 10.5-11.5 | 5/16/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-SB-A | 2-4 | 4/29/2013 | 15:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 25-SB-AD | 2-4 | 4/29/2013 | 15:32 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 25-SB-B | 7-8 | 8/8/2013 | 9:15 | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | |
| 25-SB-C | 8-11.5 | 7/31/2013 | 9:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 26-SB-A | 6-8 | 4/30/2013 | 12:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 26-SB-B | 8.1-11 | 7/31/2013 | 12:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 26-SB-C | 11-14.5 | 7/31/2013 | 12:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 27-SB-A | 6-7 | 4/30/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-SB-B | 7.5-8.5 | 7/9/2013 | 14:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-SB-C | 8-13 | 7/31/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-SB-A | 6-7.3 | 4/30/2013 | 15:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 28-SB-B | 7.3-8.5 | 7/9/2013 | 15:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 28-SB-C | 8-11.5 | 7/31/2013 | 13:55 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 29-SB-A | 6-6.7 | 5/1/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SB-B | 6.7-8 | 6/11/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SB-C | 8-11.5 | 6/28/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SB-A | 4-6 | 5/1/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SB-B | 8-9.9 | 5/1/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SB-C | 9.9-15 | 8/1/2013 | 8:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SB-A | 6-7.5 | 5/2/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SB-B | 5.5-7 | 8/7/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SB-C | 8-11.5 | 6/28/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-A | 2-4 | 5/2/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-B | 5-7.5 | 6/6/2013 | 16:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-BD | 5-7.5 | 6/6/2013 | 16:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-C | 8-12 | 6/6/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-A | 4-6 | 5/2/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-B | 8-9 | 5/2/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-C | 12-16 | 6/6/2013 | 17:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-A | 6-8 | 6/10/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-AD | 6-8 | 6/10/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-B | 8-11.5 | 6/28/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-C | 11.5-15 | 6/28/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-A | 4-6 | 5/6/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-B | 8.5-11 | 6/7/2013 | 9:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-C | 15-20 | 6/7/2013 | 9:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36-SB-A | 2-4 | 5/13/2013 | 12:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 36-SB-B | 6-8 | 5/13/2013 | 12:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 36-SB-C | 8-10 | 5/13/2013 | 13:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 37-SB-A | 2-4 | 5/13/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37-SB-B | 8-11.5 | 6/27/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37-SB-C | 11.5-15.5 | 6/27/2013 | 12:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37-SB-CD | 11.5-15.5 | 6/27/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38-SB-A | 2-4 | 5/16/2013 | 9:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 38-SB-B | 6-8 | 6/7/2013 | 13:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 38-SB-C | 8-10 | 6/27/2013 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.052 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 39-SB-A | 2-4 | 4/26/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39-SB-B | 8-11.5 | 6/27/2013 | 14:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39-SB-C | 11.5-15.5 | 6/27/2013 | 13:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40-SB-A | 6-7.5 | 4/29/2013 | 15:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 40-SB-B | 8-11.5 | 6/28/2013 | 7:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 40-SB-C | 11.5-19.5 | 6/28/2013 | 8:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 41-SB-A | 6-6.6 | 4/30/2013 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41-SB-B | 8-9.2 | 7/10/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41-SB-C | 12-16 | 8/1/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41-SB-CD | 12-16 | 8/1/2013 | 15:59 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42-SB-A | 6-7 | 4/30/2013 | 10:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 42-SB-B | 7.2-82 | 7/10/2013 | 10:55 | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | |
| 42-SB-C | 8-11.5 | 7/31/2013 | 15:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 43-SB-A | 2-4 | 4/30/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SB-B | 6-8 | 7/10/2013 | 11:22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SB-C | 8.3-11.5 | 7/31/2013 | 14:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44-SB-A | 2-4 | 5/1/2013 | 13:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 44-SB-B | 2-4 | 5/1/2013 | 12:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

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| 44-SB-C | 4-6 | 5/1/2013 | 12:30 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 45-SB-B | 4-4.9 | 5/1/2013 | 11:35 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 45-SB-C | 8-11.5 | 8/9/2013 | 14:10 | | | | | | | | | | | | | | |
| 46-SB-A | 4-6 | 5/1/2013 | 15:05 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 46-SB-B | 5-6.2 | 8/6/2013 | 11:25 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 46-SB-BD | 5-6.2 | 8/6/2013 | 11:30 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 46-SB-C | 8-11.5 | 6/28/2013 | 8:50 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| 47-SB-A | 6-7.7 | 5/2/2013 | 9:45 | | | | | | | | | | | | | | |
| 47-SB-B | 5-7 | 8/6/2013 | 14:25 | | | | | | | | | | | | | | |
| 47-SB-BD | 5-7 | 8/6/2013 | 14:30 | | | | | | | | | | | | | | |
| 47-SB-C | 8-10 | 6/27/2013 | 16:50 | | | | | | | | | | | | | | |
| 48-SB-A | 4-6 | 4/25/2013 | 14:00 | | | | | | | | | | | | | | |
| 48-SB-B | 6-8 | 4/25/2013 | 14:35 | | | | | | | | | | | | | | |
| 48-SB-C | 8-9.2 | 4/25/2013 | 15:00 | | | | | | | | | | | | | | |
| 48-SB-CD | 8-9.2 | 4/25/2013 | 15:03 | | | | | | | | | | | | | | |
| 49-SB-A | 6-7.2 | 4/25/2013 | 12:30 | | | | | | | | | | | | | | |
| 49-SB-B | 8-11.5 | 6/27/2013 | 15:15 | | | | | | | | | | | | | | |
| 49-SB-C | 11.5-14.5 | 6/27/2013 | 16:00 | | | | | | | | | | | | | | |
| 50-SB-A | 6-8 | 4/25/2013 | 10:40 | | | | | | | | | | | | | | |
| 50-SB-B | 8-11.5 | 7/31/2013 | 9:55 | | | | | | | | | | | | | | |
| 50-SB-C | 11.5-14 | 7/31/2013 | 10:10 | | | | | | | | | | | | | | |
| 51-SB-A | 4-6 | 4/24/2013 | 15:00 | | | | | | | | | | | | | | |
| 51-SB-B | 8-9 | 6/7/2013 | 10:45 | | | | | | | | | | | | | | |
| 51-SB-C | 9-12 | 6/7/2013 | 11:00 | | | | | | | | | | | | | | |
| 52-SB-A | 4-6 | 5/17/2013 | 15:20 | | | | | | | | | | | | | | |
| 52-SB-B | 6-8 | 5/17/2013 | 16:05 | | | | | | | | | | | | | | |
| 52-SB-C | 8-10 | 5/17/2013 | 16:40 | | | | | | | | | | | | | | |
| 53-SB-A | 2-2.9 | 5/21/2013 | 11:00 | | | | | | | | | | | | | | |
| 53-SB-B | 6-8 | 5/23/2013 | 11:30 | | | | | | | | | | | | | | |
| 53-SB-C | 10-12 | 6/5/2013 | 15:10 | | | | | | | | | | | | | | |
| 54-SB-A | 6-7 | 5/20/2013 | 14:05 | | | | | | | | | | | | | | |
| 54-SB-B | 8-8.5 | 5/23/2013 | 15:45 | | | | | | | | | | | | | | |
| 54-SB-C | 7-10 | 6/5/2013 | 16:40 | | | | | | | | | | | | | | |
| 55-SB-A | 4-5.75 | 5/21/2013 | 10:00 | | | | | | | | | | | | | | |
| 55-SB-B | 5.5-7.5 | 8/8/2013 | 15:25 | | | | | | | | | | | | | | |
| 55-SB-C | 6-8 | 6/5/2013 | 17:40 | | | | | | | | | | | | | | |
| 56-SB-A | 6-8 | 5/20/2013 | 14:30 | | | | | | | | | | | | | | |
| 56-SB-B | 6.5-8.5 | 8/12/2013 | 10:40 | | | | | | | | | | | | | | |
| 56-SB-C | 8-10 | 6/5/2013 | 18:25 | | | | | | | | | | | | | | |
| 57-SB-A | 4-6 | 5/21/2013 | 12:00 | | | | | | | | | | | | | | |
| 57-SB-B | 6-8 | 5/21/2013 | 12:35 | | | | | | | | | | | | | | |
| 57-SB-C | 8-12 | 7/2/2013 | 9:25 | | | | | | | | | | | | | | |
| 58-SB-A | 6-8 | 5/22/2013 | 10:40 | | | | | | | | | | | | | | |
| 58-SB-B | 10-10.8 | 5/22/2013 | 11:40 | | | | | | | | | | | | | | |
| 58-SB-C | 10.8-14 | 8/1/2013 | 12:15 | | | | | | | | | | | | | | |
| 59-SB-A | 4-6 | 5/22/2013 | 13:15 | | | | | | | | | | | | | | |
| 59-SB-B | 6-8 | 5/28/2013 | 11:40 | | | | | | | | | | | | | | |
| 59-SB-C | 8-8.7 | 5/28/2013 | 15:00 | | | | | | | | | | | | | | |
| 60-SB-A | 4-5.3 | 5/22/2013 | 9:45 | | | | | | | | | | | | | | |
| 60-SB-B | 6-8 | 5/28/2013 | 11:00 | | | | | | | | | | | | | | |
| 60-SB-C | 8-15.5 | 7/1/2013 | 16:40 | | | | | | | | | | | | | | |
| 61-SB-A | 2-4 | 5/21/2013 | 15:25 | | | | | | | | | | | | | | |
| 61-SB-B | 6-8 | 5/21/2013 | 15:45 | | | | | | | | | | | | | | |
| 61-SB-C | 8-9 | 5/21/2013 | 16:00 | | | | | | | | | | | | | | |
| 62-SB-A | 4-6 | 5/21/2013 | 15:00 | | | | | | | | | | | | | | |
| 62-SB-B | 6-8 | 5/21/2013 | 15:05 | | | | | | | | | | | | | | |
| 62-SB-C | 8-9 | 8/1/2013 | 13:00 | | | | | | | | | | | | | | |
| 63-SB-A | 2-4 | 5/21/2013 | 14:15 | | | | | | | | | | | | | | |
| 63-SB-B | 4-5.3 | 5/21/2013 | 14:35 | | | | | | | | | | | | | | |
| 63-SB-C | 6-8 | 5/28/2013 | 10:00 | | | | | | | | | | | | | | |
| 64-SB-A | 4-6 | 5/21/2013 | 12:15 | | | | | | | | | | | | | | |
| 64-SB-B | 6-6.7 | 5/21/2013 | 12:35 | | | | | | | | | | | | | | |
| 64-SB-C | 8-15.5 | 7/2/2013 | 8:45 | | | | | | | | | | | | | | |
| 65-SB-A | 6-8 | 5/28/2013 | 16:10 | | | | | | | | | | | | | | |
| 65-SB-B | 8-11.5 | 8/1/2013 | 11:30 | | | | | | | | | | | | | | |
| 65-SB-C | 11.5-15 | 8/1/2013 | 11:40 | | | | | | | | | | | | | | |

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 66-SB-A | 6-7 | 5/30/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66-SB-B | 2-4 | 5/31/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66-SB-C | 4-5.5 | 5/31/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-A | 4-6 | 5/30/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-AD | 4-6 | 5/30/2013 | 10:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-B | 6-7 | 5/30/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-BD | 6-7 | 5/30/2013 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-C | 8-16 | 7/2/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-A | 2-4 | 5/30/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-B | 4-6 | 6/6/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-C | 6-8 | 6/6/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-A | 2-4 | 5/30/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-B | 4-6 | 6/6/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-C | 8-10 | 7/2/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-A | 2-4 | 5/30/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-B | 4-6 | 6/6/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-C | 6-8 | 6/6/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-A | 2-4 | 5/30/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-AD | 2-4 | 5/30/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-B | 6-8 | 6/3/2013 | 14:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-C | 8-11.5 | 6/28/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-A | 4-6 | 5/29/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-B | 6-7.5 | 5/29/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-C | 7.5-9.5 | 5/29/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-A | 2-3.2 | 5/22/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-B | 7.5-8.5 | 8/12/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-C | 8-10.5 | 6/28/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-A | 2-4 | 5/22/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-AD | 2-4 | 5/22/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-B | 5.0-6.5 | 8/12/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-C | 8-11.5 | 8/1/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SB-A | 2-4 | 5/22/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SB-B | 4-6 | 5/22/2013 | 14:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SB-C | 8-11.5 | 7/1/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76-SB-A | 2-4 | 5/23/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76-SB-B | 4-6 | 5/23/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76-SB-C | 6-7.4 | 5/23/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-A | 2-4 | 5/24/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-B | 4-6 | 5/24/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-C | 8-15.5 | 7/1/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-A | 2-4 | 5/24/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-B | 4-5.5 | 5/24/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-C | 6-8 | 6/5/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79-SB-B | 2-4 | 5/23/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79-SB-C | 4-6 | 5/23/2013 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80-SB-A | 2-2.5 | 5/23/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80-SB-B | 2.5-3.5 | 5/23/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80-SB-C | 3.5-5.8 | 5/23/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81-SB-A | 2-4 | 5/14/2013 | 15:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81-SB-B | 5-6 | 6/11/2013 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81-SB-C | 6-7 | 6/11/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-A | 4-6 | 5/15/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-AD | 4-6 | 5/15/2013 | 9:36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-B | 5-6 | 6/11/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-C | 6-7 | 6/11/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83-SB-A | 2-4 | 5/15/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83-SB-B | 6-7 | 6/11/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83-SB-C | 7-8 | 6/11/2013 | 15:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SB-A | 4-6 | 5/15/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SB-B | 7.5-8.5 | 6/12/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SB-C | 10.5-15.5 | 8/9/2013 | 9:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85-SB-A | 2-4 | 5/15/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85-SB-B | 5.5-6.5 | 6/12/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85-SB-C | 6.5-7.5 | 6/12/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86-SB-A | 2-4 | 5/15/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86-SB-B | 5.5-6.5 | 6/12/2013 | 15:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86-SB-C | 6.5-7.0 | 6/12/2013 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 87-SB-B | 4-6 | 5/28/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87-SB-C | 6.5-7.2 | 5/28/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-A | 2-3.8 | 5/24/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-AD | 2-3.8 | 5/24/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-B | 3.8-4.2 | 5/24/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-C | 8-11.5 | 7/2/2013 | 7:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-A | 2-4 | 5/24/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-B | 4-5.9 | 5/24/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-C | 8-11.5 | 7/1/2013 | 12:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-A | 2-4 | 5/24/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-B | 4-6 | 5/24/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-C | 6-7 | 5/24/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-A | 2-4 | 5/23/2013 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-B | 4-6 | 6/4/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-C | 8-14.5 | 7/1/2013 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92-SB-A | 2-3.1 | 5/23/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92-SB-B | 4-6 | 6/4/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92-SB-C | 8-10.5 | 7/1/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-A | 2-3.1 | 5/3/2013 | 12:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-B | 4-6 | 6/5/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-C | 6.5-8 | 6/5/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-A | 2-4 | 5/24/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 95-SB-C | 8-11 | 7/1/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96-SB-A | 2-2.6 | 5/23/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96-SB-B | 4-6 | 6/5/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 97-SB-B | 4-6 | 6/10/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-BD | 4-6 | 6/10/2013 | 10:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-C | 6-7 | 6/10/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98-SB-A | 2-4 | 5/14/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98-SB-B | 3.5-4.5 | 6/11/2013 | 10:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98-SB-C | 4.5-5.5 | 6/11/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 99-SB-B | 5.5-6 | 6/11/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99-SB-C | 6-7 | 6/11/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-A | 2-3 | 5/15/2013 | 14:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-B | 5.5-6.5 | 6/12/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-C | 6.5-7.5 | 6/12/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-CD | 6.5-7.5 | 6/12/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101-SB-A | 2-3 | 5/15/2013 | 16:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101-SB-B | 6.6-7.2 | 6/12/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101-SB-C | 7.2-8.2 | 6/12/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-A | 2-3.3 | 5/28/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-B | 5.7-11 | 8/2/2013 | 9:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-C | 11-15 | 8/2/2013 | 9:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-A | 2-3 | 5/28/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-B | 8-11.5 | 8/2/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-C | 11.5-14 | 8/2/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-A | 2-4 | 5/3/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-B | 4-6 | 6/5/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-C | 6.5-8 | 6/5/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-A | 2-4 | 5/3/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-B | 6-8 | 6/5/2013 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-C | 8-11 | 7/1/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-A | 2-4 | 4/26/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-B | 4-6 | 4/26/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-C | 6-6.8 | 4/26/2013 | 10:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107-SB-A | 2-4 | 4/26/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107-SB-B | 4-6 | 4/26/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107-SB-C | 6-8 | 4/26/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 108-SB-A | 2-4 | 5/14/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| eac ing to round ater creening e el | | | | . | | | . | | | . | | | . | | | | | | . | | | | | | . | | | | | | . | | | . | | | . | | | . | | | . | | |
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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 108-SB-B | 4-4.5 | 6/10/2013 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 108-SB-C | 6-7 | 6/10/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109-SB-A | 4-5 | 5/14/2013 | 12:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109-SB-B | 4-6 | 6/10/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109-SB-C | 5-7 | 6/11/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

**(1) - EPA RSL Version used for screening level development: January 2015**
**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | . | | | | | | . | | | . | | | . | | | . | | | | | |
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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-SB-A | 4-4.8 | 5/17/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-SB-B | 8-11 | 8/8/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-SB-C | 11-15 | 8/8/2013 | 13:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SB-A | 2-4 | 5/17/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SB-B | 8-11.5 | 8/8/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SB-C | 11.5-15.5 | 8/8/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-SB-A | 4-5.4 | 5/17/2013 | 13:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-SB-B | 7.5-8.0 | 8/8/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-SB-C | 8.0-11.5 | 8/8/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-SB-A | 6-8 | 5/7/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-SB-B | 8-10.5 | 6/6/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-SB-A | 6-8 | 5/7/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-SB-B | 8-12 | 6/6/2013 | 9:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-SB-C | 12-15 | 6/6/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SB-A | 4-6 | 5/9/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SB-B | 8-12 | 8/2/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SB-C | 12-16 | 8/2/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SB-CD | 12-16 | 8/2/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-SB-A | 6-8 | 5/6/2013 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-SB-B | 8-9.5 | 5/6/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-SB-C | 12-14 | 6/6/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-SB-A | 2-4 | 5/6/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-SB-B | 7.8-8.8 | 7/11/2013 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-SB-C | 8.8-15 | 7/31/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-SB-A | 2-4 | 5/16/2013 | 14:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 9-SB-B | 8-9 | 7/11/2013 | 12:23 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 9-SB-C | 8-11 | 8/1/2013 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SB-A | 4-6 | 4/24/2013 | 11:40 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SB-B | 8-12 | 7/30/2013 | 15:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SB-C | 12-16 | 7/30/2013 | 16:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 11-SB-A | 4-6 | 5/16/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-SB-B | 8-10 | 6/27/2013 | 8:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SB-A | 2-4 | 5/7/2013 | 14:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SB-B | 8-9 | 7/11/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SB-C | 12-15 | 7/31/2013 | 7:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-SB-A | 6-6.6 | 5/7/2013 | 13:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-SB-B | 8-11.5 | 7/31/2013 | 8:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-SB-C | 11.5-14.5 | 7/31/2013 | 8:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-SB-A | 6-8 | 4/29/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-SB-B | 6-12 | 6/6/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-SB-C | 12-15 | 6/6/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SB-A | 4-6 | 5/8/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SB-AD | 4-6 | 5/8/2013 | 15:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SB-B | 7.8-8.8 | 7/12/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SB-C | 8-14 | 8/2/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-SB-A | 4-6 | 5/9/2013 | 16:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-SB-B | 8-9.5 | 5/9/2013 | 16:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-SB-C | 8-13 | 8/2/2013 | 12:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-SB-A | 4-6 | 5/10/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-SB-B | 6-8 | 5/10/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-SB-C | 8-9.2 | 5/10/2013 | 13:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SB-A | 2-4 | 5/8/2013 | 11:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SB-B | 7.7-8.5 | 7/12/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SB-C | 8-11.5 | 8/2/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SB-CD | 8-11.5 | 8/2/2013 | 13:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-SB-A | 4-4.8 | 5/2/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-SB-B | 6.5-8.0 | 8/9/2013 | 9:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-SB-C | 8.0-15.5 | 8/9/2013 | 10:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-SB-A | 4-6 | 4/24/2013 | 9:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 20-SB-B | 6-8 | 4/24/2013 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 20-SB-C | 9-15 | 8/1/2013 | 9:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SB-A | 4-6 | 5/13/2013 | 11:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SB-B | 7-8 | 6/11/2013 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SB-C | 8-11.5 | 6/27/2013 | 11:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 22-SB-A | 6-8 | 5/16/2013 | 11:32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-SB-B | 8-10 | 5/16/2013 | 11:58 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-SB-C | 10-10.5 | 5/16/2013 | 12:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | . | | | . | | | | | | | | |
| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | . | | | | | | . | | | . | | | . | | | . | | | | | |
| s ommercial u sur ace | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 23-SB-A | 6-8 | 5/16/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-SB-B | 8-10 | 5/16/2013 | 12:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-SB-C | 10.5-11.5 | 5/16/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-SB-A | 2-4 | 4/29/2013 | 15:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 3.2 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 1.4 | | |
| 25-SB-AD | 2-4 | 4/29/2013 | 15:32 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 4.4 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 2.1 | | |
| 25-SB-B | 7-8 | 8/8/2013 | 9:15 | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | 6.0 | | | < 0.23 | | | < 0.23 | | | < 4.6 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | 0.093 | | J |
| 25-SB-C | 8-11.5 | 7/31/2013 | 9:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 26-SB-A | 6-8 | 4/30/2013 | 12:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 18 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.70 | | |
| 26-SB-B | 8.1-11 | 7/31/2013 | 12:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 48 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 2.2 | | |
| 26-SB-C | 11-14.5 | 7/31/2013 | 12:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 12 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.89 | | |
| 27-SB-A | 6-7 | 4/30/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-SB-B | 7.5-8.5 | 7/9/2013 | 14:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-SB-C | 8-13 | 7/31/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-SB-A | 6-7.3 | 4/30/2013 | 15:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 24 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.97 | | |
| 28-SB-B | 7.3-8.5 | 7/9/2013 | 15:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.90 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 28-SB-C | 8-11.5 | 7/31/2013 | 13:55 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 9.5 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.48 | | |
| 29-SB-A | 6-6.7 | 5/1/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SB-B | 6.7-8 | 6/11/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SB-C | 8-11.5 | 6/28/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SB-A | 4-6 | 5/1/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SB-B | 8-9.9 | 5/1/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SB-C | 9.9-15 | 8/1/2013 | 8:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SB-A | 6-7.5 | 5/2/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SB-B | 5.5-7 | 8/7/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SB-C | 8-11.5 | 6/28/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-A | 2-4 | 5/2/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-B | 5-7.5 | 6/6/2013 | 16:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-BD | 5-7.5 | 6/6/2013 | 16:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-C | 8-12 | 6/6/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-A | 4-6 | 5/2/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-B | 8-9 | 5/2/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-C | 12-16 | 6/6/2013 | 17:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-A | 6-8 | 6/10/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-AD | 6-8 | 6/10/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-B | 8-11.5 | 6/28/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-C | 11.5-15 | 6/28/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-A | 4-6 | 5/6/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-B | 8.5-11 | 6/7/2013 | 9:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-C | 15-20 | 6/7/2013 | 9:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36-SB-A | 2-4 | 5/13/2013 | 12:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 36-SB-B | 6-8 | 5/13/2013 | 12:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 36-SB-C | 8-10 | 5/13/2013 | 13:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 37-SB-A | 2-4 | 5/13/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37-SB-B | 8-11.5 | 6/27/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37-SB-C | 11.5-15.5 | 6/27/2013 | 12:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37-SB-CD | 11.5-15.5 | 6/27/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38-SB-A | 2-4 | 5/16/2013 | 9:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 38-SB-B | 6-8 | 6/7/2013 | 13:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 38-SB-C | 8-10 | 6/27/2013 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 39-SB-A | 2-4 | 4/26/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39-SB-B | 8-11.5 | 6/27/2013 | 14:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39-SB-C | 11.5-15.5 | 6/27/2013 | 13:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40-SB-A | 6-7.5 | 4/29/2013 | 15:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.33 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.025 | | J |
| 40-SB-B | 8-11.5 | 6/28/2013 | 7:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 3.5 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.035 | | J |
| 40-SB-C | 11.5-19.5 | 6/28/2013 | 8:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 1.0 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 41-SB-A | 6-6.6 | 4/30/2013 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41-SB-B | 8-9.2 | 7/10/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41-SB-C | 12-16 | 8/1/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41-SB-CD | 12-16 | 8/1/2013 | 15:59 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42-SB-A | 6-7 | 4/30/2013 | 10:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.15 | | J | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 42-SB-B | 7.2-82 | 7/10/2013 | 10:55 | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | 8.7 | | | < 0.25 | | | < 0.25 | | | < 4.9 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | 0.13 | | J |
| 42-SB-C | 8-11.5 | 7/31/2013 | 15:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 2.0 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 43-SB-A | 2-4 | 4/30/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SB-B | 6-8 | 7/10/2013 | 11:22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SB-C | 8.3-11.5 | 7/31/2013 | 14:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44-SB-A | 2-4 | 5/1/2013 | 13:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 44-SB-B | 2-4 | 5/1/2013 | 12:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 3.9 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.19 | | J |

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | . | | | . | | | | | | | | |
| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | . | | | | | | . | | | . | | | . | | | . | | | | | |
| s ommercial u sur ace | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 44-SB-C | 4-6 | 5/1/2013 | 12:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.46 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.032 | | J |
| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 8.5 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.43 | | |
| 45-SB-B | 4-4.9 | 5/1/2013 | 11:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.93 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.037 | | J |
| 45-SB-C | 8-11.5 | 8/9/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46-SB-A | 4-6 | 5/1/2013 | 15:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 46-SB-B | 5-6.2 | 8/6/2013 | 11:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 46-SB-BD | 5-6.2 | 8/6/2013 | 11:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 46-SB-C | 8-11.5 | 6/28/2013 | 8:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 47-SB-A | 6-7.7 | 5/2/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SB-B | 5-7 | 8/6/2013 | 14:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SB-BD | 5-7 | 8/6/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SB-C | 8-10 | 6/27/2013 | 16:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-A | 4-6 | 4/25/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-B | 6-8 | 4/25/2013 | 14:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-C | 8-9.2 | 4/25/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-CD | 8-9.2 | 4/25/2013 | 15:03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SB-A | 6-7.2 | 4/25/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SB-B | 8-11.5 | 6/27/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SB-C | 11.5-14.5 | 6/27/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SB-A | 6-8 | 4/25/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SB-B | 8-11.5 | 7/31/2013 | 9:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SB-C | 11.5-14 | 7/31/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SB-A | 4-6 | 4/24/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SB-B | 8-9 | 6/7/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SB-C | 9-12 | 6/7/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-A | 4-6 | 5/17/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-B | 6-8 | 5/17/2013 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-C | 8-10 | 5/17/2013 | 16:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SB-A | 2-2.9 | 5/21/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SB-B | 6-8 | 5/23/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SB-C | 10-12 | 6/5/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SB-A | 6-7 | 5/20/2013 | 14:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SB-B | 8-8.5 | 5/23/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SB-C | 7-10 | 6/5/2013 | 16:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55-SB-A | 4-5.75 | 5/21/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55-SB-B | 5.5-7.5 | 8/8/2013 | 15:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55-SB-C | 6-8 | 6/5/2013 | 17:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SB-A | 6-8 | 5/20/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SB-B | 6.5-8.5 | 8/12/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SB-C | 8-10 | 6/5/2013 | 18:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57-SB-A | 4-6 | 5/21/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57-SB-B | 6-8 | 5/21/2013 | 12:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57-SB-C | 8-12 | 7/2/2013 | 9:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SB-A | 6-8 | 5/22/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SB-B | 10-10.8 | 5/22/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SB-C | 10.8-14 | 8/1/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59-SB-A | 4-6 | 5/22/2013 | 13:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59-SB-B | 6-8 | 5/28/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59-SB-C | 8-8.7 | 5/28/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60-SB-A | 4-5.3 | 5/22/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60-SB-B | 6-8 | 5/28/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60-SB-C | 8-15.5 | 7/1/2013 | 16:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SB-A | 2-4 | 5/21/2013 | 15:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SB-B | 6-8 | 5/21/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SB-C | 8-9 | 5/21/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62-SB-A | 4-6 | 5/21/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62-SB-B | 6-8 | 5/21/2013 | 15:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62-SB-C | 8-9 | 8/1/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SB-A | 2-4 | 5/21/2013 | 14:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SB-B | 4-5.3 | 5/21/2013 | 14:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SB-C | 6-8 | 5/28/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64-SB-A | 4-6 | 5/21/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64-SB-B | 6-6.7 | 5/21/2013 | 12:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64-SB-C | 8-15.5 | 7/2/2013 | 8:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SB-A | 6-8 | 5/28/2013 | 16:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SB-B | 8-11.5 | 8/1/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SB-C | 11.5-15 | 8/1/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| ale il o out a ota u sur ace oil am ling | | | | , I H | | | , I H | | | I , I H | | | I H , | | | H | | | H H | | | H H H I | | | H H | | | | | | , , , H H | | | , , , H H | | | H H | | | |
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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | . | | | | | | . | | | . | | | . | | | . | | | | | |
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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 66-SB-A | 6-7 | 5/30/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66-SB-B | 2-4 | 5/31/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66-SB-C | 4-5.5 | 5/31/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-A | 4-6 | 5/30/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-AD | 4-6 | 5/30/2013 | 10:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-B | 6-7 | 5/30/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-BD | 6-7 | 5/30/2013 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-C | 8-16 | 7/2/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-A | 2-4 | 5/30/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-B | 4-6 | 6/6/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-C | 6-8 | 6/6/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-A | 2-4 | 5/30/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-B | 4-6 | 6/6/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-C | 8-10 | 7/2/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-A | 2-4 | 5/30/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-B | 4-6 | 6/6/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-C | 6-8 | 6/6/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-A | 2-4 | 5/30/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-AD | 2-4 | 5/30/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-B | 6-8 | 6/3/2013 | 14:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-C | 8-11.5 | 6/28/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-A | 4-6 | 5/29/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-B | 6-7.5 | 5/29/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-C | 7.5-9.5 | 5/29/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-A | 2-3.2 | 5/22/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-B | 7.5-8.5 | 8/12/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-C | 8-10.5 | 6/28/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-A | 2-4 | 5/22/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-AD | 2-4 | 5/22/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-B | 5.0-6.5 | 8/12/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-C | 8-11.5 | 8/1/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SB-A | 2-4 | 5/22/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SB-B | 4-6 | 5/22/2013 | 14:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SB-C | 8-11.5 | 7/1/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76-SB-A | 2-4 | 5/23/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76-SB-B | 4-6 | 5/23/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76-SB-C | 6-7.4 | 5/23/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-A | 2-4 | 5/24/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-B | 4-6 | 5/24/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-C | 8-15.5 | 7/1/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-A | 2-4 | 5/24/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-B | 4-5.5 | 5/24/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-C | 6-8 | 6/5/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79-SB-B | 2-4 | 5/23/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79-SB-C | 4-6 | 5/23/2013 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80-SB-A | 2-2.5 | 5/23/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80-SB-B | 2.5-3.5 | 5/23/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80-SB-C | 3.5-5.8 | 5/23/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81-SB-A | 2-4 | 5/14/2013 | 15:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81-SB-B | 5-6 | 6/11/2013 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81-SB-C | 6-7 | 6/11/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-A | 4-6 | 5/15/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-AD | 4-6 | 5/15/2013 | 9:36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-B | 5-6 | 6/11/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-C | 6-7 | 6/11/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83-SB-A | 2-4 | 5/15/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83-SB-B | 6-7 | 6/11/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83-SB-C | 7-8 | 6/11/2013 | 15:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SB-A | 4-6 | 5/15/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SB-B | 7.5-8.5 | 6/12/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SB-C | 10.5-15.5 | 8/9/2013 | 9:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85-SB-A | 2-4 | 5/15/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85-SB-B | 5.5-6.5 | 6/12/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85-SB-C | 6.5-7.5 | 6/12/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86-SB-A | 2-4 | 5/15/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86-SB-B | 5.5-6.5 | 6/12/2013 | 15:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86-SB-C | 6.5-7.0 | 6/12/2013 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | . | | | | | | . | | | . | | | . | | | . | | | | | |
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| 87-SB-A | 2-4 | 5/28/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87-SB-B | 4-6 | 5/28/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87-SB-C | 6.5-7.2 | 5/28/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-A | 2-3.8 | 5/24/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-AD | 2-3.8 | 5/24/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-B | 3.8-4.2 | 5/24/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-C | 8-11.5 | 7/2/2013 | 7:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-A | 2-4 | 5/24/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-B | 4-5.9 | 5/24/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-C | 8-11.5 | 7/1/2013 | 12:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-A | 2-4 | 5/24/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-B | 4-6 | 5/24/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-C | 6-7 | 5/24/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-A | 2-4 | 5/23/2013 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-B | 4-6 | 6/4/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-C | 8-14.5 | 7/1/2013 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92-SB-A | 2-3.1 | 5/23/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92-SB-B | 4-6 | 6/4/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92-SB-C | 8-10.5 | 7/1/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-A | 2-3.1 | 5/3/2013 | 12:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-B | 4-6 | 6/5/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-C | 6.5-8 | 6/5/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-A | 2-4 | 5/24/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-B | 4-6 | 6/5/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-C | 6-8 | 6/5/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95-SB-A | 4-6 | 5/23/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95-SB-B | 6-8 | 5/23/2013 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95-SB-C | 8-11 | 7/1/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96-SB-A | 2-2.6 | 5/23/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96-SB-B | 4-6 | 6/5/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96-SB-C | 6-8 | 6/5/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-A | 2-4 | 5/14/2013 | 16:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-B | 4-6 | 6/10/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-BD | 4-6 | 6/10/2013 | 10:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-C | 6-7 | 6/10/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98-SB-A | 2-4 | 5/14/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98-SB-B | 3.5-4.5 | 6/11/2013 | 10:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98-SB-C | 4.5-5.5 | 6/11/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99-SB-A | 2-4 | 5/14/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99-SB-B | 5.5-6 | 6/11/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99-SB-C | 6-7 | 6/11/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-A | 2-3 | 5/15/2013 | 14:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-B | 5.5-6.5 | 6/12/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-C | 6.5-7.5 | 6/12/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-CD | 6.5-7.5 | 6/12/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101-SB-A | 2-3 | 5/15/2013 | 16:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101-SB-B | 6.6-7.2 | 6/12/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101-SB-C | 7.2-8.2 | 6/12/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-A | 2-3.3 | 5/28/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-B | 5.7-11 | 8/2/2013 | 9:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-C | 11-15 | 8/2/2013 | 9:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-A | 2-3 | 5/28/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-B | 8-11.5 | 8/2/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-C | 11.5-14 | 8/2/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-A | 2-4 | 5/3/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-B | 4-6 | 6/5/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-C | 6.5-8 | 6/5/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-A | 2-4 | 5/3/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-B | 6-8 | 6/5/2013 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-C | 8-11 | 7/1/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-A | 2-4 | 4/26/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-B | 4-6 | 4/26/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-C | 6-6.8 | 4/26/2013 | 10:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107-SB-A | 2-4 | 4/26/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107-SB-B | 4-6 | 4/26/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107-SB-C | 6-8 | 4/26/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 108-SB-A | 2-4 | 5/14/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | . | | | | | | . | | | . | | | . | | | . | | | | | |
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| 108-SB-B | 4-4.5 | 6/10/2013 | 12:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 108-SB-C | 6-7 | 6/10/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109-SB-A | 4-5 | 5/14/2013 | 12:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109-SB-B | 4-6 | 6/10/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109-SB-C | 5-7 | 6/11/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| eac ing to round ater creening e el | | | | . | | | . | | | . | | | . | | | . | | | . | | | | | | | | | | | |
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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-SB-A | 4-4.8 | 5/17/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-SB-B | 8-11 | 8/8/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-SB-C | 11-15 | 8/8/2013 | 13:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SB-A | 2-4 | 5/17/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SB-B | 8-11.5 | 8/8/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-SB-C | 11.5-15.5 | 8/8/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-SB-A | 4-5.4 | 5/17/2013 | 13:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-SB-B | 7.5-8.0 | 8/8/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-SB-C | 8.0-11.5 | 8/8/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-SB-A | 6-8 | 5/7/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4-SB-B | 8-10.5 | 6/6/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-SB-A | 6-8 | 5/7/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-SB-B | 8-12 | 6/6/2013 | 9:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-SB-C | 12-15 | 6/6/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SB-A | 4-6 | 5/9/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SB-B | 8-12 | 8/2/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SB-C | 12-16 | 8/2/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-SB-CD | 12-16 | 8/2/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-SB-A | 6-8 | 5/6/2013 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-SB-B | 8-9.5 | 5/6/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7-SB-C | 12-14 | 6/6/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-SB-A | 2-4 | 5/6/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-SB-B | 7.8-8.8 | 7/11/2013 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8-SB-C | 8.8-15 | 7/31/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-SB-A | 2-4 | 5/16/2013 | 14:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 9-SB-B | 8-9 | 7/11/2013 | 12:23 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 9-SB-C | 8-11 | 8/1/2013 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SB-A | 4-6 | 4/24/2013 | 11:40 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SB-B | 8-12 | 7/30/2013 | 15:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 10-SB-C | 12-16 | 7/30/2013 | 16:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 11-SB-A | 4-6 | 5/16/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-SB-B | 8-10 | 6/27/2013 | 8:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SB-A | 2-4 | 5/7/2013 | 14:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SB-B | 8-9 | 7/11/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12-SB-C | 12-15 | 7/31/2013 | 7:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-SB-A | 6-6.6 | 5/7/2013 | 13:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-SB-B | 8-11.5 | 7/31/2013 | 8:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-SB-C | 11.5-14.5 | 7/31/2013 | 8:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-SB-A | 6-8 | 4/29/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-SB-B | 6-12 | 6/6/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-SB-C | 12-15 | 6/6/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SB-A | 4-6 | 5/8/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SB-AD | 4-6 | 5/8/2013 | 15:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SB-B | 7.8-8.8 | 7/12/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-SB-C | 8-14 | 8/2/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-SB-A | 4-6 | 5/9/2013 | 16:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-SB-B | 8-9.5 | 5/9/2013 | 16:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16-SB-C | 8-13 | 8/2/2013 | 12:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-SB-A | 4-6 | 5/10/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-SB-B | 6-8 | 5/10/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-SB-C | 8-9.2 | 5/10/2013 | 13:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SB-A | 2-4 | 5/8/2013 | 11:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SB-B | 7.7-8.5 | 7/12/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SB-C | 8-11.5 | 8/2/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-SB-CD | 8-11.5 | 8/2/2013 | 13:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-SB-A | 4-4.8 | 5/2/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-SB-B | 6.5-8.0 | 8/9/2013 | 9:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-SB-C | 8.0-15.5 | 8/9/2013 | 10:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-SB-A | 4-6 | 4/24/2013 | 9:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 20-SB-B | 6-8 | 4/24/2013 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 20-SB-C | 9-15 | 8/1/2013 | 9:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SB-A | 4-6 | 5/13/2013 | 11:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SB-B | 7-8 | 6/11/2013 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 21-SB-C | 8-11.5 | 6/27/2013 | 11:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 22-SB-A | 6-8 | 5/16/2013 | 11:32 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-SB-B | 8-10 | 5/16/2013 | 11:58 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-SB-C | 10-10.5 | 5/16/2013 | 12:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| ale il o out a ota u sur ace oil am ling | | | | I H , , H | | | I H , , H | | | I H H | | | I H H | | | , , I H | | | I H I | | | | | | | | | | | |
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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 23-SB-A | 6-8 | 5/16/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-SB-B | 8-10 | 5/16/2013 | 12:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-SB-C | 10.5-11.5 | 5/16/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-SB-A | 2-4 | 4/29/2013 | 15:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 12 | | | 4.1 | | | 16 | | |
| 25-SB-AD | 2-4 | 4/29/2013 | 15:32 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 15 | | | 5.3 | | | 20 | | |
| 25-SB-B | 7-8 | 8/8/2013 | 9:15 | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | < 0.23 | | | 2.3 | | | 0.42 | | | 2.7 | | |
| 25-SB-C | 8-11.5 | 7/31/2013 | 9:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.11 | | J | < 0.20 | | | 0.11 | | J |
| 26-SB-A | 6-8 | 4/30/2013 | 12:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 34 | | | 1.4 | | | 36 | | |
| 26-SB-B | 8.1-11 | 7/31/2013 | 12:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 93 | | | 4.1 | | | 97 | | |
| 26-SB-C | 11-14.5 | 7/31/2013 | 12:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 17 | | | 1.4 | | | 18 | | |
| 27-SB-A | 6-7 | 4/30/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-SB-B | 7.5-8.5 | 7/9/2013 | 14:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-SB-C | 8-13 | 7/31/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-SB-A | 6-7.3 | 4/30/2013 | 15:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 41 | | | 2.4 | | | 43 | | |
| 28-SB-B | 7.3-8.5 | 7/9/2013 | 15:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 3.7 | | | 0.39 | | | 4.1 | | |
| 28-SB-C | 8-11.5 | 7/31/2013 | 13:55 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 13 | | | 5.1 | | | 18 | | |
| 29-SB-A | 6-6.7 | 5/1/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SB-B | 6.7-8 | 6/11/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29-SB-C | 8-11.5 | 6/28/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SB-A | 4-6 | 5/1/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SB-B | 8-9.9 | 5/1/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-SB-C | 9.9-15 | 8/1/2013 | 8:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SB-A | 6-7.5 | 5/2/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SB-B | 5.5-7 | 8/7/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31-SB-C | 8-11.5 | 6/28/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-A | 2-4 | 5/2/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-B | 5-7.5 | 6/6/2013 | 16:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-BD | 5-7.5 | 6/6/2013 | 16:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32-SB-C | 8-12 | 6/6/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-A | 4-6 | 5/2/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-B | 8-9 | 5/2/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33-SB-C | 12-16 | 6/6/2013 | 17:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-A | 6-8 | 6/10/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-AD | 6-8 | 6/10/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-B | 8-11.5 | 6/28/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34-SB-C | 11.5-15 | 6/28/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-A | 4-6 | 5/6/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-B | 8.5-11 | 6/7/2013 | 9:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35-SB-C | 15-20 | 6/7/2013 | 9:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36-SB-A | 2-4 | 5/13/2013 | 12:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 36-SB-B | 6-8 | 5/13/2013 | 12:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 36-SB-C | 8-10 | 5/13/2013 | 13:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 37-SB-A | 2-4 | 5/13/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37-SB-B | 8-11.5 | 6/27/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37-SB-C | 11.5-15.5 | 6/27/2013 | 12:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37-SB-CD | 11.5-15.5 | 6/27/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38-SB-A | 2-4 | 5/16/2013 | 9:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 38-SB-B | 6-8 | 6/7/2013 | 13:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 38-SB-C | 8-10 | 6/27/2013 | 10:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.11 | | J | 0.11 | | J |
| 39-SB-A | 2-4 | 4/26/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39-SB-B | 8-11.5 | 6/27/2013 | 14:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39-SB-C | 11.5-15.5 | 6/27/2013 | 13:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40-SB-A | 6-7.5 | 4/29/2013 | 15:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.055 | | J | 0.11 | | J | 0.16 | | J |
| 40-SB-B | 8-11.5 | 6/28/2013 | 7:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.35 | | | 0.35 | | |
| 40-SB-C | 11.5-19.5 | 6/28/2013 | 8:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 41-SB-A | 6-6.6 | 4/30/2013 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41-SB-B | 8-9.2 | 7/10/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41-SB-C | 12-16 | 8/1/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41-SB-CD | 12-16 | 8/1/2013 | 15:59 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42-SB-A | 6-7 | 4/30/2013 | 10:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.064 | | J | 0.11 | | J | 0.17 | | J |
| 42-SB-B | 7.2-82 | 7/10/2013 | 10:55 | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | 1.2 | | | 0.76 | | | 2.0 | | |
| 42-SB-C | 8-11.5 | 7/31/2013 | 15:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.28 | | | 0.19 | | J | 0.47 | | |
| 43-SB-A | 2-4 | 4/30/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SB-B | 6-8 | 7/10/2013 | 11:22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43-SB-C | 8.3-11.5 | 7/31/2013 | 14:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44-SB-A | 2-4 | 5/1/2013 | 13:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 44-SB-B | 2-4 | 5/1/2013 | 12:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 1.3 | | | 1.2 | | | 2.5 | | |

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| 44-SB-C | 4-6 | 5/1/2013 | 12:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.31 | | | 0.20 | | J | 0.50 | | |
| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 21 | | | 2.4 | | | 23 | | |
| 45-SB-B | 4-4.9 | 5/1/2013 | 11:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 1.5 | | | 0.22 | | | 1.8 | | |
| 45-SB-C | 8-11.5 | 8/9/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46-SB-A | 4-6 | 5/1/2013 | 15:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 46-SB-B | 5-6.2 | 8/6/2013 | 11:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 46-SB-BD | 5-6.2 | 8/6/2013 | 11:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 46-SB-C | 8-11.5 | 6/28/2013 | 8:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| 47-SB-A | 6-7.7 | 5/2/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SB-B | 5-7 | 8/6/2013 | 14:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SB-BD | 5-7 | 8/6/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-SB-C | 8-10 | 6/27/2013 | 16:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-A | 4-6 | 4/25/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-B | 6-8 | 4/25/2013 | 14:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-C | 8-9.2 | 4/25/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48-SB-CD | 8-9.2 | 4/25/2013 | 15:03 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SB-A | 6-7.2 | 4/25/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SB-B | 8-11.5 | 6/27/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49-SB-C | 11.5-14.5 | 6/27/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SB-A | 6-8 | 4/25/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SB-B | 8-11.5 | 7/31/2013 | 9:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50-SB-C | 11.5-14 | 7/31/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SB-A | 4-6 | 4/24/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SB-B | 8-9 | 6/7/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 51-SB-C | 9-12 | 6/7/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-A | 4-6 | 5/17/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-B | 6-8 | 5/17/2013 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52-SB-C | 8-10 | 5/17/2013 | 16:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SB-A | 2-2.9 | 5/21/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SB-B | 6-8 | 5/23/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 53-SB-C | 10-12 | 6/5/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SB-A | 6-7 | 5/20/2013 | 14:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SB-B | 8-8.5 | 5/23/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54-SB-C | 7-10 | 6/5/2013 | 16:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55-SB-A | 4-5.75 | 5/21/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55-SB-B | 5.5-7.5 | 8/8/2013 | 15:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55-SB-C | 6-8 | 6/5/2013 | 17:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SB-A | 6-8 | 5/20/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SB-B | 6.5-8.5 | 8/12/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56-SB-C | 8-10 | 6/5/2013 | 18:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57-SB-A | 4-6 | 5/21/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57-SB-B | 6-8 | 5/21/2013 | 12:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57-SB-C | 8-12 | 7/2/2013 | 9:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SB-A | 6-8 | 5/22/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SB-B | 10-10.8 | 5/22/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58-SB-C | 10.8-14 | 8/1/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59-SB-A | 4-6 | 5/22/2013 | 13:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59-SB-B | 6-8 | 5/28/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59-SB-C | 8-8.7 | 5/28/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60-SB-A | 4-5.3 | 5/22/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60-SB-B | 6-8 | 5/28/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60-SB-C | 8-15.5 | 7/1/2013 | 16:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SB-A | 2-4 | 5/21/2013 | 15:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SB-B | 6-8 | 5/21/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 61-SB-C | 8-9 | 5/21/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62-SB-A | 4-6 | 5/21/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62-SB-B | 6-8 | 5/21/2013 | 15:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62-SB-C | 8-9 | 8/1/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SB-A | 2-4 | 5/21/2013 | 14:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SB-B | 4-5.3 | 5/21/2013 | 14:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63-SB-C | 6-8 | 5/28/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64-SB-A | 4-6 | 5/21/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64-SB-B | 6-6.7 | 5/21/2013 | 12:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64-SB-C | 8-15.5 | 7/2/2013 | 8:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SB-A | 6-8 | 5/28/2013 | 16:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SB-B | 8-11.5 | 8/1/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65-SB-C | 11.5-15 | 8/1/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 66-SB-A | 6-7 | 5/30/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66-SB-B | 2-4 | 5/31/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66-SB-C | 4-5.5 | 5/31/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-A | 4-6 | 5/30/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-AD | 4-6 | 5/30/2013 | 10:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-B | 6-7 | 5/30/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-BD | 6-7 | 5/30/2013 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 67-SB-C | 8-16 | 7/2/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-A | 2-4 | 5/30/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-B | 4-6 | 6/6/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68-SB-C | 6-8 | 6/6/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-A | 2-4 | 5/30/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-B | 4-6 | 6/6/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 69-SB-C | 8-10 | 7/2/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-A | 2-4 | 5/30/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-B | 4-6 | 6/6/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70-SB-C | 6-8 | 6/6/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-A | 2-4 | 5/30/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-AD | 2-4 | 5/30/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-B | 6-8 | 6/3/2013 | 14:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 71-SB-C | 8-11.5 | 6/28/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-A | 4-6 | 5/29/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-B | 6-7.5 | 5/29/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72-SB-C | 7.5-9.5 | 5/29/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-A | 2-3.2 | 5/22/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-B | 7.5-8.5 | 8/12/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 73-SB-C | 8-10.5 | 6/28/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-A | 2-4 | 5/22/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-AD | 2-4 | 5/22/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-B | 5.0-6.5 | 8/12/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74-SB-C | 8-11.5 | 8/1/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SB-A | 2-4 | 5/22/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SB-B | 4-6 | 5/22/2013 | 14:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75-SB-C | 8-11.5 | 7/1/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76-SB-A | 2-4 | 5/23/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76-SB-B | 4-6 | 5/23/2013 | 9:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76-SB-C | 6-7.4 | 5/23/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-A | 2-4 | 5/24/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-B | 4-6 | 5/24/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 77-SB-C | 8-15.5 | 7/1/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-A | 2-4 | 5/24/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-B | 4-5.5 | 5/24/2013 | 12:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78-SB-C | 6-8 | 6/5/2013 | 9:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79-SB-B | 2-4 | 5/23/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 79-SB-C | 4-6 | 5/23/2013 | 11:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80-SB-A | 2-2.5 | 5/23/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80-SB-B | 2.5-3.5 | 5/23/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80-SB-C | 3.5-5.8 | 5/23/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81-SB-A | 2-4 | 5/14/2013 | 15:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81-SB-B | 5-6 | 6/11/2013 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 81-SB-C | 6-7 | 6/11/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-A | 4-6 | 5/15/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-AD | 4-6 | 5/15/2013 | 9:36 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-B | 5-6 | 6/11/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82-SB-C | 6-7 | 6/11/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83-SB-A | 2-4 | 5/15/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83-SB-B | 6-7 | 6/11/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83-SB-C | 7-8 | 6/11/2013 | 15:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SB-A | 4-6 | 5/15/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SB-B | 7.5-8.5 | 6/12/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84-SB-C | 10.5-15.5 | 8/9/2013 | 9:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85-SB-A | 2-4 | 5/15/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85-SB-B | 5.5-6.5 | 6/12/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85-SB-C | 6.5-7.5 | 6/12/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86-SB-A | 2-4 | 5/15/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86-SB-B | 5.5-6.5 | 6/12/2013 | 15:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86-SB-C | 6.5-7.0 | 6/12/2013 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 87-SB-A | 2-4 | 5/28/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87-SB-B | 4-6 | 5/28/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87-SB-C | 6.5-7.2 | 5/28/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-A | 2-3.8 | 5/24/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-AD | 2-3.8 | 5/24/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-B | 3.8-4.2 | 5/24/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-SB-C | 8-11.5 | 7/2/2013 | 7:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-A | 2-4 | 5/24/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-B | 4-5.9 | 5/24/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89-SB-C | 8-11.5 | 7/1/2013 | 12:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-A | 2-4 | 5/24/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-B | 4-6 | 5/24/2013 | 10:25 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-SB-C | 6-7 | 5/24/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-A | 2-4 | 5/23/2013 | 13:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-B | 4-6 | 6/4/2013 | 11:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91-SB-C | 8-14.5 | 7/1/2013 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92-SB-A | 2-3.1 | 5/23/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92-SB-B | 4-6 | 6/4/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92-SB-C | 8-10.5 | 7/1/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-A | 2-3.1 | 5/3/2013 | 12:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-B | 4-6 | 6/5/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93-SB-C | 6.5-8 | 6/5/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-A | 2-4 | 5/24/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-B | 4-6 | 6/5/2013 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94-SB-C | 6-8 | 6/5/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95-SB-A | 4-6 | 5/23/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95-SB-B | 6-8 | 5/23/2013 | 16:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95-SB-C | 8-11 | 7/1/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96-SB-A | 2-2.6 | 5/23/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96-SB-B | 4-6 | 6/5/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96-SB-C | 6-8 | 6/5/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-A | 2-4 | 5/14/2013 | 16:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-B | 4-6 | 6/10/2013 | 10:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-BD | 4-6 | 6/10/2013 | 10:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97-SB-C | 6-7 | 6/10/2013 | 11:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98-SB-A | 2-4 | 5/14/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98-SB-B | 3.5-4.5 | 6/11/2013 | 10:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98-SB-C | 4.5-5.5 | 6/11/2013 | 10:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99-SB-A | 2-4 | 5/14/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99-SB-B | 5.5-6 | 6/11/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99-SB-C | 6-7 | 6/11/2013 | 12:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-A | 2-3 | 5/15/2013 | 14:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-B | 5.5-6.5 | 6/12/2013 | 9:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-C | 6.5-7.5 | 6/12/2013 | 9:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-SB-CD | 6.5-7.5 | 6/12/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101-SB-A | 2-3 | 5/15/2013 | 16:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101-SB-B | 6.6-7.2 | 6/12/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101-SB-C | 7.2-8.2 | 6/12/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-A | 2-3.3 | 5/28/2013 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-B | 5.7-11 | 8/2/2013 | 9:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102-SB-C | 11-15 | 8/2/2013 | 9:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-A | 2-3 | 5/28/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-B | 8-11.5 | 8/2/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103-SB-C | 11.5-14 | 8/2/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-A | 2-4 | 5/3/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-B | 4-6 | 6/5/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104-SB-C | 6.5-8 | 6/5/2013 | 14:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-A | 2-4 | 5/3/2013 | 10:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-B | 6-8 | 6/5/2013 | 13:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105-SB-C | 8-11 | 7/1/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-A | 2-4 | 4/26/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-B | 4-6 | 4/26/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106-SB-C | 6-6.8 | 4/26/2013 | 10:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107-SB-A | 2-4 | 4/26/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107-SB-B | 4-6 | 4/26/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107-SB-C | 6-8 | 4/26/2013 | 11:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 108-SB-A | 2-4 | 5/14/2013 | 11:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 108-SB-C | 6-7 | 6/10/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109-SB-A | 4-5 | 5/14/2013 | 12:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109-SB-B | 4-6 | 6/10/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109-SB-C | 5-7 | 6/11/2013 | 10:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**NOTES:**

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| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

**(1) - EPA RSL Version used for screening level development: January 2015**
**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | >200 | | | < 0.06 | | | < 20 | | | < 0.5 | | | < 10 | | |
| 45-SB-B | 4-4.9 | 5/1/2013 | 11:35 | | | | | | | | | | | | | | | |

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| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | < 0.1 | | | < 0.5 | | | 3.7 | | | < 0.002 | | | < 0.1 | | |
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| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | < 0.5 | | | 0.034 | | J | < 0.10 | | | < 0.10 | | |
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| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| 0.5 | Exceeds Total Characteristic Leaching Procedure |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

(1) - EPA RSL Version used for screening level development: January 2015

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| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | < 0.10 | | | < 0.10 | | | < 0.10 | | | < 0.10 | | | < 2.0 | | | < 0.10 | | | < 0.10 | | | < 0.10 | | | | |
| 45-SB-B | 4-4.9 | 5/1/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | < 0.050 | | | < 0.050 | | | < 0.050 | | | < 0.25 | | | < 0.050 | | | < 0.050 | | | < 0.050 | | | < 0.050 | | | < 0.050 | | | < 0.050 | | | < 0.050 | | | < 0.10 | | |
| 45-SB-B | 4-4.9 | 5/1/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | < 0.025 | | | < 0.00050 | | | < 0.00050 | | | < 0.00050 | | | < 0.00050 | | | < 0.00050 | | | < 0.050 | | | < 0.010 | | | < 0.0020 | | | < 8.6 | | | < 8.6 | | | < 8.6 | | |
| 45-SB-B | 4-4.9 | 5/1/2013 | 11:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |

NOTES:

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| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| 0.5 | Exceeds Total Characteristic Leaching Procedure |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

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U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

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| 45-SB-A | 2-4 | 5/1/2013 | 11:00 | < 8.6 | 38 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | < 86 | < 8.6 | < 8.6 | < 8.6 | < 8.6 | 49 | < 8.6 |
| 45-SB-B | 4-4.9 | 5/1/2013 | 11:35 | < 2.2 | 2.5 | < 2.2 | < 2.2 | < 2.2 | < 2.2 | < 22 | < 2.2 | < 2.2 | < 2.2 | < 2.2 | 2.9 | < 2.2 |

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| YMW-10-SB-A | 2-4 | 4/18/2013 | 11:20 | 5.2 | J | | 8.6 | | | 4 | | | 178 | J | | < 1 | | | 22 | | | 43 | J | D | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-10-SB-B | 10-12 | 4/23/2013 | 15:30 | 9.7 | | | 8.4 | | | 3 | | | 98 | | | < 1 | | | 26 | | | 3 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-10-SB-C | 13-15 | 4/23/2013 | 16:00 | 19 | | | 8.1 | | | 7 | | | 63 | | | < 1 | | | 17 | | | 2 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-11-SB-A | 2-4 | 4/11/2013 | 10:15 | 17 | | | 8.5 | | | 7 | | | 205 | | | < 1 | | | 28 | | | 17 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-11-SB-B | 8-10 | 4/11/2013 | 11:10 | 20 | | | 8.0 | | | 10 | | | 117 | | | < 1 | | | 18 | | | 8 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-11-SB-C | 14-16 | 4/24/2013 | 11:50 | 8.8 | | | 8.1 | | | 4 | | | 53 | | | < 1 | | | 15 | | | 6 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-12-SB-A | 4-6 | 4/11/2013 | 12:32 | 15 | | | 8.4 | | | 7 | | | 175 | | | < 1 | | | 24 | | | 12 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-12-SB-AD | 4-6 | 4/11/2013 | 12:35 | 15 | | | 8.4 | | | 7 | | | 176 | | | < 1 | | | 24 | | | 20 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-12-SB-B | 11-13 | 4/30/2013 | 12:23 | 11 | | | 8.0 | | | 3 | | | 91 | | | < 1 | | | 21 | | | 7 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-12-SB-C | 13-15 | 4/30/2013 | 12:34 | 12 | | | 8.4 | | | 2 | | | 90 | | | < 1 | | | 15 | | | 8 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-13-SB-D† | 8-10 | 4/26/2013 | 14:30 | 3.8 | | | 9.1 | | | 3 | | | 106 | | | < 1 | | | 16 | | | 6 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-13-SB-B | 11-13 | 4/26/2013 | 14:44 | 16 | | | 8.4 | | | 2 | | | 68 | | | < 1 | | | 9 | | | 4 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-13-SB-C | 13-15 | 4/26/2013 | 15:01 | 11 | | | 8.6 | | | 3 | | | 122 | | | < 1 | | | 14 | | | 2 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-14-SB-A | 4-6 | 4/9/2013 | 14:10 | 19 | | | 8.5 | | | 5 | | | 163 | | | < 1 | | | 22 | | | 36 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-14-SB-B | 8-10 | 4/29/2013 | 13:00 | 8.1 | | | 8.3 | | | 2 | | | 128 | | | < 1 | | | 11 | | | 10 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-14-SB-C | 13-15 | 4/29/2013 | 13:30 | 17 | | | 8.3 | | | 6 | | | 104 | | | < 1 | | | 11 | | | 5 | U | D | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-15-SB-A | 2-4 | 4/18/2013 | 13:55 | 20 | J | | 8.6 | | | 4 | | | 155 | J | | < 1 | | | 24 | | | 20 | J | D | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-15-SB-B | 11-13 | 5/2/2013 | 14:00 | 7.4 | | | 8.6 | | | 2 | | | 133 | | | < 1 | | | 20 | | | 3 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-15-SB-C | 13-15 | 5/2/2013 | 14:10 | 5.0 | | | 8.5 | | | 4 | | | 121 | | | < 1 | | | 15 | | | 4 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-16-SB-A | 6-8 | 4/11/2013 | 15:15 | 20 | | | 8.1 | | | 6 | | | 169 | | | < 1 | | | 23 | | | 31 | J | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-16-SB-B | 8-10 | 4/30/2013 | 14:50 | 10 | | | 8.4 | | | 2 | | | 63 | | | < 1 | | | 10 | | | 11 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-16-SB-C | 13-15 | 4/30/2013 | 15:10 | 16 | | | 8.6 | | | 2 | | | 68 | | | < 1 | | | 12 | | | 5 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-17-SB-A | 6-8 | 4/15/2013 | 13:20 | 29 | | | 8.2 | | | 3 | | | 218 | | | < 1 | | | 30 | | | 115 | | | < 1 | | | < 1 | | | < 1 | | | < 9.4 | | |
| YMW-17-SB-B | 8-10 | 4/15/2013 | 14:15 | 21 | | | 7.7 | | | 3 | | | 102 | | | < 1 | | | 18 | | | 12 | | | < 1 | | | < 1 | | | < 1 | | | < 5.0 | | |
| YMW-17-SB-C | 13-15 | 4/30/2013 | 9:33 | 11 | | | 8.3 | | | 2 | | | 57 | | | < 1 | | | 11 | | | 4 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-17-SB-CD | 13-15 | 4/30/2013 | 9:37 | 12 | | | 8.6 | | | 2 | | | 55 | | | < 1 | | | 9 | | | 5 | U | D | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-18-SB-A | 2-4 | 4/23/2013 | 10:35 | 23 | | | 9.2 | | | 7 | | | 110 | | | < 1 | | | 28 | | | 6 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-18-SB-B | 6-8 | 4/23/2013 | 11:05 | 22 | | | 8.1 | | | 5 | | | 76 | | | < 1 | | | 14 | | | 3 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-18-SB-C | 13-15 | 5/2/2013 | 16:55 | 15 | | | 8.9 | | | 2 | | | 92 | | | < 1 | | | 13 | | | 3 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-19-SB-A | 2-4 | 4/23/2013 | 14:05 | 15 | | | 7.2 | | | 5 | | | 148 | | | < 1 | | | 25 | | | 49 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-19-SB-AD | 2-4 | 4/23/2013 | 14:06 | 20 | | | 7.2 | | | 5 | | | 167 | | | < 1 | | | 26 | | | 59 | | D | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-19-SB-B | 8-10 | 4/26/2013 | 9:53 | 8.4 | | | 7.9 | | | 5 | | | 90 | | | < 1 | | | 19 | | | 6 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-19-SB-C | 13-15 | 4/26/2013 | 11:40 | 12 | | | 8.5 | | | 3 | | | 136 | | | < 1 | | | 19 | | | 6 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-20-SB-A | 4-6 | 4/19/2013 | 12:30 | 25 | J | | 8.0 | | | 6 | | | 158 | J | | < 1 | | | 22 | | | 81 | J | D | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-20-SB-B | 6-8 | 4/19/2013 | 13:00 | 22 | J | | 8.0 | | | 3 | | | 127 | J | | < 1 | | | 19 | | | 22 | J | D | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-20-SB-C | 13-15 | 4/25/2013 | 15:15 | 19 | | | 8.7 | | | 4 | | | 90 | | | < 1 | | | 15 | | | 6 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-20-SB-CD | | 4/25/2013 | 15:20 | 22 | | | 8.5 | | | 2 | | | 78 | | | < 1 | | | 11 | | | 6 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-21-SB-A | 4-6 | 4/19/2013 | 15:00 | 33 | J | | 8.3 | | | 33 | | | 165 | J | | < 1 | | | 21 | | | 19300 | J | D | 1 | | | < 1 | | | < 1 | | | < 12 | | |
| YMW-21-SB-B | 8-10 | 4/29/2013 | 15:25 | 9.2 | | | 8.4 | | | 3 | | | 75 | | | < 1 | | | 13 | | | 377 | | | < 1 | | | < 1 | | | < 1 | | | < 0.33 | | |
| YMW-21-SB-C | 10-12 | 4/29/2013 | 16:45 | 14 | | | 8.8 | | | 2 | | | 54 | | | < 1 | | | 10 | | | 7 | U | D | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-22-SB-A | 6-8 | 4/17/2013 | 11:50 | 21 | | | 8.0 | | | 4 | | | 154 | | | < 1 | | | 26 | | | 1350 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-22-SB-B | 8-10 | 4/25/2013 | 12:00 | 12 | | | 8.5 | | | 2 | | | 116 | | | < 1 | | | 12 | | | 23 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-22-SB-C | 13-15 | 4/25/2013 | 12:20 | 10 | | | 8.8 | | | 5 | | | 108 | | | < 1 | | | 19 | | | 6 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-23-SB-A | 2-4 | 4/17/2013 | 14:05 | 16 | | | 8.5 | | | 4 | | | 535 | | | < 1 | | | 18 | | | 537 | | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-23-SB-B | 8-10 | 4/25/2013 | 9:42 | 4.9 | | | 9.0 | | | 4 | | | 93 | | | < 1 | | | 13 | | | 5 | U | | < 1 | | | < 1 | | | < 1 | | | | | |
| YMW-23-SB-C | 13-15 | 4/25/2013 | 10:10 | 9.1 | | | 9.0 | | | 2 | | | 72 | | | < 1 | | | 27 | | | 5 | U | | < 1 | | | < 1 | | | < 1 | | | | | |

**NOTES:**

| | |
|---|---|
| 2.5 | **Exceeds Direct Contact Commercial RSL** |
| 3.1 | **Exceeds MDEQ Leaching to Groundwater Screening Level** |
| <0.53 | **Non-Detect Result that Exceeds an Associated Screening Level** |

**† - Sample ID YMW-13-SB-D replaced sample YMW-13-SB-A**

**(1) - Compared to http://deq.mt.gov/StateSuperfund/background.mcpx**
**(2) - EPA RSL Version used for screening level development: January 2015**
**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| ale il o out a ota u sur ace oil am ling H | | | | H H | | | | | | H | | | | | | | | | | | | | | | H H | | | I | | | I H I | | | I H I | | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| et od | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| raction | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| s ommercial u sur ace | | | | . | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YMW-10-SB-A | 2-4 | 4/18/2013 | 11:20 | < 0.11 | | | 0.071 | | * | < 0.053 | | | 0.064 | | | 0.20 | | | < 0.053 | | | 0.20 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | 2.1 | | |
| YMW-10-SB-B | 10-12 | 4/23/2013 | 15:30 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| YMW-10-SB-C | 13-15 | 4/23/2013 | 16:00 | < 0.12 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.12 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| YMW-11-SB-A | 2-4 | 4/11/2013 | 10:15 | < 0.12 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| YMW-11-SB-B | 8-10 | 4/11/2013 | 11:10 | < 0.13 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.063 | | | < 0.13 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| YMW-11-SB-C | 14-16 | 4/24/2013 | 11:50 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| YMW-12-SB-A | 4-6 | 4/11/2013 | 12:32 | < 1.2 | | D | < 0.59 | | D | < 0.59 | | D | < 40 | | D | < 5.0 | | D | < 10 | | D | < 15 | | D | 6.4 | | * | 1720 | | * | 706 | | * | 3070 | | * | 4540 | | * |
| YMW-12-SB-AD | 4-6 | 4/11/2013 | 12:35 | < 3.0 | | D | < 1.5 | | D | < 1.5 | | D | < 40 | | D | < 7.0 | | D | < 10 | | D | < 17 | | D | 7.8 | | * | 1820 | | * | 801 | | * | 3100 | | * | 4780 | | * |
| YMW-12-SB-B | 11-13 | 4/30/2013 | 12:23 | < 5.6 | | D | < 2.8 | | D | < 2.8 | | D | < 2.8 | | D | < 2.8 | | D | < 2.8 | | D | < 2.8 | | D | < 5.6 | | D | 1010 | | * | 1420 | | * | 2160 | | * | 3820 | | * |
| YMW-12-SB-C | 13-15 | 4/30/2013 | 12:34 | < 5.7 | | D | 3.6 | | * | < 2.8 | | D | 29 | | * | 5.6 | | | 7.1 | | | 13 | | | < 5.7 | | D | 987 | | * | 1490 | | * | 1960 | | * | 3720 | | * |
| YMW-13-SB-D† | 8-10 | 4/26/2013 | 14:30 | < 5.2 | | D | < 2.6 | | D | < 2.6 | | D | < 45 | | D | < 2.6 | | D | < 15 | | D | < 15 | | D | < 10 | | D | 2130 | | * | 532 | | * | 5450 | | * | 6800 | | * |
| YMW-13-SB-B | 11-13 | 4/26/2013 | 14:44 | < 2.4 | | D | < 1.2 | | D | < 1.2 | | D | < 20 | | D | < 1.2 | | D | < 4.0 | | D | < 4.0 | | D | < 4.8 | | D | 624 | | * | 483 | | * | 1540 | | * | 2370 | | * |
| YMW-13-SB-C | 13-15 | 4/26/2013 | 15:01 | < 4.0 | | D | 2.5 | J | * | < 1.1 | | D | < 35 | | D | < 1.1 | | D | < 7.0 | | D | < 7.0 | | D | < 9.0 | | D | 1120 | J | * | 1260 | J | * | 3030 | J | * | 4820 | J | * |
| YMW-14-SB-A | 4-6 | 4/9/2013 | 14:10 | < 6.2 | | D | 6.8 | | * | 3.7 | | | 28 | | * | 40 | | | 6.6 | | | 47 | | | < 6.2 | | D | 814 | | * | 993 | | * | 1010 | | * | 2860 | | * |
| YMW-14-SB-B | 8-10 | 4/29/2013 | 13:00 | < 5.4 | | D | 6.9 | | * | < 5.0 | | D | 63 | | * | 53 | | | 9.4 | | | 62 | | | 32 | | * | 1530 | | * | 1130 | | * | 1600 | | * | 5030 | | * |
| YMW-14-SB-C | 13-15 | 4/29/2013 | 13:30 | < 2.4 | | D | < 1.2 | | D | < 1.2 | | D | 11 | | * | 2.8 | | | < 1.2 | | D | 2.8 | | | 7.8 | | * | 336 | | * | 265 | | * | 366 | | * | 1230 | | * |
| YMW-15-SB-A | 2-4 | 4/18/2013 | 13:55 | < 10 | | D | 23 | J | * | < 3.1 | | D | 205 | J | * | 406 | J | | < 25 | | D | 406 | J | * | < 50 | | D | 4350 | J | * | 8110 | J | * | 8370 | J | * | 18500 | J | * |
| YMW-15-SB-B | 11-13 | 5/2/2013 | 14:00 | < 1.1 | | D | < 0.54 | | D | < 1.0 | | D | 14 | | * | 2.3 | | | < 2.0 | | D | 2.3 | | | < 8.6 | | D | 389 | | * | 268 | | * | 970 | | * | 1540 | | * |
| YMW-15-SB-C | 13-15 | 5/2/2013 | 14:10 | < 0.50 | | D | 2.5 | | * | < 0.50 | | D | 4.9 | | | 1.3 | | | < 1.0 | | D | 1.3 | | | < 2.6 | | D | 108 | | * | 113 | | * | 161 | | * | 421 | | * |
| YMW-16-SB-A | 6-8 | 4/11/2013 | 15:15 | < 6.2 | | D | < 3.0 | | D | < 5.0 | | D | < 50 | | D | 58 | J | | 28 | J | | 86 | J | * | < 6.2 | | D | 2660 | J | * | 1700 | J | * | 3480 | J | * | 8970 | J | * |
| YMW-16-SB-B | 8-10 | 4/30/2013 | 14:50 | < 5.6 | | D | < 2.8 | | D | < 2.8 | | D | 19 | | * | 10 | | | 4.4 | | | 15 | | | < 5.6 | | D | 1100 | | * | 936 | | * | 1990 | | * | 3720 | | * |
| YMW-16-SB-C | 13-15 | 4/30/2013 | 15:10 | < 0.60 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.60 | | | < 12 | | | < 12 | | | < 12 | | | 12 | | J |
| YMW-17-SB-A | 6-8 | 4/15/2013 | 13:20 | < 7.0 | | D | 2.9 | | DJ* | < 3.5 | | D | < 20 | | D | 6.6 | | | < 5.0 | | D | 6.6 | | | < 7.0 | | D | 898 | | * | 780 | | * | 2060 | | * | 3550 | | * |
| YMW-17-SB-B | 8-10 | 4/15/2013 | 14:15 | < 6.3 | | D | 4.5 | | * | < 3.1 | | D | 25 | | * | 21 | | | 5.1 | | | 27 | | | 15 | | * | 933 | | * | 1000 | | * | 2030 | | * | 3630 | | * |
| YMW-17-SB-C | 13-15 | 4/30/2013 | 9:33 | < 0.56 | | | < 0.28 | | | < 0.28 | | | < 0.28 | | | < 0.28 | | | < 0.28 | | | < 0.28 | | | < 0.56 | | | 23 | | | < 11 | | | 34 | | | 69 | | |
| YMW-17-SB-CD | 13-15 | 4/30/2013 | 9:37 | < 0.57 | | | < 0.28 | | | < 0.28 | | | < 0.28 | | | < 0.28 | | | < 0.28 | | | < 0.28 | | | < 0.57 | | | 28 | | | < 11 | | | 41 | | | 81 | | |
| YMW-18-SB-A | 2-4 | 4/23/2013 | 10:35 | < 13 | | D | < 6.5 | | D | < 6.5 | | D | < 6.5 | | D | < 6.5 | | D | < 6.5 | | D | < 6.5 | | D | < 13 | | D | 2790 | | * | < 261 | | D | 3590 | | * | 9340 | | * |
| YMW-18-SB-B | 6-8 | 4/23/2013 | 11:05 | < 13 | | D | < 6.4 | | D | < 6.4 | | D | < 6.4 | | D | < 6.4 | | D | < 6.4 | | D | < 6.4 | | D | < 26 | | D | 3810 | | * | 256 | | DJ* | 5010 | | * | 13000 | | * |
| YMW-18-SB-C | 13-15 | 5/2/2013 | 16:55 | < 0.47 | | D | < 0.23 | | D | < 0.50 | | D | < 0.23 | | D | < 0.23 | | D | < 0.23 | | D | < 0.23 | | D | < 0.47 | | D | 20 | | | < 9.4 | | D | 40 | | | 77 | | |
| YMW-19-SB-A | 2-4 | 4/23/2013 | 14:05 | < 0.12 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.059 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | |
| YMW-19-SB-AD | 2-4 | 4/23/2013 | 14:06 | < 0.12 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.12 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| YMW-19-SB-B | 8-10 | 4/26/2013 | 9:53 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.25 | | D | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | 29 | | | < 2.2 | | | 50 | | | 102 | | * |
| YMW-19-SB-C | 13-15 | 4/26/2013 | 11:40 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | 2.3 | | |
| YMW-20-SB-A | 4-6 | 4/19/2013 | 12:30 | < 0.13 | | | < 0.067 | | | < 0.067 | | | < 0.25 | | D | < 0.10 | | D | < 0.10 | | D | < 0.20 | | D | < 0.20 | | D | 19 | | | 2.6 | | J | 23 | | | 46 | | |
| YMW-20-SB-B | 6-8 | 4/19/2013 | 13:00 | < 0.13 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.13 | | | < 2.6 | | | < 2.6 | | | < 2.6 | | | 2.5 | | |
| YMW-20-SB-C | 13-15 | 4/25/2013 | 15:15 | < 0.12 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.062 | | | < 0.12 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| YMW-20-SB-CD | | 4/25/2013 | 15:20 | < 0.13 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.064 | | | < 0.13 | | | < 2.6 | | | < 2.6 | | | < 2.6 | | | < 2.6 | | |
| YMW-21-SB-A | 4-6 | 4/19/2013 | 15:00 | < 7.5 | | D | < 4.0 | | D | < 4.0 | | D | < 65 | | D | 67 | J | | 27 | J | | 94 | J | * | < 40 | | D | 4480 | J | * | 3850 | J | * | 7250 | J | * | 17400 | J | * |
| YMW-21-SB-B | 8-10 | 4/29/2013 | 15:25 | < 2.2 | | D | < 1.1 | | D | < 1.1 | | D | < 10 | | D | < 2.0 | | D | < 2.0 | | D | < 4.0 | | D | < 2.2 | | D | 450 | | * | 277 | | * | 644 | | * | 1530 | | * |
| YMW-21-SB-C | 10-12 | 4/29/2013 | 16:45 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.12 | | | 1.9 | | J | < 2.3 | | | < 2.3 | | | 5.4 | | |
| YMW-22-SB-A | 6-8 | 4/17/2013 | 11:50 | < 2.5 | | D | < 1.3 | | D | < 1.3 | | D | < 3.0 | | D | < 1.3 | | D | < 1.3 | | D | < 1.3 | | D | < 3.0 | | D | 213 | | * | 97 | | * | 401 | | * | 729 | | * |
| YMW-22-SB-B | 8-10 | 4/25/2013 | 12:00 | < 0.11 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.057 | | | < 0.11 | | | 2.4 | | | < 2.3 | | | 5.3 | | | 9.1 | | |
| YMW-22-SB-C | 13-15 | 4/25/2013 | 12:20 | < 0.11 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.056 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |
| YMW-23-SB-A | 2-4 | 4/17/2013 | 14:05 | < 0.12 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.060 | | | < 0.12 | | | < 2.4 | | | < 2.4 | | | < 2.4 | | | 6.1 | | |
| YMW-23-SB-B | 8-10 | 4/25/2013 | 9:42 | < 0.11 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.053 | | | < 0.11 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | | < 2.1 | | |
| YMW-23-SB-C | 13-15 | 4/25/2013 | 10:10 | < 0.11 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.055 | | | < 0.11 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | | < 2.2 | | |

**NOTES:**

| | |
|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

**† - Sample ID YMW-13-SB-D replaced sample YMW-13-SB-A**

**(1) - EPA RSL Version used for screening level development: January 2015**
**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| et od | | | | | | | H | | | H | | | H | | | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | H | | | H | | | H | | | H | | | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| irect ontact ommercial | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YMW-10-SB-A | 2-4 | 4/18/2013 | 11:20 | | | | 17 | | | < 11 | | | 29 | | | 110 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | 0.0050 | | | 0.0067 | | | 0.010 | | | 0.0071 | | | 0.0044 | | | 0.0041 | | | < 0.0035 | | |
| YMW-10-SB-B | 10-12 | 4/23/2013 | 15:30 | | | | < 11 | | | < 11 | | | 14 | | | 23 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| YMW-10-SB-C | 13-15 | 4/23/2013 | 16:00 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | |
| YMW-11-SB-A | 2-4 | 4/11/2013 | 10:15 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| YMW-11-SB-B | 8-10 | 4/11/2013 | 11:10 | | | | < 13 | | | < 13 | | | < 13 | | | < 13 | | | < 0.0042 | | | < 0.0042 | | | 0.0059 | | U | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | |
| YMW-11-SB-C | 14-16 | 4/24/2013 | 11:50 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| YMW-12-SB-A | 4-6 | 4/11/2013 | 12:32 | | | | 469 | | * | 943 | | * | 286 | | | 1960 | | | 4.7 | | | 0.11 | | | < 0.020 | | | 0.036 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | |
| YMW-12-SB-AD | 4-6 | 4/11/2013 | 12:35 | | | | 600 | | * | 1070 | | * | 300 | | | 16300 | R | | 4.3 | | | 0.089 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | | < 0.020 | | |
| YMW-12-SB-B | 11-13 | 4/30/2013 | 12:23 | | | | 1200 | | * | 2010 | | * | 754 | | | 4630 | J | | 7.7 | J | | 0.26 | | | < 0.0037 | | | 0.053 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| YMW-12-SB-C | 13-15 | 4/30/2013 | 12:34 | | | | 454 | | * | 663 | | * | 265 | | | 1620 | J | | 2.7 | J | | 0.061 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | |
| YMW-13-SB-D† | 8-10 | 4/26/2013 | 14:30 | | | | 2530 | | * | 2480 | | * | 1920 | | | 7940 | | | 6.1 | | | 0.73 | | | < 0.035 | | | 0.54 | | | 0.30 | | * | < 0.035 | | | < 0.035 | | | < 0.035 | | | < 0.035 | | | 0.26 | | | < 0.035 | | |
| YMW-13-SB-B | 11-13 | 4/26/2013 | 14:44 | | | | 2660 | | * | 1870 | | * | 1800 | | | 7310 | | | 8.0 | | | 0.51 | | | < 0.040 | | | 0.27 | | | < 0.040 | | | < 0.040 | | | < 0.040 | | | < 0.040 | | | < 0.040 | | | < 0.040 | | | < 0.040 | | |
| YMW-13-SB-C | 13-15 | 4/26/2013 | 15:01 | | | | 2830 | | * | 2240 | | * | 1940 | | | 8040 | | | 11 | | | 0.51 | | | < 0.038 | | | 0.38 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | | < 0.038 | | |
| YMW-14-SB-A | 4-6 | 4/9/2013 | 14:10 | | | | 702 | | * | 1880 | | * | 1020 | | | 4400 | | | 7.7 | | | 0.13 | | | < 0.082 | | | 0.088 | | | < 0.082 | | | < 0.082 | | | 0.10 | | | < 0.082 | | | < 0.082 | | | 0.13 | | | < 0.082 | | |
| YMW-14-SB-B | 8-10 | 4/29/2013 | 13:00 | | | | 1790 | | * | 2530 | | * | 738 | | | 5620 | J | | 19 | J | | 0.74 | | | < 0.0036 | | | 0.078 | | | 0.025 | | | 0.0081 | | | 0.022 | | | 0.0052 | | | 0.0042 | | | 0.051 | | | < 0.0036 | | |
| YMW-14-SB-C | 13-15 | 4/29/2013 | 13:30 | | | | 654 | | * | 721 | | * | 291 | | | 1860 | J | | 6.6 | J | | 0.27 | | | < 0.0040 | | | 0.051 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| YMW-15-SB-A | 2-4 | 4/18/2013 | 13:55 | | | | 901 | | * | 5070 | | * | 318 | | | 7240 | | | 2.6 | | | < 0.0042 | | | < 0.0042 | | | 0.014 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | | 0.024 | | | < 0.0042 | | |
| YMW-15-SB-B | 11-13 | 5/2/2013 | 14:00 | | | | 734 | | * | 645 | | * | 345 | | | 1830 | | | 2.4 | | | 0.11 | | | < 0.0072 | | | 0.048 | | | 0.014 | | | < 0.0072 | | | < 0.0072 | | | < 0.0072 | | | < 0.0072 | | | 0.019 | | | < 0.0072 | | |
| YMW-15-SB-C | 13-15 | 5/2/2013 | 14:10 | | | | 67 | | | 31 | | | 46 | | | 179 | | | 0.17 | | | 0.0053 | | | < 0.0035 | | | 0.0083 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | | < 0.0035 | | |
| YMW-16-SB-A | 6-8 | 4/11/2013 | 15:15 | | | | 6340 | | * | 7350 | | * | 4700 | | | 20700 | | | 0.89 | | | 0.81 | | | < 0.021 | | | 0.59 | | | < 0.021 | | | 0.037 | | * | 0.075 | | | 0.034 | | | 0.049 | | | 0.34 | | | < 0.021 | | |
| YMW-16-SB-B | 8-10 | 4/30/2013 | 14:50 | | | | 1440 | | * | 1230 | | * | 930 | | | 4100 | J | | 3.6 | J | | 0.44 | | | < 0.037 | | | 0.31 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | | < 0.037 | | |
| YMW-16-SB-C | 13-15 | 4/30/2013 | 15:10 | | | | 13 | | | < 12 | | | 13 | | | 46 | J | | 0.012 | J | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| YMW-17-SB-A | 6-8 | 4/15/2013 | 13:20 | | | | 13800 | | * | 6720 | | * | 11200 | | | 37200 | | | 9.9 | | | 0.58 | | | < 0.19 | | | 0.54 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.90 | | | < 0.19 | | |
| YMW-17-SB-B | 8-10 | 4/15/2013 | 14:15 | | | | 6870 | | * | 8800 | | * | 5460 | | | 24000 | | | 19 | | | 0.86 | | | < 0.10 | | | 0.74 | | | < 0.10 | | | < 0.10 | | | < 0.10 | | | < 0.10 | | | < 0.10 | | | < 0.10 | | | < 0.10 | | |
| YMW-17-SB-C | 13-15 | 4/30/2013 | 9:33 | | | | 31 | | | 27 | | | 25 | | | 126 | J | | 0.064 | J | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| YMW-17-SB-CD | 13-15 | 4/30/2013 | 9:37 | | | | 18 | | | 13 | | | 17 | | | 72 | J | | 0.035 | J | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| YMW-18-SB-A | 2-4 | 4/23/2013 | 10:35 | | | | 2300 | | * | 9160 | | * | 128 | | | 11800 | | | 24 | | | < 0.043 | | | < 0.043 | | | < 0.043 | | | 0.72 | | * | 0.37 | | * | 1.4 | | * | 0.21 | | | 0.075 | | | 0.37 | | | < 0.043 | | |
| YMW-18-SB-B | 6-8 | 4/23/2013 | 11:05 | | | | 3800 | | * | 13600 | | * | 170 | | | 17900 | | | 42 | | | < 0.086 | | | < 0.086 | | | < 0.086 | | | 0.46 | | * | < 0.086 | | | 0.87 | | * | < 0.086 | | | < 0.086 | | | 0.17 | | | < 0.086 | | |
| YMW-18-SB-C | 13-15 | 5/2/2013 | 16:55 | | | | < 12 | | | 30 | | | < 12 | | | 42 | | | 0.011 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | |
| YMW-19-SB-A | 2-4 | 4/23/2013 | 14:05 | | | | 17 | | | < 12 | | | 51 | | | 117 | | | 0.0044 | | | < 0.0039 | | | < 0.0039 | | | 0.0059 | | | 0.035 | | | 0.075 | | * | 0.074 | | | 0.054 | | | 0.046 | | | 0.055 | | | < 0.0039 | | |
| YMW-19-SB-AD | 2-4 | 4/23/2013 | 14:06 | | | | 18 | | | < 12 | | | 53 | | | 132 | | | 0.0046 | | | < 0.0042 | | | < 0.0042 | | | 0.0071 | | | 0.039 | | | 0.081 | | * | 0.072 | | | 0.050 | | | 0.042 | | | 0.057 | | | < 0.0042 | | |
| YMW-19-SB-B | 8-10 | 4/26/2013 | 9:53 | | | | 42 | | | 126 | | | 42 | | | 244 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | |
| YMW-19-SB-C | 13-15 | 4/26/2013 | 11:40 | | | | < 11 | | | < 11 | | | < 11 | | | < 11 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| YMW-20-SB-A | 4-6 | 4/19/2013 | 12:30 | 69 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-B | 6-8 | 4/19/2013 | 13:00 | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-C | 13-15 | 4/25/2013 | 15:15 | < 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-CD | | 4/25/2013 | 15:20 | < 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-21-SB-A | 4-6 | 4/19/2013 | 15:00 | | | | 16800 | | * | 20400 | | * | 13400 | | | 57400 | | | 34 | | | 0.69 | | | < 0.24 | | | 1.3 | | | < 0.24 | | | < 0.24 | | | < 0.24 | | | < 0.24 | | | < 0.24 | | | 1.0 | | | < 0.24 | | |
| YMW-21-SB-B | 8-10 | 4/29/2013 | 15:25 | | | | 379 | | | 470 | | * | 242 | | | 1240 | J | | 0.39 | J | | 0.013 | | | < 0.0037 | | | 0.0076 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| YMW-21-SB-C | 10-12 | 4/29/2013 | 16:45 | | | | < 12 | | | < 12 | | | < 12 | | | < 12 | J | | < 0.0039 | J | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | |
| YMW-22-SB-A | 6-8 | 4/17/2013 | 11:50 | 8060 | | * | 2860 | | * | 1970 | | * | 2210 | | | 8150 | | | 0.51 | | | 0.034 | | | < 0.034 | | | 0.15 | | | < 0.034 | | | < 0.034 | | | < 0.034 | | | < 0.034 | | | < 0.034 | | | 0.25 | | | < 0.034 | | |
| YMW-22-SB-B | 8-10 | 4/25/2013 | 12:00 | 64 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-22-SB-C | 13-15 | 4/25/2013 | 12:20 | < 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SB-A | 2-4 | 4/17/2013 | 14:05 | 714 | | * | 158 | | | 15 | | | 137 | | | 630 | | | 0.011 | U | | < 0.0079 | | | < 0.0079 | | | 0.064 | | | 0.49 | | * | 0.50 | | * | 0.46 | | * | 0.15 | | | 0.38 | | | 0.42 | | | 0.056 | | * |
| YMW-23-SB-B | 8-10 | 4/25/2013 | 9:42 | < 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SB-C | 13-15 | 4/25/2013 | 10:10 | < 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

† - Sample ID YMW-13-SB-D replaced sample YMW-13-SB-A

(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | |
| s ommercial u sur ace | | | | | | | | | | | | | | | | | | | | | |
| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YMW-10-SB-A | 2-4 | 4/18/2013 | 11:20 | 0.0072 | | | < 0.0035 | | | 0.0095 | | | < 0.0035 | | | < 0.0035 | J | | 0.0084 | | |
| YMW-10-SB-B | 10-12 | 4/23/2013 | 15:30 | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| YMW-10-SB-C | 13-15 | 4/23/2013 | 16:00 | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | | < 0.0041 | | |
| YMW-11-SB-A | 2-4 | 4/11/2013 | 10:15 | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | | < 0.0040 | | |
| YMW-11-SB-B | 8-10 | 4/11/2013 | 11:10 | < 0.0042 | | | 0.0045 | | | 0.012 | | | < 0.0042 | | | < 0.0042 | | | < 0.0042 | | |
| YMW-11-SB-C | 14-16 | 4/24/2013 | 11:50 | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | | < 0.0037 | | |
| YMW-12-SB-A | 4-6 | 4/11/2013 | 12:32 | < 0.020 | | | 0.30 | | | 0.021 | | | 3.8 | | | 0.32 | | | 0.043 | | |
| YMW-12-SB-AD | 4-6 | 4/11/2013 | 12:35 | < 0.020 | | | 0.26 | | | < 0.020 | | | 3.6 | | | 0.26 | | | 0.036 | | |
| YMW-12-SB-B | 11-13 | 4/30/2013 | 12:23 | < 0.0037 | | | 0.62 | | | < 0.0037 | | | 3.2 | | | 0.65 | | | 0.053 | | |
| YMW-12-SB-C | 13-15 | 4/30/2013 | 12:34 | < 0.038 | | | < 0.038 | | | < 0.038 | | | 1.0 | | | 0.26 | | | < 0.038 | | |
| YMW-13-SB-D† | 8-10 | 4/26/2013 | 14:30 | 0.59 | | | 1.1 | | | < 0.035 | | | 4.3 | | * | 1.9 | | | 0.43 | | |
| YMW-13-SB-B | 11-13 | 4/26/2013 | 14:44 | 0.27 | | | 0.99 | | | < 0.040 | | | 3.3 | | | 2.1 | | | 0.35 | | |
| YMW-13-SB-C | 13-15 | 4/26/2013 | 15:01 | 0.24 | | | 1.2 | | | < 0.038 | | | 3.8 | | | 2.2 | | | 0.33 | | |
| YMW-14-SB-A | 4-6 | 4/9/2013 | 14:10 | 0.098 | | | 0.72 | | | < 0.082 | | | 3.4 | | | 0.93 | | | 0.19 | | |
| YMW-14-SB-B | 8-10 | 4/29/2013 | 13:00 | 0.048 | | | 1.5 | | | 0.014 | | | 7.3 | | * | 2.3 | | | 0.12 | | |
| YMW-14-SB-C | 13-15 | 4/29/2013 | 13:30 | < 0.0040 | | | 0.57 | | | < 0.0040 | | | 2.3 | | | 0.93 | | | 0.064 | | |
| YMW-15-SB-A | 2-4 | 4/18/2013 | 13:55 | < 0.0042 | | | 0.20 | | | < 0.0042 | | | 2.6 | | | 0.099 | J | | 0.028 | | |
| YMW-15-SB-B | 11-13 | 5/2/2013 | 14:00 | < 0.0072 | | | 0.24 | | | < 0.0072 | | | 0.96 | | | 0.56 | | | 0.050 | | |
| YMW-15-SB-C | 13-15 | 5/2/2013 | 14:10 | < 0.0035 | | | 0.030 | | | < 0.0035 | | | 0.034 | | | 0.10 | | | 0.014 | | |
| YMW-16-SB-A | 6-8 | 4/11/2013 | 15:15 | 0.11 | | | 2.0 | | | 0.064 | | | 3.9 | | | 3.9 | | | 0.57 | | |
| YMW-16-SB-B | 8-10 | 4/30/2013 | 14:50 | < 0.037 | | | 1.1 | | | < 0.037 | | | 3.8 | | | 2.7 | | | 0.38 | | |
| YMW-16-SB-C | 13-15 | 4/30/2013 | 15:10 | < 0.0040 | | | 0.0061 | | | < 0.0040 | | | 0.0071 | | | 0.018 | | | < 0.0040 | | |
| YMW-17-SB-A | 6-8 | 4/15/2013 | 13:20 | 0.39 | | | 1.9 | | | < 0.19 | | | 3.5 | | | 3.6 | | | 1.2 | | |
| YMW-17-SB-B | 8-10 | 4/15/2013 | 14:15 | 0.27 | | | 2.6 | | | < 0.10 | | | 8.5 | | * | 3.8 | | | 0.88 | | |
| YMW-17-SB-C | 13-15 | 4/30/2013 | 9:33 | < 0.0037 | | | 0.014 | | | < 0.0037 | | | 0.015 | | | 0.025 | | | 0.0047 | | |
| YMW-17-SB-CD | 13-15 | 4/30/2013 | 9:37 | < 0.0038 | | | 0.0089 | | | < 0.0038 | | | 0.0084 | | | 0.017 | | | < 0.0038 | | |
| YMW-18-SB-A | 2-4 | 4/23/2013 | 10:35 | 1.5 | | | 2.7 | | | < 0.043 | | | 8.7 | | * | 2.8 | | | 1.0 | | |
| YMW-18-SB-B | 6-8 | 4/23/2013 | 11:05 | 0.82 | | | 2.3 | | | < 0.086 | | | 12 | | * | 3.2 | | | 0.63 | | |
| YMW-18-SB-C | 13-15 | 5/2/2013 | 16:55 | < 0.0039 | | | 0.015 | | | < 0.0039 | | | 0.010 | | | 0.011 | | | < 0.0039 | | |
| YMW-19-SB-A | 2-4 | 4/23/2013 | 14:05 | 0.079 | | | < 0.0039 | | | 0.073 | | | < 0.0039 | | | 0.032 | | | 0.081 | | |
| YMW-19-SB-AD | 2-4 | 4/23/2013 | 14:06 | 0.088 | | | < 0.0042 | | | 0.069 | | | < 0.0042 | | | 0.040 | | | 0.090 | | |
| YMW-19-SB-B | 8-10 | 4/26/2013 | 9:53 | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | | < 0.0036 | | |
| YMW-19-SB-C | 13-15 | 4/26/2013 | 11:40 | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | | < 0.0038 | | |
| YMW-20-SB-A | 4-6 | 4/19/2013 | 12:30 | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-B | 6-8 | 4/19/2013 | 13:00 | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-C | 13-15 | 4/25/2013 | 15:15 | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-CD | | 4/25/2013 | 15:20 | | | | | | | | | | | | | | | | | | |
| YMW-21-SB-A | 4-6 | 4/19/2013 | 15:00 | 0.31 | | | 5.3 | | | < 0.24 | | | 8.3 | | * | 9.7 | J | | 1.9 | | |
| YMW-21-SB-B | 8-10 | 4/29/2013 | 15:25 | < 0.0037 | | | 0.068 | | | < 0.0037 | | | 0.085 | | | 0.17 | | | 0.023 | | |
| YMW-21-SB-C | 10-12 | 4/29/2013 | 16:45 | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | < 0.0039 | | | 0.0057 | | | < 0.0039 | | |
| YMW-22-SB-A | 6-8 | 4/17/2013 | 11:50 | 0.095 | | | 0.32 | | | < 0.034 | | | 0.18 | | | 0.70 | | | 0.49 | | |
| YMW-22-SB-B | 8-10 | 4/25/2013 | 12:00 | | | | | | | | | | | | | | | | | | |
| YMW-22-SB-C | 13-15 | 4/25/2013 | 12:20 | | | | | | | | | | | | | | | | | | |
| YMW-23-SB-A | 2-4 | 4/17/2013 | 14:05 | 0.79 | | | 0.0087 | | | 0.29 | | * | < 0.0079 | | | 0.17 | | | 0.70 | | |
| YMW-23-SB-B | 8-10 | 4/25/2013 | 9:42 | | | | | | | | | | | | | | | | | | |
| YMW-23-SB-C | 13-15 | 4/25/2013 | 10:10 | | | | | | | | | | | | | | | | | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

**† - Sample ID YMW-13-SB-D replaced sample YMW-13-SB-A**

**(1) - EPA RSL Version used for screening level development: January 2015**

**VQs - Validator Qualifiers**

**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**

**R - Rejected Data**

**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| eac ing to round ater creening e el | | | | | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | | | | | | | . | | | . | | | . | | | . | | | . | | | | | |
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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YMW-10-SB-A | 2-4 | 4/18/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-10-SB-B | 10-12 | 4/23/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-10-SB-C | 13-15 | 4/23/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-11-SB-A | 2-4 | 4/11/2013 | 10:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-11-SB-B | 8-10 | 4/11/2013 | 11:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-11-SB-C | 14-16 | 4/24/2013 | 11:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-12-SB-A | 4-6 | 4/11/2013 | 12:32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12-SB-AD | 4-6 | 4/11/2013 | 12:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12-SB-B | 11-13 | 4/30/2013 | 12:23 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-12-SB-C | 13-15 | 4/30/2013 | 12:34 | 1.3 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-13-SB-D† | 8-10 | 4/26/2013 | 14:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.75 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-13-SB-B | 11-13 | 4/26/2013 | 14:44 | 0.34 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-13-SB-C | 13-15 | 4/26/2013 | 15:01 | 0.92 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-14-SB-A | 4-6 | 4/9/2013 | 14:10 | 5.4 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | |
| YMW-14-SB-B | 8-10 | 4/29/2013 | 13:00 | 4.1 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-14-SB-C | 13-15 | 4/29/2013 | 13:30 | 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-15-SB-A | 2-4 | 4/18/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-15-SB-B | 11-13 | 5/2/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-15-SB-C | 13-15 | 5/2/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16-SB-A | 6-8 | 4/11/2013 | 15:15 | 1.8 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | |
| YMW-16-SB-B | 8-10 | 4/30/2013 | 14:50 | 0.13 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-16-SB-C | 13-15 | 4/30/2013 | 15:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-17-SB-A | 6-8 | 4/15/2013 | 13:20 | 0.82 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-17-SB-B | 8-10 | 4/15/2013 | 14:15 | 4.2 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | |
| YMW-17-SB-C | 13-15 | 4/30/2013 | 9:33 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-17-SB-CD | 13-15 | 4/30/2013 | 9:37 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-18-SB-A | 2-4 | 4/23/2013 | 10:35 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-18-SB-B | 6-8 | 4/23/2013 | 11:05 | 0.065 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-18-SB-C | 13-15 | 5/2/2013 | 16:55 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-19-SB-A | 2-4 | 4/23/2013 | 14:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-19-SB-AD | 2-4 | 4/23/2013 | 14:06 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-19-SB-B | 8-10 | 4/26/2013 | 9:53 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-19-SB-C | 13-15 | 4/26/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-A | 4-6 | 4/19/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-B | 6-8 | 4/19/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-C | 13-15 | 4/25/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-CD | | 4/25/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-21-SB-A | 4-6 | 4/19/2013 | 15:00 | 3.2 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | |
| YMW-21-SB-B | 8-10 | 4/29/2013 | 15:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-21-SB-C | 10-12 | 4/29/2013 | 16:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-22-SB-A | 6-8 | 4/17/2013 | 11:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-22-SB-B | 8-10 | 4/25/2013 | 12:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-22-SB-C | 13-15 | 4/25/2013 | 12:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-23-SB-A | 2-4 | 4/17/2013 | 14:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SB-B | 8-10 | 4/25/2013 | 9:42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SB-C | 13-15 | 4/25/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**NOTES:**

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| 2.5 | **Exceeds Direct Contact Commercial RSL** |
| 3.1 | **Exceeds MDEQ Leaching to Groundwater Screening Level** |
| 22 | **Exceeds MDEQ - RBSLs Commercial Subsurface** |
| <0.53 | **Non-Detect Result that Exceeds an Associated Screening Level** |

**† - Sample ID YMW-13-SB-D replaced sample YMW-13-SB-A**
**(1) - EPA RSL Version used for screening level development: January 2015**
**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity**
**R - Rejected Data because quality control criteria were not met.**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| YMW-10-SB-A | 2-4 | 4/18/2013 | 11:20 | | | | | | | | | | | | | | | | |
| YMW-10-SB-B | 10-12 | 4/23/2013 | 15:30 | | | | | | | | | | | | | | | | |
| YMW-10-SB-C | 13-15 | 4/23/2013 | 16:00 | | | | | | | | | | | | | | | | |
| YMW-11-SB-A | 2-4 | 4/11/2013 | 10:15 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-11-SB-B | 8-10 | 4/11/2013 | 11:10 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-11-SB-C | 14-16 | 4/24/2013 | 11:50 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-12-SB-A | 4-6 | 4/11/2013 | 12:32 | | | | | | | | | | | | | | | | |
| YMW-12-SB-AD | 4-6 | 4/11/2013 | 12:35 | | | | | | | | | | | | | | | | |
| YMW-12-SB-B | 11-13 | 4/30/2013 | 12:23 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-12-SB-C | 13-15 | 4/30/2013 | 12:34 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-13-SB-D† | 8-10 | 4/26/2013 | 14:30 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-13-SB-B | 11-13 | 4/26/2013 | 14:44 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-13-SB-C | 13-15 | 4/26/2013 | 15:01 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-14-SB-A | 4-6 | 4/9/2013 | 14:10 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 |
| YMW-14-SB-B | 8-10 | 4/29/2013 | 13:00 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-14-SB-C | 13-15 | 4/29/2013 | 13:30 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-15-SB-A | 2-4 | 4/18/2013 | 13:55 | | | | | | | | | | | | | | | | |
| YMW-15-SB-B | 11-13 | 5/2/2013 | 14:00 | | | | | | | | | | | | | | | | |
| YMW-15-SB-C | 13-15 | 5/2/2013 | 14:10 | | | | | | | | | | | | | | | | |
| YMW-16-SB-A | 6-8 | 4/11/2013 | 15:15 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 |
| YMW-16-SB-B | 8-10 | 4/30/2013 | 14:50 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-16-SB-C | 13-15 | 4/30/2013 | 15:10 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-17-SB-A | 6-8 | 4/15/2013 | 13:20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-17-SB-B | 8-10 | 4/15/2013 | 14:15 | < 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 |
| YMW-17-SB-C | 13-15 | 4/30/2013 | 9:33 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-17-SB-CD | 13-15 | 4/30/2013 | 9:37 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-18-SB-A | 2-4 | 4/23/2013 | 10:35 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-18-SB-B | 6-8 | 4/23/2013 | 11:05 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-18-SB-C | 13-15 | 5/2/2013 | 16:55 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-19-SB-A | 2-4 | 4/23/2013 | 14:05 | | | | | | | | | | | | | | | | |
| YMW-19-SB-AD | 2-4 | 4/23/2013 | 14:06 | | | | | | | | | | | | | | | | |
| YMW-19-SB-B | 8-10 | 4/26/2013 | 9:53 | | | | | | | | | | | | | | | | |
| YMW-19-SB-C | 13-15 | 4/26/2013 | 11:40 | | | | | | | | | | | | | | | | |
| YMW-20-SB-A | 4-6 | 4/19/2013 | 12:30 | | | | | | | | | | | | | | | | |
| YMW-20-SB-B | 6-8 | 4/19/2013 | 13:00 | | | | | | | | | | | | | | | | |
| YMW-20-SB-C | 13-15 | 4/25/2013 | 15:15 | | | | | | | | | | | | | | | | |
| YMW-20-SB-CD | | 4/25/2013 | 15:20 | | | | | | | | | | | | | | | | |
| YMW-21-SB-A | 4-6 | 4/19/2013 | 15:00 | < 0.75 | < 0.75 | < 0.75 | < 0.75 | < 0.75 | < 0.75 | < 0.75 | < 0.75 | < 0.75 | < 0.75 | < 0.75 | < 0.75 | < 0.75 | < 0.75 | < 0.75 | < 0.75 |
| YMW-21-SB-B | 8-10 | 4/29/2013 | 15:25 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-21-SB-C | 10-12 | 4/29/2013 | 16:45 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-22-SB-A | 6-8 | 4/17/2013 | 11:50 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-22-SB-B | 8-10 | 4/25/2013 | 12:00 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-22-SB-C | 13-15 | 4/25/2013 | 12:20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 | < 0.20 |
| YMW-23-SB-A | 2-4 | 4/17/2013 | 14:05 | | | | | | | | | | | | | | | | |
| YMW-23-SB-B | 8-10 | 4/25/2013 | 9:42 | | | | | | | | | | | | | | | | |
| YMW-23-SB-C | 13-15 | 4/25/2013 | 10:10 | | | | | | | | | | | | | | | | |

**NOTES:**

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| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

**† - Sample ID YMW-13-SB-D replaced sample YMW-13-SB-A**
**(1) - EPA RSL Version used for screening level development: January 2015**

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity**
**R - Rejected Data because quality control criteria were not met.**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| eac ing to round ater creening e el | | | | | | | . | | | | | | . | | | . | | | . | | | . | | | . | | | | | | . | | | . | | | . | | | . | | | . | | | . | | | | | |
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| YMW-10-SB-A | 2-4 | 4/18/2013 | 11:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-10-SB-B | 10-12 | 4/23/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-10-SB-C | 13-15 | 4/23/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-11-SB-A | 2-4 | 4/11/2013 | 10:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-11-SB-B | 8-10 | 4/11/2013 | 11:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-11-SB-C | 14-16 | 4/24/2013 | 11:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-12-SB-A | 4-6 | 4/11/2013 | 12:32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12-SB-AD | 4-6 | 4/11/2013 | 12:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12-SB-B | 11-13 | 4/30/2013 | 12:23 | 0.045 | | J | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.13 | | J |
| YMW-12-SB-C | 13-15 | 4/30/2013 | 12:34 | 9.6 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.087 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 2.1 | | |
| YMW-13-SB-D† | 8-10 | 4/26/2013 | 14:30 | 3.8 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.30 | | |
| YMW-13-SB-B | 11-13 | 4/26/2013 | 14:44 | 4.5 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.029 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.27 | | |
| YMW-13-SB-C | 13-15 | 4/26/2013 | 15:01 | 3.3 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.043 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.49 | | |
| YMW-14-SB-A | 4-6 | 4/9/2013 | 14:10 | 27 | | | < 1.2 | | | < 1.2 | | | < 25 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | 2.5 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | 53 | | |
| YMW-14-SB-B | 8-10 | 4/29/2013 | 13:00 | 31 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 1.4 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 35 | | |
| YMW-14-SB-C | 13-15 | 4/29/2013 | 13:30 | 4.0 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.056 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 1.3 | | |
| YMW-15-SB-A | 2-4 | 4/18/2013 | 13:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-15-SB-B | 11-13 | 5/2/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-15-SB-C | 13-15 | 5/2/2013 | 14:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16-SB-A | 6-8 | 4/11/2013 | 15:15 | 11 | | | < 1.2 | | | < 1.2 | | | < 25 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | 1.7 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | < 1.2 | | | 45 | | |
| YMW-16-SB-B | 8-10 | 4/30/2013 | 14:50 | 4.2 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.17 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 7.8 | | |
| YMW-16-SB-C | 13-15 | 4/30/2013 | 15:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-17-SB-A | 6-8 | 4/15/2013 | 13:20 | 4.5 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.17 | | J | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 3.6 | | |
| YMW-17-SB-B | 8-10 | 4/15/2013 | 14:15 | 21 | | | < 0.25 | | | < 0.25 | | | < 5.0 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | 0.80 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | 29 | | |
| YMW-17-SB-C | 13-15 | 4/30/2013 | 9:33 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-17-SB-CD | 13-15 | 4/30/2013 | 9:37 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-18-SB-A | 2-4 | 4/23/2013 | 10:35 | 0.050 | | J | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-18-SB-B | 6-8 | 4/23/2013 | 11:05 | 0.94 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.74 | | |
| YMW-18-SB-C | 13-15 | 5/2/2013 | 16:55 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-19-SB-A | 2-4 | 4/23/2013 | 14:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-19-SB-AD | 2-4 | 4/23/2013 | 14:06 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-19-SB-B | 8-10 | 4/26/2013 | 9:53 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-19-SB-C | 13-15 | 4/26/2013 | 11:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-A | 4-6 | 4/19/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-B | 6-8 | 4/19/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-C | 13-15 | 4/25/2013 | 15:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-20-SB-CD | | 4/25/2013 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-21-SB-A | 4-6 | 4/19/2013 | 15:00 | 34 | | | < 0.75 | | | < 0.75 | | | < 15 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | 3.0 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | < 0.75 | | | 84 | | |
| YMW-21-SB-B | 8-10 | 4/29/2013 | 15:25 | 2.1 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.32 | | |
| YMW-21-SB-C | 10-12 | 4/29/2013 | 16:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-22-SB-A | 6-8 | 4/17/2013 | 11:50 | 0.21 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.077 | | J |
| YMW-22-SB-B | 8-10 | 4/25/2013 | 12:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-22-SB-C | 13-15 | 4/25/2013 | 12:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-23-SB-A | 2-4 | 4/17/2013 | 14:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SB-B | 8-10 | 4/25/2013 | 9:42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-23-SB-C | 13-15 | 4/25/2013 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**NOTES:**

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| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

† - Sample ID YMW-13-SB-D replaced sample YMW-13-SB-A
(1) - EPA RSL Version used for screening level development: January 2015

VQs - Validator Qualifiers
J - Associated numerical value is an estimated quantity
R - Rejected Data because quality control criteria were not met.
U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers
* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)
B - The analyte was detected in the method blank.
D - Analyte Reporting Limit increased due to sample matrix.
E - Estimated value. Result exceeds the instrument upper quantitation limit.
H - Analysis performed past recommended holding time.
J - Estimated value. The analyte was present but less than the reporting limit.
L - Lowest available reporting limit for the analytical method used.

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| am le ode | H | ate | I | esult | s | s | esult | s | s |
| YMW-10-SB-A | 2-4 | 4/18/2013 | 11:20 | | | | | | |
| YMW-10-SB-B | 10-12 | 4/23/2013 | 15:30 | | | | | | |
| YMW-10-SB-C | 13-15 | 4/23/2013 | 16:00 | | | | | | |
| YMW-11-SB-A | 2-4 | 4/11/2013 | 10:15 | < 0.20 | | | < 0.20 | | |
| YMW-11-SB-B | 8-10 | 4/11/2013 | 11:10 | < 0.20 | | | < 0.20 | | |
| YMW-11-SB-C | 14-16 | 4/24/2013 | 11:50 | < 0.20 | | | < 0.20 | | |
| YMW-12-SB-A | 4-6 | 4/11/2013 | 12:32 | | | | | | |
| YMW-12-SB-AD | 4-6 | 4/11/2013 | 12:35 | | | | | | |
| YMW-12-SB-B | 11-13 | 4/30/2013 | 12:23 | < 0.20 | | | 0.13 | | J |
| YMW-12-SB-C | 13-15 | 4/30/2013 | 12:34 | 0.53 | | | 2.7 | | |
| YMW-13-SB-D† | 8-10 | 4/26/2013 | 14:30 | 0.33 | | | 0.63 | | |
| YMW-13-SB-B | 11-13 | 4/26/2013 | 14:44 | 0.22 | | | 0.49 | | |
| YMW-13-SB-C | 13-15 | 4/26/2013 | 15:01 | 0.44 | | | 0.93 | | |
| YMW-14-SB-A | 4-6 | 4/9/2013 | 14:10 | 5.7 | | | 58 | | |
| YMW-14-SB-B | 8-10 | 4/29/2013 | 13:00 | 2.7 | | | 37 | | |
| YMW-14-SB-C | 13-15 | 4/29/2013 | 13:30 | 0.23 | | | 1.5 | | |
| YMW-15-SB-A | 2-4 | 4/18/2013 | 13:55 | | | | | | |
| YMW-15-SB-B | 11-13 | 5/2/2013 | 14:00 | | | | | | |
| YMW-15-SB-C | 13-15 | 5/2/2013 | 14:10 | | | | | | |
| YMW-16-SB-A | 6-8 | 4/11/2013 | 15:15 | 10 | | | 56 | | |
| YMW-16-SB-B | 8-10 | 4/30/2013 | 14:50 | 0.77 | | | 8.6 | | |
| YMW-16-SB-C | 13-15 | 4/30/2013 | 15:10 | < 0.20 | | | < 0.20 | | |
| YMW-17-SB-A | 6-8 | 4/15/2013 | 13:20 | 1.1 | | | 4.7 | | |
| YMW-17-SB-B | 8-10 | 4/15/2013 | 14:15 | 2.3 | | | 31 | | |
| YMW-17-SB-C | 13-15 | 4/30/2013 | 9:33 | < 0.20 | | | < 0.20 | | |
| YMW-17-SB-CD | 13-15 | 4/30/2013 | 9:37 | < 0.20 | | | < 0.20 | | |
| YMW-18-SB-A | 2-4 | 4/23/2013 | 10:35 | < 0.20 | | | < 0.20 | | |
| YMW-18-SB-B | 6-8 | 4/23/2013 | 11:05 | 0.35 | | | 1.1 | | |
| YMW-18-SB-C | 13-15 | 5/2/2013 | 16:55 | < 0.20 | | | < 0.20 | | |
| YMW-19-SB-A | 2-4 | 4/23/2013 | 14:05 | | | | | | |
| YMW-19-SB-AD | 2-4 | 4/23/2013 | 14:06 | | | | | | |
| YMW-19-SB-B | 8-10 | 4/26/2013 | 9:53 | | | | | | |
| YMW-19-SB-C | 13-15 | 4/26/2013 | 11:40 | | | | | | |
| YMW-20-SB-A | 4-6 | 4/19/2013 | 12:30 | | | | | | |
| YMW-20-SB-B | 6-8 | 4/19/2013 | 13:00 | | | | | | |
| YMW-20-SB-C | 13-15 | 4/25/2013 | 15:15 | | | | | | |
| YMW-20-SB-CD | | 4/25/2013 | 15:20 | | | | | | |
| YMW-21-SB-A | 4-6 | 4/19/2013 | 15:00 | 8.9 | | | 92 | | |
| YMW-21-SB-B | 8-10 | 4/29/2013 | 15:25 | 0.11 | | J | 0.43 | | |
| YMW-21-SB-C | 10-12 | 4/29/2013 | 16:45 | < 0.20 | | | < 0.20 | | |
| YMW-22-SB-A | 6-8 | 4/17/2013 | 11:50 | 0.042 | | J | 0.12 | | J |
| YMW-22-SB-B | 8-10 | 4/25/2013 | 12:00 | < 0.20 | | | < 0.20 | | |
| YMW-22-SB-C | 13-15 | 4/25/2013 | 12:20 | < 0.20 | | | < 0.20 | | |
| YMW-23-SB-A | 2-4 | 4/17/2013 | 14:05 | | | | | | |
| YMW-23-SB-B | 8-10 | 4/25/2013 | 9:42 | | | | | | |
| YMW-23-SB-C | 13-15 | 4/25/2013 | 10:10 | | | | | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

**† - Sample ID YMW-13-SB-D replaced sample YMW-13-SB-A**
**(1) - EPA RSL Version used for screening level development: January 2015**

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity**
**R - Rejected Data because quality control criteria were not met.**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | H | | | H | | | H | | | H | | |
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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-ST-A | 2-4 | 6/5/2013 | 13:45 | 27 | | | 8.6 | | | 39 | | | 806 | | | 2 | | | 63 | | | 1440 | | | 1 | | | < 1 | | | < 1 | | | < 0.68 | | D | 0.30 | | J* | < 0.34 | | D | 4.9 | | |
| 2-ST-A | 3-4 | 6/7/2013 | 11:50 | 26 | | | 7.5 | | | 5 | | | 193 | | | < 1 | | | 28 | | | 269 | | | < 1 | | | < 1 | | | < 1 | | | < 0.27 | | D | 0.31 | | * | < 0.40 | | | 5.0 | | |
| 3-ST-A | 2-4 | 6/12/2013 | 10:26 | 20 | | | 8.1 | | | 6 | | | 197 | | | < 1 | | | 25 | | | 815 | | | < 1 | | | < 1 | | | < 1 | | | < 0.62 | | D | 1.9 | | * | 0.43 | | | 6.5 | | * |
| 3-ST-B | 6-7 | 6/12/2013 | 10:56 | 16 | | | 9.0 | | | 5 | | | 145 | | | < 1 | | | 20 | | | 151 | | | < 1 | | | < 1 | | | < 1 | | | < 1.0 | | D | 4.4 | J | * | 1.5 | J | | 34 | J | * |
| 4-ST-A | 3-4 | 6/12/2013 | 12:20 | 41 | | | 8.2 | | | 37 | | | 306 | | | < 1 | | | 32 | | | 5670 | | D | < 1 | | | 2 | | | < 1 | | | < 2.0 | | D | 2.3 | | * | 3.7 | | | 26 | | * |
| 5-ST-A | 4-5 | 6/12/2013 | 13:33 | 23 | | | 8.0 | | | 10 | | | 184 | | | < 1 | | | 30 | | | 68 | | | < 1 | | | < 1 | | | < 1 | | | < 0.65 | | D | < 0.33 | | D | < 1.0 | | D | 11 | | * |

**NOTES:**

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| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

# - DEQ Direct Contact Screening levels
(1) Compared to http://deq.mt.gov/StateSuperfund/background.mcpx
(2) - EPA RSL Version used for screening level development: January 2015
VQs - Validator Qualifiers
J - Associated numerical value is an estimated quantity because quality control criteria were not met.
R - Rejected Data
U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers
* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)
B - The analyte was detected in the method blank.
D - Analyte Reporting Limit increased due to sample matrix.
E - Estimated value. Result exceeds the instrument upper quantitation limit.
H - Analysis performed past recommended holding time.
J - Estimated value. The analyte was present but less than the reporting limit.
L - Lowest available reporting limit for the analytical method used.

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| raction | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | . | | | | |
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| am le ode | H | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| 1-ST-A | 2-4 | 6/5/2013 | 13:45 | 2.2 | | | 2.1 | | | 4.3 | | | < 8.0 | | D | 473 | | * | 117 | | * | 470 | | * | 1330 | | * | 17200 | | | 6390 | | * | 2310 | | * | 5660 | | | 0.66 | | | 0.50 | | |
| 2-ST-A | 3-4 | 6/7/2013 | 11:50 | 2.1 | | | 2.1 | | | 4.3 | | | 6.9 | | * | 415 | | * | 137 | | * | 420 | | * | 1190 | | * | 13500 | | | 3840 | | * | 5890 | | * | 2940 | | | 4.3 | | | 1.9 | | |
| 3-ST-A | 2-4 | 6/12/2013 | 10:26 | 1.2 | | | 1.6 | | | 2.8 | | | 4.8 | | * | 222 | | * | 126 | | * | 246 | | * | 655 | | * | 7260 | | | 2470 | | * | 2350 | | * | 1480 | | | 3.4 | | | 0.55 | | |
| 3-ST-B | 6-7 | 6/12/2013 | 10:56 | 12 | J | | 4.7 | J | | 17 | J | | 24 | J | * | 665 | J | * | 640 | J | * | 797 | J | * | 2290 | J | * | 10800 | | | 3400 | | * | 5360 | | * | 1440 | | | 47 | | | 1.5 | | |
| 4-ST-A | 3-4 | 6/12/2013 | 12:20 | 15 | | | 11 | | | 26 | | | 13 | | * | 945 | | * | 801 | | * | 1070 | | * | 2880 | | * | 51700 | | | 21200 | | * | 9740 | | * | 17100 | | | 62 | | | 0.89 | | |
| 5-ST-A | 4-5 | 6/12/2013 | 13:33 | 3.9 | | | 2.6 | | | 6.5 | | | 5.7 | | * | 319 | | * | 183 | | * | 358 | | * | 860 | | * | 10600 | | | 2570 | | * | 3480 | | * | 3330 | | | 3.5 | | | 0.25 | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds Direct Contact Commercial RSL |
| 3.1 | Exceeds MDEQ Leaching to Groundwater Screening Level |
| 22 | Exceeds MDEQ - RBSLs Commercial Subsurface |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

# - DEQ Direct Contact Screening levels
(1) Compared to http://deq.mt.gov/ StateSuperfund/background.mcpx
(2) - EPA RSL Version used for screening level development: January 2015
VQs - Validator Qualifiers
J - Associated numerical value is an estimated quantity because quality control criteria were not met.
R - Rejected Data
U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers
* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)
B - The analyte was detected in the method blank.
D - Analyte Reporting Limit increased due to sample matrix.
E - Estimated value. Result exceeds the instrument upper quantitation limit.
H - Analysis performed past recommended holding time.
J - Estimated value. The analyte was present but less than the reporting limit.
L - Lowest available reporting limit for the analytical method used.

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| eac ing to round ater creening e el | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 1-ST-A | 2-4 | 6/5/2013 | 13:45 | < 0.11 | | | 0.76 | | | 0.41 | | * | < 0.11 | | | < 0.11 | | | 0.24 | | | < 0.11 | | | 1.1 | | | < 0.11 | | | 0.87 | | | 1.5 | | | 0.17 | | | 0.75 | | |
| 2-ST-A | 3-4 | 6/7/2013 | 11:50 | < 0.072 | | | 0.67 | | | 0.55 | | * | 0.44 | | * | 0.51 | | * | 0.21 | | | 0.23 | | | 0.58 | | | < 0.072 | | | 1.6 | | | 1.9 | | | 0.32 | | * | 3.7 | | |
| 3-ST-A | 2-4 | 6/12/2013 | 10:26 | < 0.041 | | | 0.27 | | | 0.32 | | * | 0.30 | | * | 0.43 | | * | 0.18 | | | 0.16 | | | 0.48 | | | < 0.041 | | | 0.97 | | | 0.74 | | | 0.17 | | | 1.6 | | |
| 3-ST-B | 6-7 | 6/12/2013 | 10:56 | < 0.040 | | | 0.53 | | | 0.15 | | | < 0.040 | | | < 0.040 | | | < 0.040 | | | < 0.040 | | | 0.26 | | | < 0.040 | | | 0.44 | | | 2.8 | | | < 0.040 | | | 19 | | * |
| 4-ST-A | 3-4 | 6/12/2013 | 12:20 | < 0.11 | | | 1.1 | | | 1.8 | | * | 0.90 | | * | 0.58 | | * | 0.54 | | | 0.23 | | | 3.1 | | | < 0.11 | | | 3.0 | | | 2.6 | | | < 0.11 | | | 17 | | * |
| 5-ST-A | 4-5 | 6/12/2013 | 13:33 | 0.96 | | | 0.22 | | | 0.066 | | | < 0.043 | | | 0.056 | | | < 0.043 | | | < 0.043 | | | 0.17 | | | < 0.043 | | | 0.13 | | | 1.0 | | | < 0.043 | | | 2.7 | | |

**NOTES:**

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|---|---|
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(2) - EPA RSL Version used for screening level development: January 2015
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E - Estimated value. Result exceeds the instrument upper quantitation limit.
H - Analysis performed past recommended holding time.
J - Estimated value. The analyte was present but less than the reporting limit.
L - Lowest available reporting limit for the analytical method used.

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| 1-ST-A | 2-4 | 6/5/2013 | 13:45 | 3.0 | | | 1.2 | | |
| 2-ST-A | 3-4 | 6/7/2013 | 11:50 | 3.1 | | | 1.6 | | |
| 3-ST-A | 2-4 | 6/12/2013 | 10:26 | 1.3 | | | 1.2 | | |
| 3-ST-B | 6-7 | 6/12/2013 | 10:56 | 4.4 | | | 0.53 | | |
| 4-ST-A | 3-4 | 6/12/2013 | 12:20 | 7.6 | | | 4.1 | | |
| 5-ST-A | 4-5 | 6/12/2013 | 13:33 | 1.8 | | | 0.33 | | |

**NOTES:**

| | |
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| rin ing ater egional econdary | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MW01 | 6/4/2013 | 9:43 | 7.6 | | | 8.1 | | H | 2980 | | | 3012 | | | 10.83 | | | 158.1 | | | 6.40 | | | 1.4 | | L | 2200 | | | 560 | | L | 683 | | L | 288 | | D | 542 | | D | < 0.05 | | | 41.2 | | | 41.2 | | D | 0.008 | | |
| MW01 | 9/9/2013 | 16:05 | 7.72 | | | 7.8 | | H | 2450 | | | 2709 | | | 16.2 | | | 149.3 | | | 3.69 | | | | | | 1620 | | | 591 | | | 721 | | | 170 | | D | 368 | | D | 0.10 | | H | 15.2 | | | 15.3 | | D | | | |
| MW02 | 6/4/2013 | 12:30 | 7.12 | | | 7.6 | | H | 778 | | | 481 | | | 13.5 | | | -113.5 | | | 0.21 | | | 63.3 | | L | 456 | | | 290 | | L | 354 | | L | 14 | | | 97 | | | < 0.05 | | | 0.27 | | | 0.27 | | | 0.019 | | |
| MW02 | 9/13/2013 | 10:00 | 7.26 | | | 7.5 | | H | 845 | | | 530 | | | 16.7 | | | -175.3 | | | 0.25 | | | | | | 529 | | | 298 | | L | 363 | | L | 18 | | | 113 | | | < 0.05 | | | < 0.05 | | | 0.02 | U | | | | |
| MW03 | 6/5/2013 | 9:40 | 6.87 | | | 7.2 | | H | 6520 | | | 6029 | | | 14.13 | | | -164.4 | | | 0.19 | | | 61.4 | | | 5790 | | | 983 | | L | 1200 | | L | 232 | | D | 2520 | | D | 0.66 | | | 66.9 | | | 67.6 | | D | 0.008 | | |
| MW03 | 9/12/2013 | 13:30 | 6.95 | | | 7.1 | | H | 4420 | | | 4312 | | | 20.8 | | | -172.6 | | | 1.01 | | | | | | 3880 | | | 859 | | | 1050 | | | 135 | | D | 1470 | | D | < 0.05 | | | < 0.05 | | | 0.01 | U | | | | |
| MW-4 | 6/4/2013 | 16:52 | 6.8 | | | 7.3 | | H | 1340 | | | 1254 | | | 12.48 | | | 45.4 | | | 3.23 | | | 0.3 | | L | 892 | | | 318 | | L | 388 | | L | 85 | | D | 266 | | D | < 0.05 | | | 2.28 | | | 2.28 | | D | 0.002 | | |
| MW-4 | 9/10/2013 | 9:00 | 7.23 | | | 7.4 | | H | 997 | | | 1030 | | | 16.6 | | | 201.9 | | | 57.1 | | | | | | 679 | | | 208 | | | 253 | | | 42 | | | 250 | | | < 0.05 | | H | 0.62 | | | 0.62 | | | | | |
| MW-6 | 6/4/2013 | 14:30 | 6.28 | | | 6.8 | | H | 1300 | | | 1252 | | | 11.9 | | | -112.3 | | | 0.29 | | | 11.8 | | L | 907 | | | 328 | | L | 401 | | L | 48 | | | 315 | | | 0.26 | | | 10.6 | | | 10.9 | | D | 0.002 | | |
| MW-6 (DUP) | 6/4/2013 | 15:10 | | | | 6.8 | | H | 1320 | | | | | | | | | | | | | | | 12.0 | | L | 901 | | | 350 | | L | 427 | | L | 40 | | D | 276 | | D | 0.31 | | | 10.8 | | | 11.1 | | D | 0.002 | | |
| MW-6 | 9/10/2013 | 11:00 | 6.94 | | | 7.5 | | H | 1230 | | | 1310 | | | 17.6 | | | -164.3 | | | 33.0 | | | | | | 807 | | | 442 | | | 539 | | | 42 | | | 194 | | D | < 0.05 | | H | < 0.05 | | | 0.02 | U | | | | |
| YMW-10 | 6/3/2013 | 15:00 | 7.01 | | | 7.4 | | H | 2150 | | | 661 | | | 12.51 | | | 226.1 | | | 3.29 | | | 1.3 | | L | 1560 | | | 307 | | L | 374 | | L | 76 | | D | 635 | | D | < 0.05 | | | 21.6 | | | 21.6 | | D | 0.003 | | |
| YMW-10 | 9/11/2013 | 9:45 | 6.98 | | | 7.6 | | H | 1820 | | | 1708 | | | 18.9 | | | 117.5 | | | 5.06 | | | | | | 1320 | | | 332 | | L | 405 | | L | 68 | | | 409 | | D | < 0.05 | | | 56 | | | 56 | | D | | | |
| YMW-11 | 6/3/2013 | 12:30 | 6.86 | | | 7.3 | | H | 1880 | | | 667 | | | 12.62 | | | 186.4 | | | 1.67 | | | 0.3 | | L | 1310 | | | 344 | | L | 419 | | L | 38 | | D | 504 | | D | 0.11 | | | 19.4 | | | 19.5 | | D | 0.002 | | |
| YMW-11 | 9/9/2013 | 10:40 | 7.24 | | | 7.4 | | H | 2080 | | | 2264 | | | 17.7 | | | 131.1 | | | 25.8 | | | | | | 1600 | | | 358 | | | 437 | | | 52 | | | 724 | | D | < 0.05 | | H | 10.1 | | | 10.1 | | D | | | |
| YMW-12† | 5/16/2013 | 10:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12 | 9/11/2013 | 16:00 | 6.64 | | | 7.1 | | H | 1500 | | | 1497 | | | 20.7 | | | -211.5 | | | 0.19 | | | | | | 1080 | | | 852 | | | 1040 | | | 39 | | | < 5 | | D | < 0.05 | | | < 0.05 | | | 0.02 | U | | | | |
| YMW-13† | 5/16/2013 | 12:54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13² | 9/9/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14† | 5/16/2013 | 12:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14 | 9/12/2013 | 9:45 | 6.62 | | | 7.1 | | H | 1130 | | | 1077 | | | 16.4 | | | -191.18 | | | 0.60 | | | | | | 748 | | | 625 | | | 762 | | | 21 | | | < 2 | | D | < 0.05 | | | < 0.05 | | | < 0.01 | | | | | |
| YMW-15 | 6/5/2013 | 11:58 | 6.59 | | | 7.0 | | H | 2710 | | | 2643 | | | 16.26 | | | -31.2 | | | 0.19 | | | 60.4 | | | 1860 | | | 1160 | | L | 1410 | | L | 116 | | D | 309 | | D | < 0.05 | | | < 0.05 | | | 0.02 | | | 0.005 | | |
| YMW-15² | 9/9/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16 | 6/5/2013 | 16:24 | 6.81 | | | 7.3 | | H | 2680 | | | 2600 | | | 13.8 | | | -83.4 | | | 0.68 | | | 78.4 | | | 1990 | | | 914 | | L | 1120 | | L | 68 | | D | 620 | | D | < 0.05 | | | < 0.05 | | | 0.02 | | | 0.002 | | |
| YMW-16² | 9/9/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-17 | 6/6/2013 | 14:20 | 6.61 | | | 7.7 | | H | 2470 | | | 2460 | | | 14.51 | | | -199.2 | | | 0.30 | | | 49.2 | | L | 1660 | | | 1050 | | L | 1280 | | L | 87 | | D | 265 | | D | < 0.05 | | | < 0.05 | | | < 0.01 | | | 0.007 | | |
| YMW-17² | 9/9/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18† | 5/16/2013 | 14:18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18 | 9/12/2013 | 11:45 | 7.12 | | | 7.3 | | H | 2710 | | | 2603 | | | 18.9 | | | -261.1 | | | 1.09 | | | | | | 1720 | | | 1350 | | | 1650 | | | 160 | | D | 19 | | D | < 0.05 | | | < 0.05 | | | 0.01 | U | | | | |
| YMW-19 | 6/3/2013 | 17:45 | 6.15 | | | 6.6 | | H | 4720 | | | 1434 | | | 10.93 | | | 127.7 | | | 0.42 | | | 15.9 | | L | 4080 | | | 393 | | L | 480 | | L | 128 | | D | 2310 | | D | < 0.05 | | | 28.3 | | | 28.3 | | D | 0.001 | | |
| YMW-19 | 9/9/2013 | 12:45 | 6.31 | | | 6.7 | | H | 4470 | | | 4685 | | | 16.3 | | | 146.1 | | | 3.69 | | | | | | 4170 | | | 398 | | | 486 | | | 124 | | D | 2310 | | D | < 0.05 | | H | 25.6 | | | 25.6 | | D | | | |
| YMW-20 | 6/7/2013 | 10:12 | 6.38 | | | 7.1 | | H | 2870 | | | 2478 | | | 14.37 | | | -36.7 | | | 0.47 | | | 17.4 | | | 1950 | | | 506 | | L | 617 | | L | 494 | | D | 414 | | D | < 0.05 | | | 0.09 | | | 0.09 | | | 0.002 | | |
| YMW-20 | 9/10/2013 | 15:00 | 7.35 | | | 7.4 | | H | 2920 | | | 3530 | | | 18.7 | | | -200.7 | | | 0.32 | | | | | | 1910 | | | 804 | | | 980 | | | 424 | | D | 264 | | D | < 0.05 | | H | < 0.05 | | | 0.02 | U | | | | |
| YMW-21 | 6/6/2013 | 10:42 | 6.79 | | | 7.9 | | H | 2110 | | | 2098 | | | 13.64 | | | -167.6 | | | 0.11 | | | 24.8 | | L | 1390 | | | 963 | | L | 1170 | | L | 71 | | D | 182 | | D | < 0.05 | | | < 0.05 | | | 0.02 | | | 0.006 | | |
| YMW-21 | 9/11/2013 | 13:40 | 7.33 | | | 7.6 | | H | 2060 | | | 1962 | | | 16.3 | | | -239.5 | | | 0.19 | | | | | | 1390 | | | 944 | | | 1150 | | | 75 | | | 199 | | D | < 0.05 | | | < 0.05 | | | 0.01 | U | | | | |
| YMW-22 | 6/6/2013 | 16:17 | 6.27 | | | 7.2 | | H | 22700 | | E | 22649 | | | 14.85 | | | 44.3 | | | 0.36 | | | 11.4 | | L | 14800 | | | 675 | | L | 823 | | L | 7890 | | D | 1030 | | D | 0.05 | | | 11.0 | | | 11.1 | | D | 0.024 | | D |
| YMW-22 | 9/11/2013 | 11:45 | 7.27 | | | 7.5 | | H | 3300 | | | 3580 | | | 17.2 | | | -196.6 | | | 3.14 | | | | | | 2170 | | | 979 | | | 1190 | | | 411 | | D | 357 | | D | < 0.05 | | | < 0.05 | | | 0.02 | U | | | | |
| YMW-23 | 6/7/2013 | 13:10 | 6.68 | | | 7.3 | | H | 3460 | | | 2901 | | | 15.12 | | | -44.8 | | | 0.29 | | | 33.5 | | | 2310 | | | 663 | | L | 809 | | L | 521 | | D | 515 | | D | 0.98 | | | 1.37 | | | 2.35 | | D | 0.008 | | |
| YMW-23 | 9/10/2013 | 12:50 | 7.08 | | | 7.2 | | H | 3250 | | | 3507 | | | 19.4 | | | -172.2 | | | 0.22 | | | | | | 2150 | | | 801 | | | 978 | | | 425 | | D | 481 | | D | < 0.05 | | H | < 0.05 | | | 0.01 | U | | | | |
| YMW-23 (DUP) | 9/10/2013 | 13:00 | | | | 7.5 | | H | 3200 | | | | | | | | | | | | | | | | | | 2100 | | | 790 | | | 964 | | | 405 | | D | 473 | | D | < 0.05 | | H | < 0.05 | | | < 0.01 | | | | | |

**NOTES:**

2.5 **Exceeds DEQ-7 Human Health Level for Groundwater or MDEQ Groundwater RBSL**

55 **Exceeds EPA Drinking Water Regional Secondary MCL**

0.005 **EPA Region 9 Tapwater Screening Level used for Comparison**

<0.53 **Non-Detect Result that Exceeds an Associated Screening Level**

**² LNAPL was present, sample was not collected**

**† LNAPL was present in 5/2013, sample was not collected for 6/2013 sampling event**

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| egion a ater creening e el | | | . | . | . | . | . | | | | | | . | | | | . | . | |
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| MW01 | 6/4/2013 | 9:43 | | < 0.05 | | < 0.001 | | 69 | | < 0.005 | | < 0.03 | < 0.001 | | 60 | | < 0.0001 | | 324 |
| MW01 | 9/9/2013 | 16:05 | 0.007 | | 0.05 | | < 0.001 | 56 | | < 0.005 | < 0.005 | | | < 0.001 | | 48 | | < 0.0001 | |
| MW02 | 6/4/2013 | 12:30 | | < 0.05 | | < 0.001 | | 55 | | < 0.005 | | 0.30 | < 0.001 | | 25 | | < 0.0001 | | 41 |
| MW02 | 9/13/2013 | 10:00 | 0.019 | | < 0.05 | | < 0.001 | 54 | | < 0.005 | < 0.005 | | | 0.001 | | 24 | | < 0.0001 | |
| MW03 | 6/5/2013 | 9:40 | | 0.22 | | < 0.001 | | 514 | | < 0.005 | | 2.16 D | < 0.001 | | 231 | | < 0.0001 | | 664 |
| MW03 | 9/12/2013 | 13:30 | 0.015 | | 0.12 | | < 0.001 | 250 | | < 0.005 | < 0.005 | | | 0.004 | | 115 | | 0.0001 | |
| MW-4 | 6/4/2013 | 16:52 | | 0.06 | | < 0.001 | | 144 | | < 0.005 | | < 0.03 | < 0.001 | | 42 | | < 0.0001 | | 10 |
| MW-4 | 9/10/2013 | 9:00 | 0.003 | | < 0.05 | | < 0.001 | 98 | | < 0.005 | < 0.005 | | | < 0.001 | | 28 | | < 0.0001 | |
| MW-6 | 6/4/2013 | 14:30 | | 0.10 | | < 0.001 | | 141 | | < 0.005 | | 2.05 | < 0.001 | | 45 | | < 0.0001 | | 6 |
| MW-6 (DUP) | 6/4/2013 | 15:10 | | 0.10 | | < 0.001 | | 142 | | < 0.005 | | 2.17 | < 0.001 | | 46 | | < 0.0001 | | 7 |
| MW-6 | 9/10/2013 | 11:00 | 0.009 | | 0.12 | | < 0.001 | 134 | | < 0.005 | < 0.005 | | | 0.001 | | 45 | | < 0.0001 | |
| YMW-10 | 6/3/2013 | 15:00 | | 0.05 | | < 0.001 | | 152 | | < 0.005 | | < 0.03 | < 0.001 | | 90 | | < 0.0001 | | 16 |
| YMW-10 | 9/11/2013 | 9:45 | 0.008 | | 0.07 | | < 0.001 | 127 | | < 0.005 | < 0.005 | | | < 0.001 | | 76 | | < 0.0001 | |
| YMW-11 | 6/3/2013 | 12:30 | | < 0.05 | | < 0.001 | | 181 | | < 0.005 | | < 0.03 | < 0.001 | | 60 | | < 0.0001 | | 118 |
| YMW-11 | 9/9/2013 | 10:40 | 0.004 | | 0.05 | | < 0.001 | 226 | | < 0.005 | < 0.005 | | | < 0.001 | | 75 | | < 0.0001 | |
| YMW-12† | 5/16/2013 | 10:33 | | | | | | | | | | | | | | | | | |
| YMW-12 | 9/11/2013 | 16:00 | 0.024 | | 0.79 | | < 0.001 | 133 | | < 0.005 | < 0.005 | | | 0.001 | | 64 | | < 0.0001 | |
| YMW-13† | 5/16/2013 | 12:54 | | | | | | | | | | | | | | | | | |
| YMW-13² | 9/9/2013 | 12:50 | | | | | | | | | | | | | | | | | |
| YMW-14† | 5/16/2013 | 12:47 | | | | | | | | | | | | | | | | | |
| YMW-14 | 9/12/2013 | 9:45 | 0.005 | | 0.58 | | < 0.001 | 145 | | < 0.005 | < 0.005 | | | 0.001 | | 44 | | < 0.0001 | |
| YMW-15 | 6/5/2013 | 11:58 | | 0.34 | | < 0.001 | | 126 | | < 0.005 | | 2.18 | 0.005 | | 108 | | < 0.0001 | | 20 |
| YMW-15² | 9/9/2013 | 15:55 | | | | | | | | | | | | | | | | | |
| YMW-16 | 6/5/2013 | 16:24 | | 0.08 | | < 0.001 | | 269 | | < 0.005 | | 0.38 | 0.002 | | 118 | | < 0.0001 | | 7 |
| YMW-16² | 9/9/2013 | 13:00 | | | | | | | | | | | | | | | | | |
| YMW-17 | 6/6/2013 | 14:20 | | 0.15 | | < 0.001 | | 147 | | < 0.005 | | 4.93 | < 0.001 | | 122 | | < 0.0001 | | 12 |
| YMW-17² | 9/9/2013 | 12:55 | | | | | | | | | | | | | | | | | |
| YMW-18† | 5/16/2013 | 14:18 | | | | | | | | | | | | | | | | | |
| YMW-18 | 9/12/2013 | 11:45 | 0.016 | | 0.30 | | < 0.001 | 67 | | < 0.005 | < 0.005 | | | < 0.001 | | 82 | | < 0.0001 | |
| YMW-19 | 6/3/2013 | 17:45 | | 0.06 | | < 0.001 | | 476 | | < 0.005 | | 0.33 | < 0.001 | | 202 | | < 0.0001 | | 87 |
| YMW-19 | 9/9/2013 | 12:45 | 0.002 | | 0.05 | | < 0.001 | 462 | | < 0.005 | < 0.005 | | | < 0.001 | | 210 | | < 0.0001 | |
| YMW-20 | 6/7/2013 | 10:12 | | 0.10 | | < 0.001 | | 328 | | < 0.005 | | 0.40 | < 0.001 | | 106 | | < 0.0001 | | 36 |
| YMW-20 | 9/10/2013 | 15:00 | 0.007 | | 0.21 | | < 0.001 | 222 | | < 0.005 | < 0.005 | | | < 0.001 | | 100 | | < 0.0001 | |
| YMW-21 | 6/6/2013 | 10:42 | | 0.09 | | < 0.001 | | 84 | | < 0.005 | | 1.32 | < 0.001 | | 110 | | < 0.0001 | | 6 |
| YMW-21 | 9/11/2013 | 13:40 | 0.008 | | 0.09 | | < 0.001 | 81 | | < 0.005 | < 0.005 | | | 0.026 | | 108 | | < 0.0001 | |
| YMW-22 | 6/6/2013 | 16:17 | | 0.16 | | 0.002 | | 898 | | 0.007 | | 0.9 D | 0.037 | | 650 | | < 0.0001 | | 77 D |
| YMW-22 | 9/11/2013 | 11:45 | 0.008 | | 0.08 | | < 0.001 | 140 | | < 0.005 | < 0.005 | | | 0.045 | | 125 | | < 0.0001 | |
| YMW-23 | 6/7/2013 | 13:10 | | 0.07 | | < 0.001 | | 154 | | < 0.005 | | 0.46 | < 0.001 | | 124 | | < 0.0001 | | 10 |
| YMW-23 | 9/10/2013 | 12:50 | 0.036 | | 0.12 | | < 0.001 | 171 | | < 0.005 | < 0.005 | | | 0.003 | | 129 | | < 0.0001 | |
| YMW-23 (DUP) | 9/10/2013 | 13:00 | 0.033 | | 0.11 | | < 0.001 | 164 | | < 0.005 | < 0.005 | | | 0.001 | | 123 | | < 0.0001 | |

**NOTES:**

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| 2.5 | Exceeds DEQ-7 Human Health Level for Groundwater or MDEQ Groundwater RBSL |
| 55 | Exceeds EPA Drinking Water Regional Secondary MCL |
| 0.005 | EPA Region 9 Tapwater Screening Level used for Comparison |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

² LNAPL was present, sample was not collected

† LNAPL was present in 5/2013, sample was not collected for 6/2013 sampling event

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| rin ing ater egional econdary | | | | | | | | | | | | | | | | | | | | | | | | | | |
| egion a ater creening e el | | | | | | . | | | . | | | . | | | . | | | | | | | | | | | |
| ite ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| MW01 | 6/4/2013 | 9:43 | | | | 0.011 | | | | | | < 0.001 | | | | | | 366 | | D | | | | < 10 | | |
| MW01 | 9/9/2013 | 16:05 | 217 | | | | | | 0.004 | | | | | | < 0.001 | | | | | | 321 | | D | < 10 | | |
| MW02 | 6/4/2013 | 12:30 | | | | < 0.001 | | | | | | < 0.001 | | | | | | 52 | | | | | | < 10 | | |
| MW02 | 9/13/2013 | 10:00 | 48 | | | | | | < 0.001 | | | | | | < 0.001 | | | | | | 48 | | | < 10 | | |
| MW03 | 6/5/2013 | 9:40 | | | | 0.191 | | D | | | | < 0.001 | | | | | | 466 | | D | | | | < 10 | | |
| MW03 | 9/12/2013 | 13:30 | 505 | | | | | | 0.006 | | | | | | < 0.001 | | | | | | 307 | | D | < 10 | | |
| MW-4 | 6/4/2013 | 16:52 | | | | 0.005 | | | | | | < 0.001 | | | | | | 83 | | | | | | < 10 | | |
| MW-4 | 9/10/2013 | 9:00 | 12 | | | | | | 0.008 | | | | | | < 0.001 | | | | | | 86 | | | < 10 | | |
| MW-6 | 6/4/2013 | 14:30 | | | | 0.002 | | | | | | < 0.001 | | | | | | 76 | | | | | | < 10 | | |
| MW-6 (DUP) | 6/4/2013 | 15:10 | | | | 0.001 | | | | | | < 0.001 | | | | | | 82 | | | | | | < 10 | | |
| MW-6 | 9/10/2013 | 11:00 | 8 | | | | | | < 0.001 | | | | | | < 0.001 | | | | | | 86 | | | < 10 | | |
| YMW-10 | 6/3/2013 | 15:00 | | | | 0.006 | | | | | | < 0.001 | | | | | | 167 | | D | | | | < 10 | | |
| YMW-10 | 9/11/2013 | 9:45 | 21 | | | | | | 0.004 | | | | | | < 0.001 | | | | | | 179 | | | < 10 | | |
| YMW-11 | 6/3/2013 | 12:30 | | | | 0.001 | | | | | | < 0.001 | | | | | | 89 | | | | | | < 10 | | |
| YMW-11 | 9/9/2013 | 10:40 | 132 | | | | | | 0.001 | | | | | | < 0.001 | | | | | | 99 | | D | < 10 | | |
| YMW-12† | 5/16/2013 | 10:33 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12 | 9/11/2013 | 16:00 | 6 | | | | | | < 0.001 | | | | | | < 0.001 | | | | | | 163 | | | < 10 | | |
| YMW-13† | 5/16/2013 | 12:54 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13² | 9/9/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14† | 5/16/2013 | 12:47 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14 | 9/12/2013 | 9:45 | 14 | | | | | | < 0.001 | | | | | | < 0.001 | | | | | | 51 | | | < 10 | | |
| YMW-15 | 6/5/2013 | 11:58 | | | | < 0.001 | | | | | | < 0.001 | | | | | | 376 | | D | | | | < 10 | | |
| YMW-15² | 9/9/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16 | 6/5/2013 | 16:24 | | | | < 0.001 | | | | | | < 0.001 | | | | | | 248 | | | | | | < 10 | | |
| YMW-16² | 9/9/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-17 | 6/6/2013 | 14:20 | | | | < 0.001 | | | | | | < 0.001 | | | | | | 301 | | D | | | | < 10 | | |
| YMW-17² | 9/9/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18† | 5/16/2013 | 14:18 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18 | 9/12/2013 | 11:45 | 64 | | | | | | < 0.001 | | | | | | < 0.001 | | | | | | 473 | | D | < 10 | | |
| YMW-19 | 6/3/2013 | 17:45 | | | | 0.001 | | | | | | < 0.001 | | | | | | 342 | | D | | | | < 10 | | |
| YMW-19 | 9/9/2013 | 12:45 | 126 | | | | | | 0.002 | | | | | | < 0.001 | | | | | | 419 | | D | < 10 | | |
| YMW-20 | 6/7/2013 | 10:12 | | | | < 0.001 | | | | | | < 0.001 | | | | | | 134 | | | | | | < 10 | | |
| YMW-20 | 9/10/2013 | 15:00 | 24 | | | | | | < 0.001 | | | | | | < 0.001 | | | | | | 193 | | D | < 10 | | |
| YMW-21 | 6/6/2013 | 10:42 | | | | < 0.001 | | | | | | < 0.001 | | | | | | 294 | | D | | | | < 10 | | |
| YMW-21 | 9/11/2013 | 13:40 | 5 | | | | | | < 0.001 | | | | | | < 0.001 | | | | | | 299 | | D | < 10 | | |
| YMW-22 | 6/6/2013 | 16:17 | | | | < 0.001 | | | | | | < 0.001 | | | | | | 3390 | | D | | | | < 10 | | |
| YMW-22 | 9/11/2013 | 11:45 | 14 | | | | | | < 0.001 | | | | | | < 0.001 | | | | | | 482 | | D | < 10 | | |
| YMW-23 | 6/7/2013 | 13:10 | | | | < 0.001 | | | | | | < 0.001 | | | | | | 430 | | D | | | | < 10 | | |
| YMW-23 | 9/10/2013 | 12:50 | 13 | | | | | | < 0.001 | | | | | | < 0.001 | | | | | | 463 | | D | < 10 | | |
| YMW-23 (DUP) | 9/10/2013 | 13:00 | 12 | | | | | | < 0.001 | | | | | | < 0.001 | | | | | | 454 | | D | < 10 | | |

**NOTES:**

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| 2.5 | Exceeds DEQ-7 Human Health Level for Groundwater or MDEQ Groundwater RBSL |
| 55 | Exceeds EPA Drinking Water Regional Secondary MCL |
| 0.005 | EPA Region 9 Tapwater Screening Level used for Comparison |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

² LNAPL was present, sample was not collected

† LNAPL was present in 5/2013, sample was not collected for 6/2013 sampling event

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| MW01 | 6/4/2013 | 9:43 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| MW01 | 9/9/2013 | 16:05 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| MW02 | 6/4/2013 | 12:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| MW02 | 9/13/2013 | 10:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| MW03 | 6/5/2013 | 9:40 | < 1.0 | | | < 0.50 | | | < 0.50 | | | 1.1 | | | < 0.50 | | | 0.48 | | J | 0.48 | | J | 1.3 | | | 89 | | | 17 | | J | 105 | | | 245 | | |
| MW03 | 9/12/2013 | 13:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | 24 | | | < 20 | | | 86 | | | 156 | | |
| MW-4 | 6/4/2013 | 16:52 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| MW-4 | 9/10/2013 | 9:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| MW-6 | 6/4/2013 | 14:30 | < 1.0 | | | 1.8 | | | < 1.0 | | D | < 1.0 | | D | 1.7 | | | < 2.0 | | D | 1.7 | | | < 2.0 | | D | 76 | | | 168 | | | 157 | | | 376 | | |
| MW-6 (DUP) | 6/4/2013 | 15:10 | < 1.0 | | | 1.7 | | | < 1.0 | | D | < 1.0 | | D | 1.7 | | | < 2.0 | | D | 1.7 | | | < 2.0 | | D | 81 | | | 169 | | | 165 | | | 391 | | |
| MW-6 | 9/10/2013 | 11:00 | < 1.0 | | | 1.1 | | | < 1.0 | | D | < 1.5 | | D | 1.2 | | | < 1.0 | | D | 1.2 | | | < 2.0 | | D | 81 | | | 161 | | | 49 | | | 269 | | |
| YMW-10 | 6/3/2013 | 15:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| YMW-10 | 9/11/2013 | 9:45 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| YMW-11 | 6/3/2013 | 12:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| YMW-11 | 9/9/2013 | 10:40 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| YMW-12† | 5/16/2013 | 10:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12 | 9/11/2013 | 16:00 | < 10 | | D | 2050 | | * | 24 | | | 538 | | | 153 | | | 49 | | | 202 | | | 81 | | | 1350 | | * | 4470 | | * | 1150 | | * | 7420 | | * |
| YMW-13† | 5/16/2013 | 12:54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13² | 9/9/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14† | 5/16/2013 | 12:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14 | 9/12/2013 | 9:45 | < 10 | | D | 2600 | | * | 46 | | | 376 | | | 149 | | | 33 | | | 181 | | | 187 | | | 1270 | | * | 5760 | | * | 844 | | | 9020 | | * |
| YMW-15 | 6/5/2013 | 11:58 | < 50 | | D | 6380 | | * | 249 | | | 1580 | | * | 935 | | | 110 | | | 1050 | | | 336 | | * | 2780 | | * | 13500 | | * | 5460 | | * | 22900 | | * |
| YMW-15² | 9/9/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16 | 6/5/2013 | 16:24 | < 50 | | D | 291 | | * | 33 | | | 225 | | | 296 | | | 44 | | | 341 | | | 56 | | | 969 | | J | 3280 | | * | 1840 | | * | 5260 | | * |
| YMW-16² | 9/9/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-17 | 6/6/2013 | 14:20 | < 5.0 | | | 87 | | * | 8.9 | | | 12 | | | 134 | | | 23 | | | 157 | | | 24 | | | 529 | | | 1330 | | * | 753 | | | 2230 | | * |
| YMW-17² | 9/9/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18† | 5/16/2013 | 14:18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18 | 9/12/2013 | 11:45 | < 2.0 | | D | 6.3 | | * | < 1.0 | | D | 5.3 | | | < 1.0 | | D | < 1.0 | | D | < 1.0 | | D | 93 | | | 653 | | | 37 | | J | 244 | | | 1050 | | * |
| YMW-19 | 6/3/2013 | 17:45 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | 26 | | | 29 | | |
| YMW-19 | 9/9/2013 | 12:45 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | 40 | | | < 20 | | | < 20 | | | 61 | | |
| YMW-20 | 6/7/2013 | 10:12 | < 1.0 | | | < 0.50 | | | < 0.50 | | | 2.1 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 0.66 | | J | 56 | | | 38 | | | 23 | | | 92 | | |
| YMW-20 | 9/10/2013 | 15:00 | < 2.5 | | D | 17 | | * | < 1.0 | | D | 4.3 | | | < 1.0 | | D | < 1.0 | | D | < 2.0 | | D | < 1.5 | | D | 167 | | | 164 | | | 48 | | | 328 | | |
| YMW-21 | 6/6/2013 | 10:42 | < 1.0 | | | 1.1 | | | < 0.50 | | | 2.6 | | | 0.77 | | | 0.94 | | | 1.7 | | | 1.5 | | | 125 | | | 175 | | | 177 | | | 392 | | |
| YMW-21 | 9/11/2013 | 13:40 | < 1.0 | | | 1.1 | | | < 0.50 | | | 2.5 | | | 1.4 | | | < 1.0 | | D | 1.4 | | | 1.0 | | | 86 | | | 77 | | | 32 | | | 179 | | |
| YMW-22 | 6/6/2013 | 16:17 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 0.44 | | J | < 0.50 | | | 0.44 | | J | 0.86 | | J | < 20 | | | < 20 | | | 35 | | | 42 | | |
| YMW-22 | 9/11/2013 | 11:45 | < 1.0 | | | < 0.50 | | | < 0.50 | | | 0.66 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | 56 | | | 21 | | | 9.2 | | J | 80 | | |
| YMW-23 | 6/7/2013 | 13:10 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | 21 | | |
| YMW-23 | 9/10/2013 | 12:50 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | D | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | 37 | | | < 20 | | | 15 | | J | 54 | | |
| YMW-23 (DUP) | 9/10/2013 | 13:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | 33 | | | < 20 | | | 1.7 | | J | 41 | | |

**NOTES:**

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| 2.5 | **Exceeds DEQ-7 Human Health Level for Groundwater or MDEQ Groundwater RBSL** |
| 0.005 | **EPA Region 9 Tapwater Screening Level used for Comparison** |
| <0.53 | **Non-Detect Result that Exceeds an Associated Screening Level** |

**² LNAPL was present, sample was not collected**

**† LNAPL was present in 5/2013, sample was not collected for 6/2013 sampling event**

**VQs - Validator Qualifiers**

**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**

**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| raction | | | H | | | H | | | H | | | H | | | | | | | | | | | | | | | | | | | | | | | |
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| MW01 | 6/4/2013 | 9:43 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| MW01 | 9/9/2013 | 16:05 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| MW02 | 6/4/2013 | 12:30 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | 0.31 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| MW02 | 9/13/2013 | 10:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| MW03 | 6/5/2013 | 9:40 | 748 | | | < 300 | | | < 300 | | | 1310 | | * | 0.32 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| MW03 | 9/12/2013 | 13:30 | 604 | | | < 300 | | | < 300 | | | 705 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| MW-4 | 6/4/2013 | 16:52 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| MW-4 | 9/10/2013 | 9:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| MW-6 | 6/4/2013 | 14:30 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| MW-6 (DUP) | 6/4/2013 | 15:10 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| MW-6 | 9/10/2013 | 11:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-10 | 6/3/2013 | 15:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-10 | 9/11/2013 | 9:45 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-11 | 6/3/2013 | 12:30 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-11 | 9/9/2013 | 10:40 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YMW-12† | 5/16/2013 | 10:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12 | 9/11/2013 | 16:00 | 368 | | | < 300 | | | 565 | | | 2120 | | * | 27 | | | 0.73 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-13† | 5/16/2013 | 12:54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13² | 9/9/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14† | 5/16/2013 | 12:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14 | 9/12/2013 | 9:45 | < 300 | | | < 300 | | | 692 | | | 1300 | | * | 69 | | | 1.8 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YMW-15 | 6/5/2013 | 11:58 | 6270 | | * | 1960 | | * | 5310 | | * | 16000 | | * | 168 | | | 3.4 | | | < 0.20 | | | 1.1 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-15² | 9/9/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16 | 6/5/2013 | 16:24 | 5260 | | * | 4330 | | * | 5540 | | * | 16800 | | * | 9.3 | | | 1.7 | | | < 0.19 | | | 0.88 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YMW-16² | 9/9/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-17 | 6/6/2013 | 14:20 | < 300 | | | 379 | | | 513 | | | 1760 | | * | 19 | | | 0.35 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YMW-17² | 9/9/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18† | 5/16/2013 | 14:18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18 | 9/12/2013 | 11:45 | 442 | | | < 300 | | | 846 | | | 1660 | | * | 54 | | | 0.48 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YMW-19 | 6/3/2013 | 17:45 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-19 | 9/9/2013 | 12:45 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | 0.25 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YMW-20 | 6/7/2013 | 10:12 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | 0.37 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YMW-20 | 9/10/2013 | 15:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YMW-21 | 6/6/2013 | 10:42 | 308 | | | < 300 | | | 367 | | | 1190 | | * | 2.6 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.21 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-21 | 9/11/2013 | 13:40 | < 300 | | | < 300 | | | < 300 | | | 662 | | | 0.33 | U | | 0.21 | | | < 0.19 | | | < 0.19 | | | 0.33 | | | 0.41 | | * | 0.62 | | * | 0.42 | | |
| YMW-22 | 6/6/2013 | 16:17 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | 0.44 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YMW-22 | 9/11/2013 | 11:45 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YMW-23 | 6/7/2013 | 13:10 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YMW-23 | 9/10/2013 | 12:50 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YMW-23 (DUP) | 9/10/2013 | 13:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |

**NOTES:**

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| 2.5 | Exceeds DEQ-7 Human Health Level for Groundwater or MDEQ Groundwater RBSL |
| 0.005 | EPA Region 9 Tapwater Screening Level used for Comparison |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

# - DEQ Groundwater RBSL only

² LNAPL was present, sample was not collected

† LNAPL was present in 5/2013, sample was not collected for 6/2013 sampling event

VQs - Validator Qualifiers
J - Associated numerical value is an estimated quantity because quality control criteria were not met.
R - Rejected Data
U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers
* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)
B - The analyte was detected in the method blank.
D - Analyte Reporting Limit increased due to sample matrix.
E - Estimated value. Result exceeds the instrument upper quantitation limit.
H - Analysis performed past recommended holding time.
J - Estimated value. The analyte was present but less than the reporting limit.
L - Lowest available reporting limit for the analytical method used.

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| MW01 | 6/4/2013 | 9:43 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.0016 | U | |
| MW01 | 9/9/2013 | 16:05 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.0014 | J | |
| MW02 | 6/4/2013 | 12:30 | < 0.20 | | | < 0.20 | | | 0.28 | | | < 0.20 | | | < 0.20 | | | 0.36 | U | B | 0.22 | | | 0.27 | | | 0.044 | | |
| MW02 | 9/13/2013 | 10:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.26 | | | < 0.20 | | | < 0.20 | | | 0.0031 | J | |
| MW03 | 6/5/2013 | 9:40 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.46 | U | | < 0.19 | | | < 0.19 | | | 0.012 | | |
| MW03 | 9/12/2013 | 13:30 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.0070 | J | |
| MW-4 | 6/4/2013 | 16:52 | < 0.19 | | | < 0.19 | | | 0.23 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.22 | | | 0.0011 | U | |
| MW-4 | 9/10/2013 | 9:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.0010 | J | |
| MW-6 | 6/4/2013 | 14:30 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.053 | | |
| MW-6 (DUP) | 6/4/2013 | 15:10 | < 0.19 | | | < 0.19 | | | 0.21 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.20 | | | 0.047 | | |
| MW-6 | 9/10/2013 | 11:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.030 | J | |
| YMW-10 | 6/3/2013 | 15:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.0074 | | |
| YMW-10 | 9/11/2013 | 9:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.20 | U | | < 0.20 | | | < 0.20 | | | < 0.0010 | J | |
| YMW-11 | 6/3/2013 | 12:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.0030 | U | |
| YMW-11 | 9/9/2013 | 10:40 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.0010 | J | |
| YMW-12† | 5/16/2013 | 10:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12 | 9/11/2013 | 16:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | 1.2 | | | < 0.20 | | | 46 | | | 0.67 | | | < 0.20 | | | 12 | J | |
| YMW-13† | 5/16/2013 | 12:54 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13² | 9/9/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14† | 5/16/2013 | 12:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14 | 9/12/2013 | 9:45 | < 0.19 | | | < 0.19 | | | < 0.19 | | | 2.9 | | | < 0.19 | | | 107 | | * | 1.6 | | | < 0.19 | | | 23 | J | |
| YMW-15 | 6/5/2013 | 11:58 | 0.27 | | | < 0.20 | | | 0.38 | | | 7.3 | | | < 0.20 | | | 187 | | * | 14 | | | 0.70 | | | 5.4 | | |
| YMW-15² | 9/9/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16 | 6/5/2013 | 16:24 | 0.43 | | | < 0.19 | | | 0.43 | | | 4.5 | | | < 0.19 | | | 35 | | | 7.7 | | | 0.84 | | | 1.4 | | |
| YMW-16² | 9/9/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-17 | 6/6/2013 | 14:20 | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.90 | | | < 0.19 | | | 13 | | | 0.97 | | | < 0.19 | | | 0.093 | | |
| YMW-17² | 9/9/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18† | 5/16/2013 | 14:18 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18 | 9/12/2013 | 11:45 | < 0.19 | | | < 0.19 | | | < 0.19 | | | 1.9 | | | < 0.19 | | | 74 | | | 0.49 | | | < 0.19 | | | 12 | J | |
| YMW-19 | 6/3/2013 | 17:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.0070 | | |
| YMW-19 | 9/9/2013 | 12:45 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.27 | U | B | < 0.19 | | | < 0.19 | | | 0.0032 | J | |
| YMW-20 | 6/7/2013 | 10:12 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.89 | U | | < 0.19 | | | < 0.19 | | | 0.035 | | |
| YMW-20 | 9/10/2013 | 15:00 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.41 | U | | < 0.19 | | | < 0.19 | | | 0.80 | J | |
| YMW-21 | 6/6/2013 | 10:42 | 0.20 | | | < 0.20 | | | 0.44 | | | 0.26 | | | < 0.20 | | | 1.8 | | | 0.77 | | | 0.33 | | | 0.040 | | |
| YMW-21 | 9/11/2013 | 13:40 | 0.32 | | | 0.43 | | * | < 0.19 | | | < 0.19 | | | 0.58 | | * | 0.29 | U | | < 0.19 | | | < 0.19 | | | 0.040 | J | |
| YMW-22 | 6/6/2013 | 16:17 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.33 | U | | < 0.19 | | | < 0.19 | | | 0.0029 | U | |
| YMW-22 | 9/11/2013 | 11:45 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.011 | J | |
| YMW-23 | 6/7/2013 | 13:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.0086 | | |
| YMW-23 | 9/10/2013 | 12:50 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.013 | J | |
| YMW-23 (DUP) | 9/10/2013 | 13:00 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.0073 | J | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds DEQ-7 Human Health Level for Groundwater or MDEQ Groundwater RBSL |
| 0.005 | EPA Region 9 Tapwater Screening Level used for Comparison |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

# - DEQ Groundwater RBSL only

² LNAPL was present, sample was not collected

† LNAPL was present in 5/2013, sample was not collected for 6/2013 sampling event

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| MW01 | 6/4/2013 | 9:43 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| MW01 | 9/9/2013 | 16:05 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| MW02 | 6/4/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| MW02 | 9/13/2013 | 10:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| MW03 | 6/5/2013 | 9:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| MW03 | 9/12/2013 | 13:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| MW-4 | 6/4/2013 | 16:52 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| MW-4 | 9/10/2013 | 9:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| MW-6 | 6/4/2013 | 14:30 | 1.9 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| MW-6 (DUP) | 6/4/2013 | 15:10 | 1.9 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| MW-6 | 9/10/2013 | 11:00 | 0.64 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-10 | 6/3/2013 | 15:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-10 | 9/11/2013 | 9:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-11 | 6/3/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-11 | 9/9/2013 | 10:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-12† | 5/16/2013 | 10:33 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12 | 9/11/2013 | 16:00 | 2320 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-13† | 5/16/2013 | 12:54 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13[2] | 9/9/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14† | 5/16/2013 | 12:47 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14 | 9/12/2013 | 9:45 | 3180 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 10 | | |
| YMW-15 | 6/5/2013 | 11:58 | 7860 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| YMW-15[2] | 9/9/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16 | 6/5/2013 | 16:24 | 308 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-16[2] | 9/9/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-17 | 6/6/2013 | 14:20 | 108 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-17[2] | 9/9/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18† | 5/16/2013 | 14:18 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18 | 9/12/2013 | 11:45 | 6.7 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-19 | 6/3/2013 | 17:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-19 | 9/9/2013 | 12:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-20 | 6/7/2013 | 10:12 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-20 | 9/10/2013 | 15:00 | 17 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-21 | 6/6/2013 | 10:42 | 1.5 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-21 | 9/11/2013 | 13:40 | 0.49 | | J | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-22 | 6/6/2013 | 16:17 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-22 | 9/11/2013 | 11:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-23 | 6/7/2013 | 13:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-23 | 9/10/2013 | 12:50 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YMW-23 (DUP) | 9/10/2013 | 13:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |

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| MW01 | 6/4/2013 | 9:43 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| MW01 | 9/9/2013 | 16:05 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| MW02 | 6/4/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| MW02 | 9/13/2013 | 10:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| MW03 | 6/5/2013 | 9:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| MW03 | 9/12/2013 | 13:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| MW-4 | 6/4/2013 | 16:52 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| MW-4 | 9/10/2013 | 9:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| MW-6 | 6/4/2013 | 14:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| MW-6 (DUP) | 6/4/2013 | 15:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| MW-6 | 9/10/2013 | 11:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-10 | 6/3/2013 | 15:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-10 | 9/11/2013 | 9:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | 0.21 | | J | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-11 | 6/3/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-11 | 9/9/2013 | 10:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | 0.32 | | J | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-12† | 5/16/2013 | 10:33 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12 | 9/11/2013 | 16:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-13† | 5/16/2013 | 12:54 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13[2] | 9/9/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14† | 5/16/2013 | 12:47 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14 | 9/12/2013 | 9:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-15 | 6/5/2013 | 11:58 | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| YMW-15[2] | 9/9/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16 | 6/5/2013 | 16:24 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-16[2] | 9/9/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-17 | 6/6/2013 | 14:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-17[2] | 9/9/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18† | 5/16/2013 | 14:18 | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18 | 9/12/2013 | 11:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-19 | 6/3/2013 | 17:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-19 | 9/9/2013 | 12:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-20 | 6/7/2013 | 10:12 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-20 | 9/10/2013 | 15:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-21 | 6/6/2013 | 10:42 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-21 | 9/11/2013 | 13:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-22 | 6/6/2013 | 16:17 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-22 | 9/11/2013 | 11:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-23 | 6/7/2013 | 13:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-23 | 9/10/2013 | 12:50 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |
| YMW-23 (DUP) | 9/10/2013 | 13:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | |

**NOTES:**

| Key | Description |
|---|---|
| 2.5 | **Exceeds DEQ-7 Human Health Level for Groundwater or MDEQ Groundwater RBSL** |
| 0.005 | **EPA Region 9 Tapwater Screening Level used for Comparison** |
| <0.53 | **Non-Detect Result that Exceeds an Associated Screening Level** |

**[2] LNAPL was present, sample was not collected**

**† LNAPL was present in 5/2013, sample was not collected for 6/2013 sampling event**

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| ale Human Healt tandards round ater | | | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| egion a ater creening e el | | | | | | | | | | | | . | | | | | | . | | | . | | | . | | | | | | | | | | | | . | | | | | | | | | | | | | | | | | | | |
| ite ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| MW01 | 6/4/2013 | 9:43 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW01 | 9/9/2013 | 16:05 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW02 | 6/4/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW02 | 9/13/2013 | 10:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW03 | 6/5/2013 | 9:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW03 | 9/12/2013 | 13:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW-4 | 6/4/2013 | 16:52 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW-4 | 9/10/2013 | 9:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW-6 | 6/4/2013 | 14:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW-6 (DUP) | 6/4/2013 | 15:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW-6 | 9/10/2013 | 11:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-10 | 6/3/2013 | 15:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | 0.26 | | J | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-10 | 9/11/2013 | 9:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-11 | 6/3/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-11 | 9/9/2013 | 10:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-12† | 5/16/2013 | 10:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12 | 9/11/2013 | 16:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-13† | 5/16/2013 | 12:54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13² | 9/9/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14† | 5/16/2013 | 12:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14 | 9/12/2013 | 9:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-15 | 6/5/2013 | 11:58 | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | |
| YMW-15² | 9/9/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16 | 6/5/2013 | 16:24 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-16² | 9/9/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-17 | 6/6/2013 | 14:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-17² | 9/9/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18† | 5/16/2013 | 14:18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18 | 9/12/2013 | 11:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-19 | 6/3/2013 | 17:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-19 | 9/9/2013 | 12:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-20 | 6/7/2013 | 10:12 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-20 | 9/10/2013 | 15:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | 0.91 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-21 | 6/6/2013 | 10:42 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-21 | 9/11/2013 | 13:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-22 | 6/6/2013 | 16:17 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-22 | 9/11/2013 | 11:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-23 | 6/7/2013 | 13:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-23 | 9/10/2013 | 12:50 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-23 (DUP) | 9/10/2013 | 13:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds DEQ-7 Human Health Level for Groundwater or MDEQ Groundwater RBSL |
| 0.005 | EPA Region 9 Tapwater Screening Level used for Comparison |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

² LNAPL was present, sample was not collected

† LNAPL was present in 5/2013, sample was not collected for 6/2013 sampling event

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

| I H I | | | H | | | H H | | | H H | | | H H I | | | | | | ' ' ' H H | | | ' ' ' H H | | | H H | | | | | | ' ' I H H | | | ' ' I H H | | | I H H | | | I H H | | | ' ' I H | | | I H I | | | | | |
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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| egion a ater creening e el | | | . | | | | | | | | | | | | | | | . | | | . | | | | | | | | | | | | . | | | . | | | | | | . | | | . | | | | | |
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| MW01 | 6/4/2013 | 9:43 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW01 | 9/9/2013 | 16:05 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW02 | 6/4/2013 | 12:30 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW02 | 9/13/2013 | 10:00 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW03 | 6/5/2013 | 9:40 | 0.74 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 0.50 | | J | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW03 | 9/12/2013 | 13:30 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 1.2 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW-4 | 6/4/2013 | 16:52 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW-4 | 9/10/2013 | 9:00 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| MW-6 | 6/4/2013 | 14:30 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 0.16 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | 1.3 | | |
| MW-6 (DUP) | 6/4/2013 | 15:10 | 0.13 | | J | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 0.16 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | 1.4 | | |
| MW-6 | 9/10/2013 | 11:00 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | 0.31 | | J |
| YMW-10 | 6/3/2013 | 15:00 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 2.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 0.55 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-10 | 9/11/2013 | 9:45 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 3.5 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 0.76 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-11 | 6/3/2013 | 12:30 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-11 | 9/9/2013 | 10:40 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 0.10 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-12† | 5/16/2013 | 10:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-12 | 9/11/2013 | 16:00 | 618 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 19 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | 157 | | |
| YMW-13† | 5/16/2013 | 12:54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-13² | 9/9/2013 | 12:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14† | 5/16/2013 | 12:47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-14 | 9/12/2013 | 9:45 | 440 | | | 14 | | J | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 41 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | 153 | | |
| YMW-15 | 6/5/2013 | 11:58 | 1930 | | | < 50 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | 286 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | < 2.5 | | | 1210 | | |
| YMW-15² | 9/9/2013 | 15:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-16 | 6/5/2013 | 16:24 | 154 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 38 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | 381 | | |
| YMW-16² | 9/9/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-17 | 6/6/2013 | 14:20 | 138 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 11 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | 231 | | |
| YMW-17² | 9/9/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18† | 5/16/2013 | 14:18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YMW-18 | 9/12/2013 | 11:45 | 10 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-19 | 6/3/2013 | 17:45 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-19 | 9/9/2013 | 12:45 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-20 | 6/7/2013 | 10:12 | 1.7 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-20 | 9/10/2013 | 15:00 | 1.6 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 0.16 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-21 | 6/6/2013 | 10:42 | 5.9 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 0.24 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | 3.7 | | |
| YMW-21 | 9/11/2013 | 13:40 | 0.79 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | 0.80 | | |
| YMW-22 | 6/6/2013 | 16:17 | 0.28 | | J | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | 0.40 | | J |
| YMW-22 | 9/11/2013 | 11:45 | 0.46 | | J | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-23 | 6/7/2013 | 13:10 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-23 | 9/10/2013 | 12:50 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |
| YMW-23 (DUP) | 9/10/2013 | 13:00 | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds DEQ-7 Human Health Level for Groundwater or MDEQ Groundwater RBSL |
| 0.005 | EPA Region 9 Tapwater Screening Level used for Comparison |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

² LNAPL was present, sample was not collected

† LNAPL was present in 5/2013, sample was not collected for 6/2013 sampling event

**VQs - Validator Qualifiers**

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

**LQs - Lab Qualifiers**

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| MW01 | 6/4/2013 | 9:43 | < 0.50 | | | < 0.50 | | |
| MW01 | 9/9/2013 | 16:05 | < 0.50 | | | < 0.50 | | |
| MW02 | 6/4/2013 | 12:30 | < 0.50 | | | < 0.50 | | |
| MW02 | 9/13/2013 | 10:00 | < 0.50 | | | < 0.50 | | |
| MW03 | 6/5/2013 | 9:40 | 0.44 | | J | 0.44 | | J |
| MW03 | 9/12/2013 | 13:30 | < 0.50 | | | < 0.50 | | |
| MW-4 | 6/4/2013 | 16:52 | < 0.50 | | | < 0.50 | | |
| MW-4 | 9/10/2013 | 9:00 | < 0.50 | | | < 0.50 | | |
| MW-6 | 6/4/2013 | 14:30 | 0.36 | | J | 1.7 | | |
| MW-6 (DUP) | 6/4/2013 | 15:10 | 0.36 | | J | 1.7 | | |
| MW-6 | 9/10/2013 | 11:00 | < 0.50 | | | 0.31 | | J |
| YMW-10 | 6/3/2013 | 15:00 | < 0.50 | | | < 0.50 | | |
| YMW-10 | 9/11/2013 | 9:45 | < 0.50 | | | < 0.50 | | |
| YMW-11 | 6/3/2013 | 12:30 | < 0.50 | | | < 0.50 | | |
| YMW-11 | 9/9/2013 | 10:40 | < 0.50 | | | < 0.50 | | |
| YMW-12† | 5/16/2013 | 10:33 | | | | | | |
| YMW-12 | 9/11/2013 | 16:00 | 37 | | | 193 | | |
| YMW-13† | 5/16/2013 | 12:54 | | | | | | |
| YMW-13² | 9/9/2013 | 12:50 | | | | | | |
| YMW-14† | 5/16/2013 | 12:47 | | | | | | |
| YMW-14 | 9/12/2013 | 9:45 | 26 | | | 179 | | |
| YMW-15 | 6/5/2013 | 11:58 | 123 | | | 1330 | | |
| YMW-15² | 9/9/2013 | 15:55 | | | | | | |
| YMW-16 | 6/5/2013 | 16:24 | 57 | | | 438 | | |
| YMW-16² | 9/9/2013 | 13:00 | | | | | | |
| YMW-17 | 6/6/2013 | 14:20 | 25 | | | 257 | | |
| YMW-17² | 9/9/2013 | 12:55 | | | | | | |
| YMW-18† | 5/16/2013 | 14:18 | | | | | | |
| YMW-18 | 9/12/2013 | 11:45 | 0.51 | | | 0.51 | | |
| YMW-19 | 6/3/2013 | 17:45 | < 0.50 | | | < 0.50 | | |
| YMW-19 | 9/9/2013 | 12:45 | < 0.50 | | | < 0.50 | | |
| YMW-20 | 6/7/2013 | 10:12 | < 0.50 | | | < 0.50 | | |
| YMW-20 | 9/10/2013 | 15:00 | < 0.50 | | | < 0.50 | | |
| YMW-21 | 6/6/2013 | 10:42 | 0.39 | | J | 4.1 | | |
| YMW-21 | 9/11/2013 | 13:40 | < 0.50 | | | 0.80 | | |
| YMW-22 | 6/6/2013 | 16:17 | 0.085 | | J | 0.48 | | J |
| YMW-22 | 9/11/2013 | 11:45 | < 0.50 | | | < 0.50 | | |
| YMW-23 | 6/7/2013 | 13:10 | < 0.50 | | | < 0.50 | | |
| YMW-23 | 9/10/2013 | 12:50 | < 0.50 | | | < 0.50 | | |
| YMW-23 (DUP) | 9/10/2013 | 13:00 | < 0.50 | | | < 0.50 | | |

**NOTES:**

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|---|---|
| 2.5 | Exceeds DEQ-7 Human Health Level for Groundwater or MDEQ Groundwater RBSL |
| 0.005 | EPA Region 9 Tapwater Screening Level used for Comparison |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

² LNAPL was present, sample was not collected

† LNAPL was present in 5/2013, sample was not collected for 6/2013 sampling event

VQs - Validator Qualifiers

J - Associated numerical value is an estimated quantity because quality control criteria were not met.

R - Rejected Data

U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.

LQs - Lab Qualifiers

* - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)

B - The analyte was detected in the method blank.

D - Analyte Reporting Limit increased due to sample matrix.

E - Estimated value. Result exceeds the instrument upper quantitation limit.

H - Analysis performed past recommended holding time.

J - Estimated value. The analyte was present but less than the reporting limit.

L - Lowest available reporting limit for the analytical method used.

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| YD-1 | 7/16/2013 | 15:30 | 8.3 | | | 8.0 | | H | 797 | | | 720 | | | 20.5 | | | 7.6 | | | | | | 14 | | | 514 | | | 146 | | L | 178 | | L | 42 | | | 190 | | | 0.021 | | |
| YD-3 | 7/16/2013 | 14:30 | 8.21 | | | 8.1 | | H | 802 | | | 645 | | | 21.5 | | | 7.29 | | | | | | < 10 | | | 500 | | | 148 | | L | 181 | | L | 40 | | | 199 | | | 0.020 | | |
| YD-4 | 7/16/2013 | 12:55 | 8.29 | | | 8.1 | | H | 824 | | | 747 | | | 21.2 | | | 6.84 | | | | | | < 10 | | | 519 | | | 156 | | L | 190 | | L | 40 | | | 209 | | | 0.019 | | |
| YD-5 | 7/16/2013 | 9:30 | 8.32 | | | 8.0 | | H | 843 | | | 817 | | | 20.4 | | | 6.91 | | | | | | < 10 | | | 520 | | | 157 | | L | 192 | | L | 42 | | | 212 | | | 0.018 | | |
| YD-5 (DUP) | 7/16/2013 | 9:35 | | | | 8.0 | | H | 847 | | | | | | | | | | | | | | | 10 | | | 521 | | | 158 | | L | 193 | | L | 42 | | | 213 | | | 0.019 | | |
| YD-1 | 9/4/2013 | 12:30 | 8.23 | | | 8.25 | | H | 1330 | | L | 143 | | | 23.3 | | | 4.43 | | | 0.63 | | | 21 | | | 922 | | | 189 | | L | 230 | | L | 72 | | | 400 | | D | 0.025 | | |
| YD-3 | 9/4/2013 | 11:00 | 8.00 | | | 8.20 | | H | 1320 | | L | 1410 | | | 23.2 | | | 4.63 | | | 0.65 | | | 33 | | | 930 | | | 191 | | L | 233 | | L | 71 | | | 399 | | D | 0.025 | | |
| YD-3 (DUP) | 9/4/2013 | 11:15 | | | | 8.16 | | H | 1320 | | L | | | | | | | | | | | | | 36 | | | 920 | | | 192 | | L | 234 | | L | 71 | | | 399 | | D | 0.025 | | |
| YD-4 | 9/4/2013 | 10:00 | 7.94 | | | 8.16 | | H | 1350 | | L | 1471 | | | 22.2 | | | 4.28 | | | 0.59 | | | 19 | | | 933 | | | 193 | | L | 235 | | L | 77 | | | 402 | | D | 0.024 | | |
| YD-5 | 9/4/2013 | 9:00 | 7.46 | | | 8.15 | | H | 1340 | | L | 1470 | | | 22.5 | | | 4.69 | | | 0.54 | | | 22 | | | 918 | | | 195 | | L | 237 | | L | 79 | | | 402 | | D | 0.024 | | |

**NOTES:**

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|---|---|
| 1360 | Exceeds DEQ-7 Human Health Level for Surface Water |
| 0.05 | Exceeds DEQ-7 Aquatic Acute Level for Surface Water |
| 0.0025 | Exceeds DEQ-7 Aquatic Chronic Level for Surface Water |
| <0.53 | Non-Detect Result that Exceeds an Associated Screening Level |

**VQs - Validator Qualifiers**

**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**

**R - Rejected Data**

**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| YD-1 | 7/16/2013 | 15:30 | 0.12 | | | < 0.001 | | | 58 | | | < 0.005 | | | < 0.001 | | | 25 | | | < 0.0001 | | | 22 | | | 0.025 | | | < 0.001 | | | 63 | | | < 10 | | |
| YD-3 | 7/16/2013 | 14:30 | 0.11 | | | < 0.001 | | | 59 | | | < 0.005 | | | < 0.001 | | | 25 | | | < 0.0001 | | | 20 | | | 0.024 | | | < 0.001 | | | 63 | | | < 10 | | |
| YD-4 | 7/16/2013 | 12:55 | 0.12 | | | < 0.001 | | | 64 | | | < 0.005 | | | < 0.001 | | | 27 | | | < 0.0001 | | | 21 | | | 0.024 | | | < 0.001 | | | 65 | | | < 10 | | |
| YD-5 | 7/16/2013 | 9:30 | 0.13 | | | < 0.001 | | | 65 | | | < 0.005 | | | < 0.001 | | | 27 | | | < 0.0001 | | | 22 | | | 0.025 | | | < 0.001 | | | 67 | | | < 10 | | |
| YD-5 (DUP) | 7/16/2013 | 9:35 | 0.13 | | | < 0.001 | | | 65 | | | < 0.005 | | | < 0.001 | | | 27 | | | < 0.0001 | | | 22 | | | 0.025 | | | < 0.001 | | | 67 | | | < 10 | | |
| YD-1 | 9/4/2013 | 12:30 | 0.149 | | | < 0.00008 | | | 96 | | | 0.002 | U | | 0.0013 | U | | 39 | | | < 0.00001 | | | 43 | | | 0.035 | | | < 0.0005 | | | 120 | | | | | |
| YD-3 | 9/4/2013 | 11:00 | 0.156 | | | < 0.00008 | | | 98 | | | 0.002 | U | | 0.0023 | U | | 40 | | | < 0.00001 | | | 43 | | | 0.034 | | | < 0.0005 | | | 121 | | | | | |
| YD-3 (DUP) | 9/4/2013 | 11:15 | 0.156 | | | < 0.00008 | | | 93 | | | 0.002 | U | | 0.0023 | U | | 40 | | | < 0.00001 | | | 41 | | | 0.034 | | | < 0.0005 | | | 121 | | | | | |
| YD-4 | 9/4/2013 | 10:00 | 0.152 | | | < 0.00008 | | | 102 | | | 0.001 | U | | 0.0014 | U | | 42 | | | < 0.00001 | | | 45 | | | 0.033 | | | < 0.0005 | | | 132 | | | | | |
| YD-5 | 9/4/2013 | 9:00 | 0.155 | | | < 0.00008 | | | 102 | | | 0.002 | U | | 0.0017 | U | | 42 | | | < 0.00001 | | | 41 | | | 0.032 | | | < 0.0005 | | | 126 | | | | | |

**NOTES:**

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| 1360 | **Exceeds DEQ-7 Human Health Level for Surface Water** |
| 0.05 | **Exceeds DEQ-7 Aquatic Acute Level for Surface Water** |
| 0.0025 | **Exceeds DEQ-7 Aquatic Chronic Level for Surface Water** |
| <0.53 | **Non-Detect Result that Exceeds an Associated Screening Level** |

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| YD-1 | 7/16/2013 | 15:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-3 | 7/16/2013 | 14:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-4 | 7/16/2013 | 12:55 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-5 | 7/16/2013 | 9:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-5 (DUP) | 7/16/2013 | 9:35 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-1 | 9/4/2013 | 12:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-3 | 9/4/2013 | 11:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-3 (DUP) | 9/4/2013 | 11:15 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-4 | 9/4/2013 | 10:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-5 | 9/4/2013 | 9:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |

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| YD-1 | 7/16/2013 | 15:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | |
| YD-3 | 7/16/2013 | 14:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | |
| YD-4 | 7/16/2013 | 12:55 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | |
| YD-5 | 7/16/2013 | 9:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | |
| YD-5 (DUP) | 7/16/2013 | 9:35 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | |
| YD-1 | 9/4/2013 | 12:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | |
| YD-3 | 9/4/2013 | 11:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | |
| YD-3 (DUP) | 9/4/2013 | 11:15 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | |
| YD-4 | 9/4/2013 | 10:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | |
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| YD-1 | 7/16/2013 | 15:30 | < 20 | | | < 20 | | | 37 | | | 38 | U | |
| YD-3 | 7/16/2013 | 14:30 | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| YD-4 | 7/16/2013 | 12:55 | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| YD-5 | 7/16/2013 | 9:30 | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| YD-5 (DUP) | 7/16/2013 | 9:35 | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
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| YD-3 (DUP) | 9/4/2013 | 11:15 | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| YD-4 | 9/4/2013 | 10:00 | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| YD-5 | 9/4/2013 | 9:00 | < 20 | | | < 20 | | | < 20 | | | < 20 | | |

**NOTES:**

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| 1360 | **Exceeds DEQ-7 Human Health Level for Surface Water** |
| <0.53 | **Non-Detect Result that Exceeds an Associated Screening Level** |

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| YD-1 | 7/16/2013 | 15:30 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-3 | 7/16/2013 | 14:30 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-4 | 7/16/2013 | 12:55 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-5 | 7/16/2013 | 9:30 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-5 (DUP) | 7/16/2013 | 9:35 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-1 | 9/4/2013 | 12:30 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | 0.28 | U | B | 0.23 | U | B | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-3 | 9/4/2013 | 11:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-3 (DUP) | 9/4/2013 | 11:15 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-4 | 9/4/2013 | 10:00 | < 300 | | | 491 | | | 325 | | | 1070 | | * | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-5 | 9/4/2013 | 9:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |

**NOTES:**

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| 1360 | **Exceeds DEQ-7 Human Health Level for Surface Water** |
| <0.53 | **Non-Detect Result that Exceeds an Associated Screening Level** |

**VQs - Validator Qualifiers**

**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**

**R - Rejected Data**

**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| YD-1 | 7/16/2013 | 15:30 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-3 | 7/16/2013 | 14:30 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-4 | 7/16/2013 | 12:55 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-5 | 7/16/2013 | 9:30 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-5 (DUP) | 7/16/2013 | 9:35 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-1 | 9/4/2013 | 12:30 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.42 | U | B | < 0.19 | | | < 0.19 | | |
| YD-3 | 9/4/2013 | 11:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-3 (DUP) | 9/4/2013 | 11:15 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.29 | U | | < 0.19 | | | < 0.19 | | |
| YD-4 | 9/4/2013 | 10:00 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| YD-5 | 9/4/2013 | 9:00 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |

**NOTES:**

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| 1360 | **Exceeds DEQ-7 Human Health Level for Surface Water** |
| <0.53 | **Non-Detect Result that Exceeds an Associated Screening Level** |

**VQs - Validator Qualifiers**

**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**

**R - Rejected Data**

**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

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*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| YD-1 | 7/16/2013 | 15:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| YD-3 | 7/16/2013 | 14:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| YD-4 | 7/16/2013 | 12:55 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
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| YD-5 (DUP) | 7/16/2013 | 9:35 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| YD-1 | 9/4/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 0.23 | | J | < 1.0 | | |
| YD-3 | 9/4/2013 | 11:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| YD-3 (DUP) | 9/4/2013 | 11:15 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| YD-4 | 9/4/2013 | 10:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
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**NOTES:**

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| 1360 | Exceeds DEQ-7 Human Health Level for Surface Water |
| <0.53 | Non-Detect Result that Exceeds a DEQ-7 Human Health Level or MDEQ RBSL |

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| YD-1 | 7/16/2013 | 15:30 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| YD-3 | 7/16/2013 | 14:30 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| YD-4 | 7/16/2013 | 12:55 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| YD-5 | 7/16/2013 | 9:30 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| YD-5 (DUP) | 7/16/2013 | 9:35 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| YD-1 | 9/4/2013 | 12:30 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| YD-3 | 9/4/2013 | 11:00 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| YD-3 (DUP) | 9/4/2013 | 11:15 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| YD-4 | 9/4/2013 | 10:00 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| YD-5 | 9/4/2013 | 9:00 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |

**NOTES:**

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| 1360 | **Exceeds DEQ-7 Human Health Level for Surface Water** |
| <0.53 | **Non-Detect Result that Exceeds a DEQ-7 Human Health Level or MDEQ RBSL** |

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| YD-1 | 7/16/2013 | 15:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-3 | 7/16/2013 | 14:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-4 | 7/16/2013 | 12:55 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-5 | 7/16/2013 | 9:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-5 (DUP) | 7/16/2013 | 9:35 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-1 | 9/4/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-3 | 9/4/2013 | 11:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-3 (DUP) | 9/4/2013 | 11:15 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-4 | 9/4/2013 | 10:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-5 | 9/4/2013 | 9:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |

**NOTES:**

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| 1360 | **Exceeds DEQ-7 Human Health Level for Surface Water** |
| <0.53 | **Non-Detect Result that Exceeds a DEQ-7 Human Health Level or MDEQ RBSL** |

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**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| YD-1 | 7/16/2013 | 15:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-3 | 7/16/2013 | 14:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-4 | 7/16/2013 | 12:55 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-5 | 7/16/2013 | 9:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-5 (DUP) | 7/16/2013 | 9:35 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-1 | 9/4/2013 | 12:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-3 | 9/4/2013 | 11:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-3 (DUP) | 9/4/2013 | 11:15 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-4 | 9/4/2013 | 10:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| YD-5 | 9/4/2013 | 9:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |

**NOTES:**

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| 1360 | **Exceeds DEQ-7 Human Health Level for Surface Water** |
| <0.53 | **Non-Detect Result that Exceeds a DEQ-7 Human Health Level or MDEQ RBSL** |

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| YD-1-SS-A | 0-6 | 7/17/2013 | 14:15 | 43 | J | | 7.6 | | | 8 | J | | 184 | J | | < 1 | | | 29 | J | | 63 | J | | < 1 | | | 4 | | | < 1 | | | < 0.59 | | |
| YD-1-SS-B | 6-12 | 7/17/2013 | 14:20 | 25 | J | | 8.0 | | | 7 | J | | 180 | J | | < 1 | | | 46 | J | | 48 | J | | < 1 | | | 1 | | | < 1 | | | < 0.45 | | |
| YD-1-SS-C | 12-18 | 7/17/2013 | 14:25 | 32 | J | | 8.0 | | | 11 | J | | 134 | J | | < 1 | | | 20 | J | | 28 | J | | < 1 | | | 2 | | | < 1 | | | < 0.49 | | |
| YD-3-SS-A | 0-6 | 7/17/2013 | 12:50 | 62 | J | | 7.7 | | | 15 | J | | 319 | J | | < 1 | | | 32 | J | | 61 | J | | < 1 | | | 11 | | | < 1 | | | < 0.88 | | |
| YD-3-SS-B | 6-12 | 7/17/2013 | 12:45 | 25 | J | | 7.8 | | | 9 | J | | 128 | J | | < 1 | | | 12 | J | | 16 | J | | < 1 | | | 3 | | | < 1 | | | < 0.45 | | |
| YD-3-SS-BD | 6-12 | 7/17/2013 | 12:55 | 49 | J | | 7.8 | | | 16 | J | | 261 | J | | < 1 | | | 26 | J | | 24 | J | | < 1 | | | 6 | | | < 1 | | | < 0.65 | | |
| YD-4-SS-A | 0-6 | 7/17/2013 | 11:35 | 50 | J | | 7.8 | | | 9 | J | | 230 | J | | < 1 | | | 23 | J | | 92 | J | | < 1 | | | 8 | | | < 1 | | | < 0.67 | | |
| YD-4-SS-B | 6-12 | 7/17/2013 | 11:30 | 36 | J | | 7.2 | | | 12 | J | | 171 | J | | < 1 | | | 32 | J | | 79 | J | | < 1 | | | 9 | | | < 1 | | | < 0.53 | | |
| YD-5-SS-A | 0-6 | 7/16/2013 | 12:05 | 36 | J | | 7.8 | | | 11 | J | | 203 | J | | < 1 | | | 21 | J | | 49 | J | | < 1 | | | 10 | | | < 1 | | | < 0.52 | | |
| YD-5-SS-B | 6-12 | 7/16/2013 | 12:10 | 31 | J | | 7.8 | | | 8 | J | | 129 | J | | < 1 | | | 21 | J | | 32 | J | | < 1 | | | 10 | | | < 1 | | | < 0.49 | | |
| YD-5-SS-C | 12-18 | 7/16/2013 | 12:00 | 14 | J | | 7.4 | | | 7 | J | | 81 | J | | < 1 | | | 17 | J | | 10 | J | | < 1 | | | 8 | | | < 1 | | | < 0.39 | | |

**NOTES:**

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| 2.5 | **Exceeds Ecological Risk Based Screening Concentration-Freshwater Sediment** |
| <0.53 | **Non-Detect Result that Exceeds the Ecological Risk Based Screening Concentration-Freshwater Sediment** |

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**

*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**

**B - The analyte was detected in the method blank.**

**D - Analyte Reporting Limit increased due to sample matrix.**

**E - Estimated value. Result exceeds the instrument upper quantitation limit.**

**H - Analysis performed past recommended holding time.**

**J - Estimated value. The analyte was present but less than the reporting limit.**

**L - Lowest available reporting limit for the analytical method used.**

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| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YD-1-SS-A | 0-6 | 7/17/2013 | 14:15 | < 0.18 | | | < 0.088 | | | < 0.088 | | | < 0.088 | | | < 0.088 | | | < 0.088 | | | < 0.088 | | | < 3.5 | | | < 3.5 | | | < 3.5 | | | < 0.18 | | | < 3.5 | | |
| YD-1-SS-B | 6-12 | 7/17/2013 | 14:20 | < 0.13 | | | < 0.067 | | | 0.074 | | | < 0.10 | | D | < 0.067 | | | < 0.067 | | | < 0.067 | | | 12 | | | < 2.7 | | | 14 | | | < 0.50 | | D | 43 | | |
| YD-1-SS-C | 12-18 | 7/17/2013 | 14:25 | < 0.15 | | | < 0.074 | | | < 0.074 | | | < 0.074 | | | < 0.074 | | | < 0.074 | | | < 0.074 | | | < 2.9 | | | < 2.9 | | | 3.8 | | | < 0.15 | | | 5.5 | | |
| YD-3-SS-A | 0-6 | 7/17/2013 | 12:50 | < 0.26 | | | < 0.13 | | | 0.32 | | | < 0.13 | | | < 0.13 | | | < 0.13 | | | < 0.13 | | | 6.9 | | | < 5.3 | | | 6.8 | | | < 0.26 | | | 17 | | |
| YD-3-SS-B | 6-12 | 7/17/2013 | 12:45 | < 0.27 | | | < 0.13 | | | 0.27 | | | < 0.20 | | D | < 0.13 | | | < 0.13 | | | < 0.13 | | | 62 | | | < 5.4 | | | 63 | | | < 2.8 | | D | 221 | | * |
| YD-3-SS-BD | 6-12 | 7/17/2013 | 12:55 | < 0.19 | | | < 0.097 | | | 0.18 | | | < 0.10 | | D | < 0.097 | | | < 0.097 | | | < 0.097 | | | 74 | | | < 3.9 | | | 70 | | | < 2.5 | | D | 245 | | * |
| YD-4-SS-A | 0-6 | 7/17/2013 | 11:35 | < 0.20 | | | < 0.10 | | | 0.095 | | J | < 0.10 | | | < 0.10 | | | < 0.10 | | | < 0.10 | | | 3.3 | | J | < 4.0 | | | 3.3 | | J | < 0.20 | | | 9.2 | | |
| YD-4-SS-B | 6-12 | 7/17/2013 | 11:30 | < 0.16 | | | < 0.079 | | | < 0.079 | | | < 0.079 | | | < 0.079 | | | < 0.079 | | | < 0.079 | | | < 3.1 | | | < 3.1 | | | < 3.1 | | | < 0.16 | | | 3.4 | | |
| YD-5-SS-A | 0-6 | 7/16/2013 | 12:05 | < 0.16 | | | < 0.078 | | | 0.11 | | | < 0.078 | | | < 0.078 | | | < 0.078 | | | < 0.078 | | | < 3.1 | | | < 3.1 | | | < 3.1 | | | < 0.16 | | | 2.7 | | J |
| YD-5-SS-B | 6-12 | 7/16/2013 | 12:10 | < 0.15 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 0.073 | | | < 2.9 | | | < 2.9 | | | < 2.9 | | | < 0.15 | | | < 2.9 | | |
| YD-5-SS-C | 12-18 | 7/16/2013 | 12:00 | < 0.12 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 0.058 | | | < 2.3 | | | < 2.3 | | | < 2.3 | | | < 0.12 | | | < 2.3 | | |

**NOTES:**

2.5 **Exceeds Ecological Risk Based Screening Concentration-Freshwater Sediment**

<0.53 **Non-Detect Result that Exceeds the Ecological Risk Based Screening Concentration-Freshwater Sediment**

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
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| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| cological is ased creening oncentration res ater ediment | | | | | | | | | | | | | | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YD-1-SS-A | 0-6 | 7/17/2013 | 14:15 | 86 | | | < 35 | | | 152 | | | 314 | | | < 0.012 | | | < 0.012 | | | < 0.012 | | | 0.10 | | | 0.32 | | * | 0.44 | | * | 0.43 | | * | 0.26 | J | |
| YD-1-SS-B | 6-12 | 7/17/2013 | 14:20 | 220 | | | 59 | | | 318 | | | 676 | | | < 0.0089 | | | 0.016 | | | < 0.0089 | | | < 0.0089 | | | 0.086 | | | 0.098 | | * | 0.10 | | | 0.075 | J | |
| YD-1-SS-C | 12-18 | 7/17/2013 | 14:25 | 38 | | | < 15 | | | 69 | | | 133 | | | < 0.0098 | | | < 0.0098 | | | < 0.0098 | | | < 0.0098 | | | 0.060 | | | 0.094 | | * | 0.12 | | | 0.076 | J | |
| YD-3-SS-A | 0-6 | 7/17/2013 | 12:50 | 91 | | | 40 | | | 135 | | | 314 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | < 0.018 | | | 0.070 | | | 0.086 | | * | 0.11 | | | 0.078 | J | |
| YD-3-SS-B | 6-12 | 7/17/2013 | 12:45 | 235 | | | 404 | | * | 176 | | | 845 | | | < 0.0089 | | | < 0.0089 | | | < 0.0089 | | | 0.023 | | | 0.13 | | | 0.17 | | * | 0.16 | | | 0.099 | J | |
| YD-3-SS-BD | 6-12 | 7/17/2013 | 12:55 | 297 | | | 529 | | * | 240 | | | 1110 | | | < 0.013 | | | < 0.013 | | | < 0.013 | | | 0.058 | | | 0.21 | | * | 0.25 | | * | 0.24 | | * | 0.17 | J | |
| YD-4-SS-A | 0-6 | 7/17/2013 | 11:35 | 57 | | | < 20 | | | 131 | | | 248 | | | < 0.013 | | | < 0.013 | | | < 0.013 | | | 0.042 | | | 0.14 | | | 0.25 | | * | 0.25 | | * | 0.12 | J | |
| YD-4-SS-B | 6-12 | 7/17/2013 | 11:30 | 54 | | | < 31 | | | 95 | | | 200 | | | < 0.010 | | | < 0.010 | | | < 0.010 | | | 0.029 | | | 0.26 | | * | 0.31 | | * | 0.35 | | * | 0.18 | J | |
| YD-5-SS-A | 0-6 | 7/16/2013 | 12:05 | 33 | | | < 16 | | | 120 | | | 189 | | | < 0.010 | | | < 0.010 | | | < 0.010 | | | 0.023 | | | 0.065 | | | 0.074 | | * | 0.11 | | | 0.055 | J | |
| YD-5-SS-B | 6-12 | 7/16/2013 | 12:10 | 30 | | | < 15 | | | 61 | | | 120 | | | < 0.0097 | | | < 0.0097 | | | < 0.0097 | | | 0.073 | | | 0.14 | | | 0.16 | | * | 0.18 | | | 0.10 | J | |
| YD-5-SS-C | 12-18 | 7/16/2013 | 12:00 | 20 | | | < 12 | | | 36 | | | 72 | | | < 0.0078 | | | < 0.0078 | | | < 0.0078 | | | 0.11 | | | 0.26 | | * | 0.32 | | * | 0.33 | | * | 0.29 | J | |

**NOTES:**

2.5 — **Exceeds Ecological Risk Based Screening Concentration-Freshwater Sediment**

<0.53 — **Non-Detect Result that Exceeds the Ecological Risk Based Screening Concentration-Freshwater Sediment**

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
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**L - Lowest available reporting limit for the analytical method used.**

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| ale il o out a ota ediment oil am ling H, | | | | H | | | H | | | I ,H H | | | H | | | | | | I , , , | | | H H | | | H H | | | | | |
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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| cological is ased creening oncentration res ater ediment | | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | | . | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YD-1-SS-A | 0-6 | 7/17/2013 | 14:15 | 0.28 | J | | 0.44 | | | < 0.012 | | | 0.85 | J | | 0.022 | | | 0.35 | J | * | 0.015 | U | | 0.32 | J | | 0.67 | J | |
| YD-1-SS-B | 6-12 | 7/17/2013 | 14:20 | 0.049 | J | | 0.073 | | | < 0.0089 | | | 0.19 | J | | 0.070 | | | 0.095 | J | | < 0.0089 | | | 0.086 | J | | 0.16 | J | |
| YD-1-SS-C | 12-18 | 7/17/2013 | 14:25 | 0.026 | J | | 0.046 | | | 0.017 | | | 0.11 | J | | < 0.0098 | | | 0.085 | J | | 0.015 | U | | 0.040 | J | | 0.13 | J | |
| YD-3-SS-A | 0-6 | 7/17/2013 | 12:50 | 0.043 | J | | 0.049 | | | < 0.018 | | | 0.16 | J | | < 0.018 | | | 0.11 | J | | < 0.018 | | | 0.075 | J | | 0.19 | J | |
| YD-3-SS-B | 6-12 | 7/17/2013 | 12:45 | 0.080 | J | | 0.16 | | | < 0.0089 | | | 0.26 | J | | < 0.0089 | | | 0.12 | J | | < 0.0089 | | | 0.095 | J | | 0.25 | J | |
| YD-3-SS-BD | 6-12 | 7/17/2013 | 12:55 | 0.17 | J | | 0.26 | | | < 0.013 | | | 0.59 | J | | < 0.013 | | | 0.23 | J | * | < 0.013 | | | 0.27 | J | | 0.47 | J | |
| YD-4-SS-A | 0-6 | 7/17/2013 | 11:35 | 0.11 | J | | 0.18 | | | < 0.013 | | | 0.32 | J | | < 0.013 | | | 0.18 | J | | 0.020 | U | | 0.17 | J | | 0.30 | J | |
| YD-4-SS-B | 6-12 | 7/17/2013 | 11:30 | 0.20 | J | | 0.34 | | | < 0.010 | | | 0.57 | J | | < 0.010 | | | 0.23 | J | * | < 0.010 | | | 0.17 | J | | 0.49 | J | |
| YD-5-SS-A | 0-6 | 7/16/2013 | 12:05 | 0.052 | J | | 0.086 | | | < 0.010 | | | 0.18 | J | | < 0.010 | | | 0.061 | J | | < 0.010 | | | 0.099 | J | | 0.16 | J | |
| YD-5-SS-B | 6-12 | 7/16/2013 | 12:10 | 0.12 | J | | 0.19 | | | < 0.0097 | | | 0.35 | J | | 0.024 | | | 0.12 | J | | < 0.0097 | | | 0.22 | J | | 0.31 | J | |
| YD-5-SS-C | 12-18 | 7/16/2013 | 12:00 | 0.27 | J | | 0.32 | | | < 0.0078 | | | 0.62 | J | | 0.021 | | | 0.31 | J | * | < 0.0078 | | | 0.28 | J | | 0.45 | J | |

**NOTES:**

2.5 — **Exceeds Ecological Risk Based Screening Concentration-Freshwater Sediment**

<0.53 — **Non-Detect Result that Exceeds the Ecological Risk Based Screening Concentration-Freshwater Sediment**

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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| cological is ased creening oncentration res ater ediment | | | | | | | | | | | | | | | | | | | . | | | | | | . | | | . | | | | | | | | | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YD-1-SS-A | 0-6 | 7/17/2013 | 14:15 | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | |
| YD-1-SS-B | 6-12 | 7/17/2013 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-1-SS-C | 12-18 | 7/17/2013 | 14:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-3-SS-A | 0-6 | 7/17/2013 | 12:50 | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | |
| YD-3-SS-B | 6-12 | 7/17/2013 | 12:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-3-SS-BD | 6-12 | 7/17/2013 | 12:55 | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | |
| YD-4-SS-A | 0-6 | 7/17/2013 | 11:35 | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | |
| YD-4-SS-B | 6-12 | 7/17/2013 | 11:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-5-SS-A | 0-6 | 7/16/2013 | 12:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-5-SS-B | 6-12 | 7/16/2013 | 12:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-5-SS-C | 12-18 | 7/16/2013 | 12:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

**NOTES:**

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| 2.5 | **Exceeds Ecological Risk Based Screening Concentration-Freshwater Sediment** |
| <0.53 | **Non-Detect Result that Exceeds the Ecological Risk Based Screening Concentration-Freshwater Sediment** |

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| ale il o out a ota ediment oil am ling | | | | H I H | | | I , H | | | I H | | | , I H | | | , I H | | | , I H | | | I H I H | | | , I H H | | | , I H H | | | I , I H H | | | , I H H | | | I H , H | | | , I H | | | , I H | | |
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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| cological is ased creening oncentration res ater ediment | | | | | | | | | | | | | . | | | . | | | . | | | | | | | | | | | | . | | | . | | | | | | | | | | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YD-1-SS-A | 0-6 | 7/17/2013 | 14:15 | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | |
| YD-1-SS-B | 6-12 | 7/17/2013 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-1-SS-C | 12-18 | 7/17/2013 | 14:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-3-SS-A | 0-6 | 7/17/2013 | 12:50 | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | |
| YD-3-SS-B | 6-12 | 7/17/2013 | 12:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-3-SS-BD | 6-12 | 7/17/2013 | 12:55 | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | |
| YD-4-SS-A | 0-6 | 7/17/2013 | 11:35 | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | |
| YD-4-SS-B | 6-12 | 7/17/2013 | 11:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-5-SS-A | 0-6 | 7/16/2013 | 12:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-5-SS-B | 6-12 | 7/16/2013 | 12:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-5-SS-C | 12-18 | 7/16/2013 | 12:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

**NOTES:**

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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| cological is ased creening oncentration res ater ediment | | | | | | | | | | | | | | | | . | | | | | | | | | | | | . | | | | | | . | | | . | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YD-1-SS-A | 0-6 | 7/17/2013 | 14:15 | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 5.0 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | 0.23 | | J |
| YD-1-SS-B | 6-12 | 7/17/2013 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.090 | | J |
| YD-1-SS-C | 12-18 | 7/17/2013 | 14:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-3-SS-A | 0-6 | 7/17/2013 | 12:50 | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 8.5 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | 0.66 | | |
| YD-3-SS-B | 6-12 | 7/17/2013 | 12:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.20 | | J |
| YD-3-SS-BD | 6-12 | 7/17/2013 | 12:55 | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 5.8 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | 0.19 | | J |
| YD-4-SS-A | 0-6 | 7/17/2013 | 11:35 | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 6.0 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | |
| YD-4-SS-B | 6-12 | 7/17/2013 | 11:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-5-SS-A | 0-6 | 7/16/2013 | 12:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.046 | | J |
| YD-5-SS-B | 6-12 | 7/16/2013 | 12:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-5-SS-C | 12-18 | 7/16/2013 | 12:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 4.0 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

**NOTES:**

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| 2.5 | **Exceeds Ecological Risk Based Screening Concentration-Freshwater Sediment** |
| <0.53 | **Non-Detect Result that Exceeds the Ecological Risk Based Screening Concentration-Freshwater Sediment** |

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| cological is ased creening oncentration res ater ediment | | | | . | | | . | | | . | | | | | | | | | | | | . | | | | | | . | | |
| am le ode | H I | ate | I | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| YD-1-SS-A | 0-6 | 7/17/2013 | 14:15 | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | | < 0.25 | | |
| YD-1-SS-B | 6-12 | 7/17/2013 | 14:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-1-SS-C | 12-18 | 7/17/2013 | 14:25 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-3-SS-A | 0-6 | 7/17/2013 | 12:50 | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | | < 0.43 | | |
| YD-3-SS-B | 6-12 | 7/17/2013 | 12:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-3-SS-BD | 6-12 | 7/17/2013 | 12:55 | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | | < 0.29 | | |
| YD-4-SS-A | 0-6 | 7/17/2013 | 11:35 | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | | < 0.30 | | |
| YD-4-SS-B | 6-12 | 7/17/2013 | 11:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-5-SS-A | 0-6 | 7/16/2013 | 12:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-5-SS-B | 6-12 | 7/16/2013 | 12:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| YD-5-SS-C | 12-18 | 7/16/2013 | 12:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |

**NOTES:**

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| 2.5 | **Exceeds Ecological Risk Based Screening Concentration-Freshwater Sediment** |
| <0.53 | **Non-Detect Result that Exceeds the Ecological Risk Based Screening Concentration-Freshwater Sediment** |

**VQs - Validator Qualifiers**
**J - Associated numerical value is an estimated quantity because quality control criteria were not met.**
**R - Rejected Data**
**U - Blank Exceedance. Associated value may be less than reported value or not detected due to blank contamination.**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| SOIL BLANK | YOSD-1210-200 | 10/3/2012 | 13:00 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1210-201 | 10/3/2012 | 13:30 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259B | 10/10/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-202 | 10/10/2012 | 9:40 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1210-203 | 10/10/2012 | 10:30 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT092112 B-TS SHP0259 | 10/16/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-204 | 10/16/2012 | 10:10 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1210-205 | 10/16/2012 | 13:00 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259B | 10/19/2012 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-206 | 10/19/2012 | 15:20 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | < 10 | | |
| SOIL BLANK | YOSD-1210-207 | 10/19/2012 | 15:25 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | < 10 | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259 | 10/25/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-208 | 10/25/2012 | 14:50 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1210-209 | 10/25/2012 | 15:00 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | 0.001 | U | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259 | 10/26/2012 | 15:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-210 | 10/31/2012 | 9:20 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1210-211 | 10/31/2012 | 9:32 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1211-212 | 11/2/2012 | 10:42 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1211-213 | 11/2/2012 | 10:50 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259 | 11/7/2012 | 15:14 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-214 | 11/7/2012 | 15:14 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1211-215 | 11/7/2012 | 15:20 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1211-216 | 11/8/2012 | 15:32 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1211-217 | 11/8/2012 | 15:39 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1211-302 | 11/28/2012 | 10:41 | | | | | | | | | | | | | < 0.001 | | | | | | | | | | | | < 10 | | |
| SOIL BLANK | YOSD-1211-301 | 11/28/2012 | 10:44 | | | | | | | | | | | | | < 0.001 | | | | | | | | | | | | < 10 | | |
| SOIL BLANK | YOSD-1211-303 | 11/28/2012 | 15:30 | | | | | | | | | | | | | < 0.001 | | | | | | | | | | | | < 10 | | |
| SOIL BLANK | YOSD-1211-304 | 11/28/2012 | 15:34 | | | | | | | | | | | | | < 0.001 | | | | | | | | | | | | < 10 | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259A | 11/29/2012 | 11:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-401 | 11/29/2012 | 11:38 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1211-402 | 11/29/2012 | 11:43 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1211-403 | 11/30/2012 | 10:38 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1211-404 | 11/30/2012 | 10:43 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1211-405 | 11/30/2012 | 12:30 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1211-406 | 11/30/2012 | 12:35 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1304-100 | 4/11/2013 | 13:30 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262 | 4/19/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-102 | 4/19/2013 | 11:05 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT #031913 B-TS SHP0262 | 4/23/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-103 | 4/23/2013 | 12:45 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262A | 4/29/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-104 | 4/29/2013 | 16:00 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | 0.001 | U | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1305-101 | 5/1/2013 | 14:00 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT031913 B-TS SHP0262 | 5/2/2013 | 17:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1305-102 | 5/2/2013 | 17:10 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1305-104 | 5/8/2013 | 16:45 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1305-105 | 5/15/2013 | 12:30 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | 0.002 | U | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1305-106 | 5/20/2013 | 15:00 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1305-107 | 5/22/2013 | 13:00 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT050213 B-TS SHP0262 | 5/24/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1305-108 | 5/24/2013 | 14:00 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT #042313 B-TS SHP0262 | 5/30/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1305-109 | 5/30/2013 | 14:30 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT #052213 B-TS SHP0262 | 6/10/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1306-110 | 6/10/2013 | 15:45 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1306-111 | 6/11/2013 | 10:00 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1306-112 | 6/11/2013 | 14:20 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1306-113 | 6/28/2013 | 15:05 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1307-100 | 7/1/2013 | 17:10 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT 070513 B-TS SHP0262 | 7/17/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1307-608 | 7/17/2013 | 11:45 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1308-101 | 8/2/2013 | 7:30 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | TRIP BLANK LOT073113 B-TS SHP0262 | 8/7/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1308-103 | 8/7/2013 | 16:00 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1308-104 | 8/8/2013 | 10:15 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1308-105 | 8/8/2013 | 13:00 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |
| SOIL BLANK | YOSD-1308-106 | 8/12/2013 | 13:20 | < 0.001 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | | | |

**NOTES:**
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**U - Blank Exceedance**

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**J - Estimated value. The analyte was present but less than the reporting limit**
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| SW BLANK | TRIP BLANK 1 LOT071512 B-TS SHP0262 | 7/16/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | TRIP BLANK 3 LOT070512 B-TS SHP0262 | 7/16/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | YOSD-1307-606 | 7/16/2013 | 14:40 | 5.9 | | H | < 5 | | | < 10 | | | < 10 | | | < 4 | | L | < 4 | | L | < 1 | | | < 1 | | | < 0.001 | | | < 0.05 | | | < 0.001 | | | | | |
| SW BLANK | TRIP BLANK 2 LOT070512 B-TS SHP0262 | 7/16/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | TRIP BLANK 4 LOT #082113 B-TS SHP0262 | 9/4/2013 | 8:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | YOSD-1309-107 | 9/4/2013 | 8:30 | 5.64 | | H | < 5 | | L | < 10 | | | < 10 | | | < 4 | | L | < 4 | | L | < 1 | | | < 1 | | | < 0.003 | | | < 0.005 | | | < 0.00008 | | | | | |
| SW BLANK | TRIP BLANK 2 LOT #082113 B-TS SHP0262 | 9/4/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | YOSD-1309-108 | 9/4/2013 | 10:15 | 5.64 | | H | < 5 | | L | < 10 | | | < 10 | | | < 4 | | L | < 4 | | L | < 1 | | | < 1 | | | < 0.003 | | | < 0.005 | | | < 0.00008 | | | | | |
| SW BLANK | TRIP BLANK 3 LOT #082113 B-TS SHP0262 | 9/4/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | TRIP BLANK 1 LOT #082113 B-TS SHP0262 | 9/4/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| SW BLANK | TRIP BLANK 1 LOT071512 B-TS SHP0262 | 7/16/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | TRIP BLANK 3 LOT070512 B-TS SHP0262 | 7/16/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | YOSD-1307-606 | 7/16/2013 | 14:40 | < 1 | | | < 0.005 | | | < 0.001 | | | < 1 | | | < 0.0001 | | | < 1 | | | < 0.001 | | | < 0.001 | | | < 1 | | | < 10 | | |
| SW BLANK | TRIP BLANK 2 LOT070512 B-TS SHP0262 | 7/16/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | TRIP BLANK 4 LOT #082113 B-TS SHP0262 | 9/4/2013 | 8:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | YOSD-1309-107 | 9/4/2013 | 8:30 | < 1 | | | < 0.001 | | | < 0.0005 | | | < 1 | | | < 0.00001 | | | < 1 | | | < 0.001 | | | < 0.0005 | | | < 1 | | | | | |
| SW BLANK | TRIP BLANK 2 LOT #082113 B-TS SHP0262 | 9/4/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | YOSD-1309-108 | 9/4/2013 | 10:15 | < 1 | | | < 0.001 | | | < 0.0005 | | | < 1 | | | < 0.00001 | | | < 1 | | | < 0.001 | | | < 0.0005 | | | < 1 | | | | | |
| SW BLANK | TRIP BLANK 3 LOT #082113 B-TS SHP0262 | 9/4/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| GW BLANK | TRIP BLANK 1 LOT #051713 B-TS SHP0262 | 6/3/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT #051713 B-TS SHP0262 | 6/3/2013 | 17:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT #051713 B-TS SHP0262 | 6/3/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262A-1 | 6/4/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262A-2 | 6/4/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262A-3 | 6/4/2013 | 9:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262A-4 | 6/4/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 5 LOT051713 B-TS SHP0262A-5 | 6/4/2013 | 16:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262 | 6/5/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262 | 6/5/2013 | 11:58 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262 | 6/5/2013 | 16:24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262 | 6/5/2013 | 17:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1306-311 | 6/5/2013 | 17:30 | 6.2 | | H | < 5 | | | 0.1 | | | < 10 | | | < 4 | | L | < 4 | | L | < 1 | | | < 1 | | | < 0.05 | | | < 0.05 | | | < 0.01 | | | < 0.001 | | | < 0.05 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262B | 6/6/2013 | 10:42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262B | 6/6/2013 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262B | 6/6/2013 | 16:17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262B | 6/6/2013 | 17:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1306-315 | 6/6/2013 | 17:15 | 5.9 | | H | < 5 | | | 0.3 | | L | < 10 | | | < 4 | | L | < 4 | | L | < 1 | | | < 1 | | | < 0.05 | | | < 0.05 | | | < 0.01 | | | < 0.001 | | | < 0.05 | | |
| GW BLANK | TRIP BLANK 1 LOT052213 B-TS SHP0262 | 6/7/2013 | 10:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262D | 6/7/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT111212 B-TS SHP0259 | 9/9/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT082113 B-TS SHP0262 | 9/9/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1309-137 | 9/9/2013 | 13:30 | 5.9 | | H | < 5 | | | | | | < 10 | | | 4 | | | 5 | | | < 1 | | | < 1 | | | < 0.05 | | H | < 0.05 | | | < 0.01 | | < 0.001 (TRC) | | | < 0.05 (TRC) | | | < 0 |
| GW BLANK | TRIP BLANK 3 LOT082113 B-TS SHP0262 | 9/10/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 6 LOT082113 B-TS SHP0262 | 9/10/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT082113 B-TS SHP0262 | 9/10/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1309-138 | 9/11/2013 | 14:20 | 5.9 | | H | 5 | | | | | | < 10 | | | 23 | | | 28 | | | < 1 | | | < 1 | | | < 0.05 | | | < 0.05 | | | 0.01 | U | < 0.001 (TRC) | | | < 0.05 (TRC) | | | < 0 |
| GW BLANK | TRIP BLANK 5 LOT082813 B-TS SHP0262 | 9/12/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK LOT091013 B-TS SHP0262 | 9/13/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| GW BLANK | TRIP BLANK 1 LOT #051713 B-TS SHP0262 | 6/3/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT #051713 B-TS SHP0262 | 6/3/2013 | 17:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT #051713 B-TS SHP0262 | 6/3/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262A-1 | 6/4/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262A-2 | 6/4/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262A-3 | 6/4/2013 | 9:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262A-4 | 6/4/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 5 LOT051713 B-TS SHP0262A-5 | 6/4/2013 | 16:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262 | 6/5/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262 | 6/5/2013 | 11:58 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262 | 6/5/2013 | 16:24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262 | 6/5/2013 | 17:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1306-311 | 6/5/2013 | 17:30 | < 0.001 | | | < 1 | | | < 0.005 | | | < 0.03 | | | < 0.001 | | | < 1 | | | < 0.0001 | | | < 1 | | | < 0.001 | | | < 0.001 | | | < 1 | | | < 10 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262B | 6/6/2013 | 10:42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262B | 6/6/2013 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262B | 6/6/2013 | 16:17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262B | 6/6/2013 | 17:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1306-315 | 6/6/2013 | 17:15 | < 0.001 | | | < 1 | | | < 0.005 | | | < 0.03 | | | < 0.001 | | | < 1 | | | < 0.0001 | | | < 1 | | | < 0.001 | | | < 0.001 | | | < 1 | | | < 10 | | |
| GW BLANK | TRIP BLANK 1 LOT052213 B-TS SHP0262 | 6/7/2013 | 10:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262D | 6/7/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT111212 B-TS SHP0259 | 9/9/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT082113 B-TS SHP0262 | 9/9/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1309-137 | 9/9/2013 | 13:30 | .001 (TRC) | | | <1 (TRC) | | | < 0.005 (TRC) | | | | | | < 0.001 (TRC) | | | <1 (TRC) | | | < 0.0001 (TRC) | | | <1 (TRC) | | | < 0.001 (TRC) | | | < 0.001 (TRC) | | | <1 (TRC) | | | < 10 | | |
| GW BLANK | TRIP BLANK 3 LOT082113 B-TS SHP0262 | 9/10/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 6 LOT082113 B-TS SHP0262 | 9/10/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT082113 B-TS SHP0262 | 9/10/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1309-138 | 9/11/2013 | 14:20 | .001 (TRC) | | | <1 (TRC) | | | < 0.005 (TRC) | | | | | | < 0.001 (TRC) | | | <1 (TRC) | | | < 0.0001 (TRC) | | | <1 (TRC) | | | < 0.001 (TRC) | | | < 0.001 (TRC) | | | <1 (TRC) | | | < 10 | | |
| GW BLANK | TRIP BLANK 5 LOT082813 B-TS SHP0262 | 9/12/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK LOT091013 B-TS SHP0262 | 9/13/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**NOTES:**
**VQs - Validator Qualifiers**
**U - Blank Exceedance**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

| I H | I H | | | H H | | | | | | | | | H | | | | | | | | | | | | | H H | | | I | | | I H I | | | I H I | | | H | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| et od | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| raction | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| nit | | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | |
| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| SOIL BLANK | YOSD-1210-200 | 10/3/2012 | 13:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1210-201 | 10/3/2012 | 13:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | 17 | | J | < 20 | | | < 20 | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259B | 10/10/2012 | 9:40 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1210-202 | 10/10/2012 | 9:40 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1210-203 | 10/10/2012 | 10:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | TRIP BLANK LOT092112 B-TS SHP0259 | 10/16/2012 | 10:10 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1210-204 | 10/16/2012 | 10:10 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1210-205 | 10/16/2012 | 13:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259B | 10/19/2012 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-206 | 10/19/2012 | 15:20 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1210-207 | 10/19/2012 | 15:25 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259 | 10/25/2012 | 14:50 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1210-208 | 10/25/2012 | 14:50 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1210-209 | 10/25/2012 | 15:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259 | 10/26/2012 | 15:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-210 | 10/31/2012 | 9:20 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1210-211 | 10/31/2012 | 9:32 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1211-212 | 11/2/2012 | 10:42 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | 16 | | J | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1211-213 | 11/2/2012 | 10:50 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | 16 | | J | < 20 | | | < 20 | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259 | 11/7/2012 | 15:14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-214 | 11/7/2012 | 15:14 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1211-215 | 11/7/2012 | 15:20 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1211-216 | 11/8/2012 | 15:32 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1211-217 | 11/8/2012 | 15:39 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1211-302 | 11/28/2012 | 10:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-301 | 11/28/2012 | 10:44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-303 | 11/28/2012 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-304 | 11/28/2012 | 15:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259A | 11/29/2012 | 11:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-401 | 11/29/2012 | 11:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-402 | 11/29/2012 | 11:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-403 | 11/30/2012 | 10:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-404 | 11/30/2012 | 10:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-405 | 11/30/2012 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-406 | 11/30/2012 | 12:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-100 | 4/11/2013 | 13:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262 | 4/19/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-102 | 4/19/2013 | 11:05 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | TRIP BLANK LOT #031913 B-TS SHP0262 | 4/23/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-103 | 4/23/2013 | 12:45 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262A | 4/29/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-104 | 4/29/2013 | 16:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1305-101 | 5/1/2013 | 14:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | TRIP BLANK LOT031913 B-TS SHP0262 | 5/2/2013 | 17:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1305-102 | 5/2/2013 | 17:10 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1305-104 | 5/8/2013 | 16:45 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1305-105 | 5/15/2013 | 12:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1305-106 | 5/20/2013 | 15:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1305-107 | 5/22/2013 | 13:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | TRIP BLANK LOT050213 B-TS SHP0262 | 5/24/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1305-108 | 5/24/2013 | 14:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | TRIP BLANK LOT #042313 B-TS SHP0262 | 5/30/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1305-109 | 5/30/2013 | 14:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| GW BLANK | TRIP BLANK 1 LOT #051713 B-TS SHP0262 | 6/3/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT #051713 B-TS SHP0262 | 6/3/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT #051713 B-TS SHP0262 | 6/3/2013 | 17:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262A-3 | 6/4/2013 | 9:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262A-4 | 6/4/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262A-2 | 6/4/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262A-1 | 6/4/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 5 LOT051713 B-TS SHP0262A-5 | 6/4/2013 | 16:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262 | 6/5/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262 | 6/5/2013 | 11:58 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262 | 6/5/2013 | 16:24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262 | 6/5/2013 | 17:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1306-311 | 6/5/2013 | 17:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262B | 6/6/2013 | 10:42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262B | 6/6/2013 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262B | 6/6/2013 | 16:17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262B | 6/6/2013 | 17:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1306-315 | 6/6/2013 | 17:15 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| GW BLANK | TRIP BLANK 1 LOT052213 B-TS SHP0262 | 6/7/2013 | 10:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262D | 6/7/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT #052213 B-TS SHP0262 | 6/10/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1306-110 | 6/10/2013 | 15:45 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1306-111 | 6/11/2013 | 10:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1306-112 | 6/11/2013 | 14:20 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1306-113 | 6/28/2013 | 15:05 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1307-100 | 7/1/2013 | 17:10 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SW BLANK | TRIP BLANK 1 LOT071512 B-TS SHP0262 | 7/16/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | TRIP BLANK 2 LOT070512 B-TS SHP0262 | 7/16/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| et od | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| raction | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| nit | | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | |
| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| SW BLANK | TRIP BLANK 3 LOT070512 B-TS SHP0262 | 7/16/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | YOSD-1307-606 | 7/16/2013 | 14:40 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | 280 | U | | < 20 | | | 208 | U | |
| SOIL BLANK | TRIP BLANK LOT 070513 B-TS SHP0262 | 7/17/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1307-608 | 7/17/2013 | 11:45 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1308-101 | 8/2/2013 | 7:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | TRIP BLANK LOT073113 B-TS SHP0262 | 8/7/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1308-103 | 8/7/2013 | 16:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1308-104 | 8/8/2013 | 10:15 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1308-105 | 8/8/2013 | 13:00 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SOIL BLANK | YOSD-1308-106 | 8/12/2013 | 13:20 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SW BLANK | TRIP BLANK 4 LOT #082113 B-TS SHP0262 | 9/4/2013 | 8:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | YOSD-1309-107 | 9/4/2013 | 8:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SW BLANK | TRIP BLANK 2 LOT #082113 B-TS SHP0262 | 9/4/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | YOSD-1309-108 | 9/4/2013 | 10:15 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| SW BLANK | TRIP BLANK 3 LOT #082113 B-TS SHP0262 | 9/4/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | TRIP BLANK 1 LOT #082113 B-TS SHP0262 | 9/4/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT111212 B-TS SHP0259 | 9/9/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT082113 B-TS SHP0262 | 9/9/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1309-137 | 9/9/2013 | 13:30 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| GW BLANK | TRIP BLANK 3 LOT082113 B-TS SHP0262 | 9/10/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 6 LOT082113 B-TS SHP0262 | 9/10/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT082113 B-TS SHP0262 | 9/10/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1309-138 | 9/11/2013 | 14:20 | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | |
| GW BLANK | TRIP BLANK 5 LOT082813 B-TS SHP0262 | 9/12/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK LOT091013 B-TS SHP0262 | 9/13/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**NOTES:**
**VQs - Validator Qualifiers**
**U - Blank Exceedance**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs.  These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value.  Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value.  The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

| I H I H, | | | | I H I | | | I H I | | | I | | | H H | | | H H H | | | H H | | | H | | | H | | | H | | | H | | | HI | | | H | | |
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| et od | | | | H | | | H | | | H | | | H | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | H | | | H | | | H | | | H | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | |
| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| SOIL BLANK | YOSD-1210-200 | 10/3/2012 | 13:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | YOSD-1210-201 | 10/3/2012 | 13:30 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259B | 10/10/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-202 | 10/10/2012 | 9:40 | < 312 | | | < 312 | | | < 312 | | | < 312 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | |
| SOIL BLANK | YOSD-1210-203 | 10/10/2012 | 10:30 | < 306 | | | < 306 | | | < 306 | | | < 306 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | TRIP BLANK LOT092112 B-TS SHP0259 | 10/16/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-204 | 10/16/2012 | 10:10 | < 312 | | | < 312 | | | < 312 | | | < 312 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | |
| SOIL BLANK | YOSD-1210-205 | 10/16/2012 | 13:00 | < 309 | | | < 309 | | | < 309 | | | < 309 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259B | 10/19/2012 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-206 | 10/19/2012 | 15:20 | < 312 | | | < 312 | | | < 312 | | | < 312 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | |
| SOIL BLANK | YOSD-1210-207 | 10/19/2012 | 15:25 | < 309 | | | < 309 | | | < 309 | | | < 309 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259 | 10/25/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-208 | 10/25/2012 | 14:50 | < 303 | | | < 303 | | | < 303 | | | < 303 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | YOSD-1210-209 | 10/25/2012 | 15:00 | < 306 | | | < 306 | | | < 306 | | | < 306 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259 | 10/26/2012 | 15:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-210 | 10/31/2012 | 9:20 | < 303 | | | < 303 | | | < 303 | | | < 303 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | YOSD-1210-211 | 10/31/2012 | 9:32 | < 309 | | | < 309 | | | < 309 | | | < 309 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | |
| SOIL BLANK | YOSD-1211-212 | 11/2/2012 | 10:42 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | YOSD-1211-213 | 11/2/2012 | 10:50 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259 | 11/7/2012 | 15:14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-214 | 11/7/2012 | 15:14 | < 303 | | | < 303 | | | < 303 | | | < 303 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | YOSD-1211-215 | 11/7/2012 | 15:20 | < 309 | | | < 309 | | | < 309 | | | < 309 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | |
| SOIL BLANK | YOSD-1211-216 | 11/8/2012 | 15:32 | < 303 | | | < 303 | | | < 303 | | | < 303 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | YOSD-1211-217 | 11/8/2012 | 15:39 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | YOSD-1211-302 | 11/28/2012 | 10:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-301 | 11/28/2012 | 10:44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-303 | 11/28/2012 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-304 | 11/28/2012 | 15:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259A | 11/29/2012 | 11:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-401 | 11/29/2012 | 11:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-402 | 11/29/2012 | 11:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-403 | 11/30/2012 | 10:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-404 | 11/30/2012 | 10:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-405 | 11/30/2012 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-406 | 11/30/2012 | 12:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-100 | 4/11/2013 | 13:30 | < 309 | | | < 309 | | | < 309 | | | < 309 | | | 0.35 | U | B | < 0.21 | | | 0.22 | U | B | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262 | 4/19/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-102 | 4/19/2013 | 11:05 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | 0.36 | U | B | < 0.20 | | | 0.21 | U | B | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | TRIP BLANK LOT #031913 B-TS SHP0262 | 4/23/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-103 | 4/23/2013 | 12:45 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262A | 4/29/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-104 | 4/29/2013 | 16:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | 0.32 | U | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | YOSD-1305-101 | 5/1/2013 | 14:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | 0.33 | U | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | TRIP BLANK LOT031913 B-TS SHP0262 | 5/2/2013 | 17:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1305-102 | 5/2/2013 | 17:10 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | YOSD-1305-104 | 5/8/2013 | 16:45 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | 0.64 | U | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | YOSD-1305-105 | 5/15/2013 | 12:30 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | 0.21 | U | B | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | YOSD-1305-106 | 5/20/2013 | 15:00 | < 316 | | | < 316 | | | < 316 | | | < 316 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | |
| SOIL BLANK | YOSD-1305-107 | 5/22/2013 | 13:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | TRIP BLANK LOT050213 B-TS SHP0262 | 5/24/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1305-108 | 5/24/2013 | 14:00 | < 308 | | | < 308 | | | < 308 | | | < 308 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | 0.50 | U | * | 0.24 | U | * | 0.32 | U | | 0.47 | U | | 0.43 | U | |
| SOIL BLANK | TRIP BLANK LOT #042313 B-TS SHP0262 | 5/30/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1305-109 | 5/30/2013 | 14:30 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| GW BLANK | TRIP BLANK 1 LOT #051713 B-TS SHP0262 | 6/3/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT #051713 B-TS SHP0262 | 6/3/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT #051713 B-TS SHP0262 | 6/3/2013 | 17:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262A-3 | 6/4/2013 | 9:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262A-4 | 6/4/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262A-2 | 6/4/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262A-1 | 6/4/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 5 LOT051713 B-TS SHP0262A-5 | 6/4/2013 | 16:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262 | 6/5/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262 | 6/5/2013 | 11:58 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262 | 6/5/2013 | 16:24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262 | 6/5/2013 | 17:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1306-311 | 6/5/2013 | 17:30 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262B | 6/6/2013 | 10:42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262B | 6/6/2013 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262B | 6/6/2013 | 16:17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262B | 6/6/2013 | 17:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1306-315 | 6/6/2013 | 17:15 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| GW BLANK | TRIP BLANK 1 LOT052213 B-TS SHP0262 | 6/7/2013 | 10:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262D | 6/7/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT #052213 B-TS SHP0262 | 6/10/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1306-110 | 6/10/2013 | 15:45 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| SOIL BLANK | YOSD-1306-111 | 6/11/2013 | 10:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.34 | U | | 0.21 | U | * | 0.21 | U | | < 0.19 | | |
| SOIL BLANK | YOSD-1306-112 | 6/11/2013 | 14:20 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| SOIL BLANK | YOSD-1306-113 | 6/28/2013 | 15:05 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | 0.64 | U | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| SOIL BLANK | YOSD-1307-100 | 7/1/2013 | 17:10 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SW BLANK | TRIP BLANK 1 LOT071512 B-TS SHP0262 | 7/16/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | TRIP BLANK 3 LOT070512 B-TS SHP0262 | 7/16/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| SW BLANK | YOSD-1307-606 | 7/16/2013 | 14:40 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| SW BLANK | TRIP BLANK 2 LOT070512 B-TS SHP0262 | 7/16/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 070513 B-TS SHP0262 | 7/17/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1307-608 | 7/17/2013 | 11:45 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| SOIL BLANK | YOSD-1308-101 | 8/2/2013 | 7:30 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | TRIP BLANK LOT073113 B-TS SHP0262 | 8/7/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1308-103 | 8/7/2013 | 16:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | 0.30 | U | B | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | YOSD-1308-104 | 8/8/2013 | 10:15 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SOIL BLANK | YOSD-1308-105 | 8/8/2013 | 13:00 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| SOIL BLANK | YOSD-1308-106 | 8/12/2013 | 13:20 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| SW BLANK | TRIP BLANK 4 LOT #082113 B-TS SHP0262 | 9/4/2013 | 8:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | YOSD-1309-107 | 9/4/2013 | 8:30 | < 300 | | | 349 | U | | 245 | | J | 891 | U | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| SW BLANK | TRIP BLANK 2 LOT #082113 B-TS SHP0262 | 9/4/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | YOSD-1309-108 | 9/4/2013 | 10:15 | < 300 | | | < 300 | | | < 300 | | | 785 | U | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| SW BLANK | TRIP BLANK 3 LOT #082113 B-TS SHP0262 | 9/4/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | TRIP BLANK 1 LOT #082113 B-TS SHP0262 | 9/4/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT111212 B-TS SHP0259 | 9/9/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT082113 B-TS SHP0262 | 9/9/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1309-137 | 9/9/2013 | 13:30 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | |
| GW BLANK | TRIP BLANK 3 LOT082113 B-TS SHP0262 | 9/10/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 6 LOT082113 B-TS SHP0262 | 9/10/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT082113 B-TS SHP0262 | 9/10/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1309-138 | 9/11/2013 | 14:20 | < 300 | | | < 300 | | | < 300 | | | < 300 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | |
| GW BLANK | TRIP BLANK 5 LOT082813 B-TS SHP0262 | 9/12/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK LOT091013 B-TS SHP0262 | 9/13/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**NOTES:**
**VQs - Validator Qualifiers**
**U - Blank Exceedance**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| SOIL BLANK | YOSD-1210-200 | 10/3/2012 | 13:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | YOSD-1210-201 | 10/3/2012 | 13:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259B | 10/10/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-202 | 10/10/2012 | 9:40 | < 0.21 | | | < 0.21 | | | 0.25 | U | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | 0.27 | U | | | | |
| SOIL BLANK | YOSD-1210-203 | 10/10/2012 | 10:30 | < 0.20 | | | < 0.20 | | | 0.22 | U | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.22 | U | | | | |
| SOIL BLANK | TRIP BLANK LOT092112 B-TS SHP0259 | 10/16/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-204 | 10/16/2012 | 10:10 | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | 0.26 | U | | < 0.21 | | | < 0.21 | | | | | |
| SOIL BLANK | YOSD-1210-205 | 10/16/2012 | 13:00 | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | 0.29 | U | | < 0.21 | | | < 0.21 | | | | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259B | 10/19/2012 | 15:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-206 | 10/19/2012 | 15:20 | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | 0.29 | U | | < 0.21 | | | < 0.21 | | | | | |
| SOIL BLANK | YOSD-1210-207 | 10/19/2012 | 15:25 | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | 0.33 | U | | < 0.21 | | | < 0.21 | | | | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259 | 10/25/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-208 | 10/25/2012 | 14:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | YOSD-1210-209 | 10/25/2012 | 15:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259 | 10/26/2012 | 15:33 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-210 | 10/31/2012 | 9:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.32 | U | B | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | YOSD-1210-211 | 10/31/2012 | 9:32 | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | | | |
| SOIL BLANK | YOSD-1211-212 | 11/2/2012 | 10:42 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.21 | U | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | YOSD-1211-213 | 11/2/2012 | 10:50 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.23 | U | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259 | 11/7/2012 | 15:14 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-214 | 11/7/2012 | 15:14 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | YOSD-1211-215 | 11/7/2012 | 15:20 | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | | | |
| SOIL BLANK | YOSD-1211-216 | 11/8/2012 | 15:32 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | YOSD-1211-217 | 11/8/2012 | 15:39 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | YOSD-1211-302 | 11/28/2012 | 10:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-301 | 11/28/2012 | 10:44 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-303 | 11/28/2012 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-304 | 11/28/2012 | 15:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259A | 11/29/2012 | 11:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-401 | 11/29/2012 | 11:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-402 | 11/29/2012 | 11:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-403 | 11/30/2012 | 10:38 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-404 | 11/30/2012 | 10:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-405 | 11/30/2012 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-406 | 11/30/2012 | 12:35 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-100 | 4/11/2013 | 13:30 | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | 0.40 | U | B | < 0.21 | | | < 0.21 | | | | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262 | 4/19/2013 | 11:05 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-102 | 4/19/2013 | 11:05 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.50 | U | B | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | TRIP BLANK LOT #031913 B-TS SHP0262 | 4/23/2013 | 12:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-103 | 4/23/2013 | 12:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.22 | U | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262A | 4/29/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1304-104 | 4/29/2013 | 16:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 1.2 | U | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | YOSD-1305-101 | 5/1/2013 | 14:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 1.3 | U | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | TRIP BLANK LOT031913 B-TS SHP0262 | 5/2/2013 | 17:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1305-102 | 5/2/2013 | 17:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | YOSD-1305-104 | 5/8/2013 | 16:45 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.52 | U | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | YOSD-1305-105 | 5/15/2013 | 12:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.34 | U | B | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | YOSD-1305-106 | 5/20/2013 | 15:00 | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | < 0.21 | | | 0.26 | U | | < 0.21 | | | < 0.21 | | | | | |
| SOIL BLANK | YOSD-1305-107 | 5/22/2013 | 13:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | TRIP BLANK LOT050213 B-TS SHP0262 | 5/24/2013 | 14:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1305-108 | 5/24/2013 | 14:00 | 0.48 | U | | < 0.21 | | | 0.53 | U | | < 0.21 | | | < 0.21 | | | 0.29 | U | | < 0.21 | | | 0.55 | U | | | | |
| SOIL BLANK | TRIP BLANK LOT #042313 B-TS SHP0262 | 5/30/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1305-109 | 5/30/2013 | 14:30 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | | | |
| GW BLANK | TRIP BLANK 1 LOT #051713 B-TS SHP0262 | 6/3/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT #051713 B-TS SHP0262 | 6/3/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT #051713 B-TS SHP0262 | 6/3/2013 | 17:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262A-3 | 6/4/2013 | 9:43 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262A-4 | 6/4/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262A-2 | 6/4/2013 | 14:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262A-1 | 6/4/2013 | 15:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 5 LOT051713 B-TS SHP0262A-5 | 6/4/2013 | 16:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262 | 6/5/2013 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262 | 6/5/2013 | 11:58 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262 | 6/5/2013 | 16:24 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262 | 6/5/2013 | 17:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1306-311 | 6/5/2013 | 17:30 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.0015 | U | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262B | 6/6/2013 | 10:42 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262B | 6/6/2013 | 14:20 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262B | 6/6/2013 | 16:17 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262B | 6/6/2013 | 17:15 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1306-315 | 6/6/2013 | 17:15 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.0014 | U | |
| GW BLANK | TRIP BLANK 1 LOT052213 B-TS SHP0262 | 6/7/2013 | 10:12 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262D | 6/7/2013 | 13:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT #052213 B-TS SHP0262 | 6/10/2013 | 15:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1306-110 | 6/10/2013 | 15:45 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | | | |
| SOIL BLANK | YOSD-1306-111 | 6/11/2013 | 10:00 | 0.24 | U | | < 0.19 | | | 0.66 | U | | < 0.19 | | | 0.36 | U | | < 0.19 | | | 0.23 | U | | 0.84 | U | | | | |
| SOIL BLANK | YOSD-1306-112 | 6/11/2013 | 14:20 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | | | |
| SOIL BLANK | YOSD-1306-113 | 6/28/2013 | 15:05 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.45 | U | | < 0.19 | | | < 0.19 | | | | | |
| SOIL BLANK | YOSD-1307-100 | 7/1/2013 | 17:10 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | | | |
| SW BLANK | TRIP BLANK 1 LOT071512 B-TS SHP0262 | 7/16/2013 | 9:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | TRIP BLANK 3 LOT070512 B-TS SHP0262 | 7/16/2013 | 12:55 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| SW BLANK | YOSD-1307-606 | 7/16/2013 | 14:40 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | | | |
| SW BLANK | TRIP BLANK 2 LOT070512 B-TS SHP0262 | 7/16/2013 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 070513 B-TS SHP0262 | 7/17/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1307-608 | 7/17/2013 | 11:45 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.26 | U | B | < 0.19 | | | < 0.19 | | | | | |
| SOIL BLANK | YOSD-1308-101 | 8/2/2013 | 7:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.22 | U | B | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | TRIP BLANK LOT073113 B-TS SHP0262 | 8/7/2013 | 16:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1308-103 | 8/7/2013 | 16:00 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.60 | U | B | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | YOSD-1308-104 | 8/8/2013 | 10:15 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.34 | U | B | < 0.20 | | | < 0.20 | | | | | |
| SOIL BLANK | YOSD-1308-105 | 8/8/2013 | 13:00 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.26 | U | B | < 0.19 | | | < 0.19 | | | | | |
| SOIL BLANK | YOSD-1308-106 | 8/12/2013 | 13:20 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | 0.26 | U | B | < 0.20 | | | < 0.20 | | | | | |
| SW BLANK | TRIP BLANK 4 LOT #082113 B-TS SHP0262 | 9/4/2013 | 8:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | YOSD-1309-107 | 9/4/2013 | 8:30 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | | | |
| SW BLANK | TRIP BLANK 2 LOT #082113 B-TS SHP0262 | 9/4/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | YOSD-1309-108 | 9/4/2013 | 10:15 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | 0.20 | U | B | < 0.19 | | | < 0.19 | | | | | |
| SW BLANK | TRIP BLANK 3 LOT #082113 B-TS SHP0262 | 9/4/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW BLANK | TRIP BLANK 1 LOT #082113 B-TS SHP0262 | 9/4/2013 | 12:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 4 LOT111212 B-TS SHP0259 | 9/9/2013 | 10:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 1 LOT082113 B-TS SHP0262 | 9/9/2013 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1309-137 | 9/9/2013 | 13:30 | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.20 | | | < 0.0010 | J | |
| GW BLANK | TRIP BLANK 3 LOT082113 B-TS SHP0262 | 9/10/2013 | 11:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 6 LOT082113 B-TS SHP0262 | 9/10/2013 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK 2 LOT082113 B-TS SHP0262 | 9/10/2013 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | YOSD-1309-138 | 9/11/2013 | 14:20 | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.19 | | | < 0.0010 | J | |
| GW BLANK | TRIP BLANK 5 LOT082813 B-TS SHP0262 | 9/12/2013 | 11:45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GW BLANK | TRIP BLANK LOT091013 B-TS SHP0262 | 9/13/2013 | 10:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**NOTES:**
**VQs - Validator Qualifiers**
**U - Blank Exceedance**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| SOIL BLANK | YOSD-1210-200 | 10/3/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-201 | 10/3/2012 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259B | 10/10/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-202 | 10/10/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-203 | 10/10/2012 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT092112 B-TS SHP0259 | 10/16/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-204 | 10/16/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-205 | 10/16/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259B | 10/19/2012 | 15:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1210-206 | 10/19/2012 | 15:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 0.30 | | J | < 1.0 | | |
| SOIL BLANK | YOSD-1210-207 | 10/19/2012 | 15:25 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 0.39 | | J | < 1.0 | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259 | 10/25/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-208 | 10/25/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-209 | 10/25/2012 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259 | 10/26/2012 | 15:33 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1210-210 | 10/31/2012 | 9:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 0.47 | | J | < 1.0 | | |
| SOIL BLANK | YOSD-1210-211 | 10/31/2012 | 9:32 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 0.62 | U | | < 1.0 | | |
| SOIL BLANK | YOSD-1211-212 | 11/2/2012 | 10:42 | < 0.50 | | | < 1.0 | | | < 1.0 | | | 0.12 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 7.0 | U | | 0.61 | | J |
| SOIL BLANK | YOSD-1211-213 | 11/2/2012 | 10:50 | < 0.50 | | | < 1.0 | | | < 1.0 | | | 0.12 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 6.9 | U | | 0.61 | | J |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259 | 11/7/2012 | 15:14 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1211-214 | 11/7/2012 | 15:14 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 2.1 | U | | < 1.0 | | |
| SOIL BLANK | YOSD-1211-215 | 11/7/2012 | 15:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 3.0 | U | | < 1.0 | | |
| SOIL BLANK | YOSD-1211-216 | 11/8/2012 | 15:32 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 0.73 | U | | < 1.0 | | |
| SOIL BLANK | YOSD-1211-217 | 11/8/2012 | 15:39 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 0.47 | | J | < 1.0 | | |
| SOIL BLANK | YOSD-1211-302 | 11/28/2012 | 10:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-301 | 11/28/2012 | 10:44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-303 | 11/28/2012 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-304 | 11/28/2012 | 15:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259A | 11/29/2012 | 11:38 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1211-401 | 11/29/2012 | 11:38 | < 0.50 | | | < 1.0 | | | < 1.0 | | | 0.17 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 6.3 | U | | 0.56 | | J |
| SOIL BLANK | YOSD-1211-402 | 11/29/2012 | 11:43 | < 0.50 | | | < 1.0 | | | < 1.0 | | | 0.18 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 6.8 | U | | 0.64 | | J |
| SOIL BLANK | YOSD-1211-403 | 11/30/2012 | 10:38 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1211-404 | 11/30/2012 | 10:43 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1211-405 | 11/30/2012 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1211-406 | 11/30/2012 | 12:35 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1304-100 | 4/11/2013 | 13:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 5.6 | U | | 0.44 | | J |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262 | 4/19/2013 | 11:05 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1304-102 | 4/19/2013 | 11:05 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | TRIP BLANK LOT #031913 B-TS SHP0262 | 4/23/2013 | 12:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1304-103 | 4/23/2013 | 12:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262A | 4/29/2013 | 16:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1304-104 | 4/29/2013 | 16:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 3.2 | U | | < 1.0 | | |
| SOIL BLANK | YOSD-1305-101 | 5/1/2013 | 14:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | TRIP BLANK LOT031913 B-TS SHP0262 | 5/2/2013 | 17:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1305-102 | 5/2/2013 | 17:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1305-104 | 5/8/2013 | 16:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1305-105 | 5/15/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 5.9 | U | | 0.37 | | J |
| SOIL BLANK | YOSD-1305-106 | 5/20/2013 | 15:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 5.8 | U | | 0.35 | | J |
| SOIL BLANK | YOSD-1305-107 | 5/22/2013 | 13:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | TRIP BLANK LOT050213 B-TS SHP0262 | 5/24/2013 | 14:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1305-108 | 5/24/2013 | 14:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | TRIP BLANK LOT #042313 B-TS SHP0262 | 5/30/2013 | 14:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1305-109 | 5/30/2013 | 14:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 1 LOT #051713 B-TS SHP0262 | 6/3/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 3 LOT #051713 B-TS SHP0262 | 6/3/2013 | 15:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 2 LOT #051713 B-TS SHP0262 | 6/3/2013 | 17:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262A-3 | 6/4/2013 | 9:43 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262A-4 | 6/4/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262A-2 | 6/4/2013 | 14:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262A-1 | 6/4/2013 | 15:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 5 LOT051713 B-TS SHP0262A-5 | 6/4/2013 | 16:52 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262 | 6/5/2013 | 9:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262 | 6/5/2013 | 11:58 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262 | 6/5/2013 | 16:24 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262 | 6/5/2013 | 17:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | YOSD-1306-311 | 6/5/2013 | 17:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262B | 6/6/2013 | 10:42 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262B | 6/6/2013 | 14:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262B | 6/6/2013 | 16:17 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262B | 6/6/2013 | 17:15 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | YOSD-1306-315 | 6/6/2013 | 17:15 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 1 LOT052213 B-TS SHP0262 | 6/7/2013 | 10:12 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262D | 6/7/2013 | 13:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | TRIP BLANK LOT #052213 B-TS SHP0262 | 6/10/2013 | 15:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1306-110 | 6/10/2013 | 15:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1306-111 | 6/11/2013 | 10:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 1.7 | U | | < 1.0 | | |
| SOIL BLANK | YOSD-1306-112 | 6/11/2013 | 14:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 1.9 | U | | < 1.0 | | |
| SOIL BLANK | YOSD-1306-113 | 6/28/2013 | 15:05 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |
| SOIL BLANK | YOSD-1307-100 | 7/1/2013 | 17:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | 1.9 | U | | < 1.0 | | |
| SW BLANK | TRIP BLANK 1 LOT071512 B-TS SHP0262 | 7/16/2013 | 9:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | |

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| I I | am le ode | ate | ime | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s | esult s s |
| SW BLANK | TRIP BLANK 3 LOT070512 B-TS SHP0262 | 7/16/2013 | 12:55 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| SW BLANK | YOSD-1307-606 | 7/16/2013 | 14:40 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | 1.9 U | < 1.0 | < 0.50 |
| SW BLANK | TRIP BLANK 2 LOT070512 B-TS SHP0262 | 7/16/2013 | 15:30 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| SOIL BLANK | TRIP BLANK LOT 070513 B-TS SHP0262 | 7/17/2013 | 11:45 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| SOIL BLANK | YOSD-1307-608 | 7/17/2013 | 11:45 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | 1.9 U | < 1.0 | < 0.50 |
| SOIL BLANK | YOSD-1308-101 | 8/2/2013 | 7:30 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | 1.3 U | < 1.0 | < 0.50 |
| SOIL BLANK | TRIP BLANK LOT073113 B-TS SHP0262 | 8/7/2013 | 16:00 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| SOIL BLANK | YOSD-1308-103 | 8/7/2013 | 16:00 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | 0.41 J | < 1.0 | < 0.50 |
| SOIL BLANK | YOSD-1308-104 | 8/8/2013 | 10:15 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | 0.44 J | < 1.0 | < 0.50 |
| SOIL BLANK | YOSD-1308-105 | 8/8/2013 | 13:00 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | 0.40 J | < 1.0 | < 0.50 |
| SOIL BLANK | YOSD-1308-106 | 8/12/2013 | 13:20 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | 0.48 J | < 1.0 | < 0.50 |
| SW BLANK | TRIP BLANK 4 LOT #082113 B-TS SHP0262 | 9/4/2013 | 8:30 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| SW BLANK | YOSD-1309-107 | 9/4/2013 | 8:30 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| SW BLANK | TRIP BLANK 2 LOT #082113 B-TS SHP0262 | 9/4/2013 | 10:00 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| SW BLANK | YOSD-1309-108 | 9/4/2013 | 10:15 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| SW BLANK | TRIP BLANK 3 LOT #082113 B-TS SHP0262 | 9/4/2013 | 11:00 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| SW BLANK | TRIP BLANK 1 LOT #082113 B-TS SHP0262 | 9/4/2013 | 12:30 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| GW BLANK | TRIP BLANK 4 LOT111212 B-TS SHP0259 | 9/9/2013 | 10:40 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| GW BLANK | TRIP BLANK 1 LOT082113 B-TS SHP0262 | 9/9/2013 | 13:30 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| GW BLANK | YOSD-1309-137 | 9/9/2013 | 13:30 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| GW BLANK | TRIP BLANK 3 LOT082113 B-TS SHP0262 | 9/10/2013 | 11:00 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| GW BLANK | TRIP BLANK 6 LOT082113 B-TS SHP0262 | 9/10/2013 | 13:00 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| GW BLANK | TRIP BLANK 2 LOT082113 B-TS SHP0262 | 9/10/2013 | 15:00 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| GW BLANK | YOSD-1309-138 | 9/11/2013 | 14:20 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| GW BLANK | TRIP BLANK 5 LOT082813 B-TS SHP0262 | 9/12/2013 | 11:45 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |
| GW BLANK | TRIP BLANK LOT091013 B-TS SHP0262 | 9/13/2013 | 10:00 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 | < 1.0 | < 1.0 | < 0.50 | < 1.0 | < 0.50 |

**NOTES:**
**VQs - Validator Qualifiers**
**U - Blank Exceedance**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| SOIL BLANK | YOSD-1210-200 | 10/3/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-201 | 10/3/2012 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259B | 10/10/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-202 | 10/10/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-203 | 10/10/2012 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT092112 B-TS SHP0259 | 10/16/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-204 | 10/16/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-205 | 10/16/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259B | 10/19/2012 | 15:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1210-206 | 10/19/2012 | 15:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1210-207 | 10/19/2012 | 15:25 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259 | 10/25/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-208 | 10/25/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-209 | 10/25/2012 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259 | 10/26/2012 | 15:33 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1210-210 | 10/31/2012 | 9:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1210-211 | 10/31/2012 | 9:32 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-212 | 11/2/2012 | 10:42 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-213 | 11/2/2012 | 10:50 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259 | 11/7/2012 | 15:14 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-214 | 11/7/2012 | 15:14 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-215 | 11/7/2012 | 15:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-216 | 11/8/2012 | 15:32 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-217 | 11/8/2012 | 15:39 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-302 | 11/28/2012 | 10:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-301 | 11/28/2012 | 10:44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-303 | 11/28/2012 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-304 | 11/28/2012 | 15:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259A | 11/29/2012 | 11:38 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-401 | 11/29/2012 | 11:38 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-402 | 11/29/2012 | 11:43 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-403 | 11/30/2012 | 10:38 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-404 | 11/30/2012 | 10:43 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-405 | 11/30/2012 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-406 | 11/30/2012 | 12:35 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1304-100 | 4/11/2013 | 13:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262 | 4/19/2013 | 11:05 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1304-102 | 4/19/2013 | 11:05 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT #031913 B-TS SHP0262 | 4/23/2013 | 12:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1304-103 | 4/23/2013 | 12:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262A | 4/29/2013 | 16:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1304-104 | 4/29/2013 | 16:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-101 | 5/1/2013 | 14:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT031913 B-TS SHP0262 | 5/2/2013 | 17:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-102 | 5/2/2013 | 17:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-104 | 5/8/2013 | 16:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-105 | 5/15/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-106 | 5/20/2013 | 15:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-107 | 5/22/2013 | 13:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT050213 B-TS SHP0262 | 5/24/2013 | 14:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-108 | 5/24/2013 | 14:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT #042313 B-TS SHP0262 | 5/30/2013 | 14:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-109 | 5/30/2013 | 14:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT #051713 B-TS SHP0262 | 6/3/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT #051713 B-TS SHP0262 | 6/3/2013 | 15:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT #051713 B-TS SHP0262 | 6/3/2013 | 17:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262A-3 | 6/4/2013 | 9:43 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262A-4 | 6/4/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262A-2 | 6/4/2013 | 14:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262A-1 | 6/4/2013 | 15:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 5 LOT051713 B-TS SHP0262A-5 | 6/4/2013 | 16:52 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262 | 6/5/2013 | 9:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262 | 6/5/2013 | 11:58 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262 | 6/5/2013 | 16:24 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262 | 6/5/2013 | 17:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | YOSD-1306-311 | 6/5/2013 | 17:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262B | 6/6/2013 | 10:42 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262B | 6/6/2013 | 14:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262B | 6/6/2013 | 16:17 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262B | 6/6/2013 | 17:15 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | YOSD-1306-315 | 6/6/2013 | 17:15 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT052213 B-TS SHP0262 | 6/7/2013 | 10:12 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262D | 6/7/2013 | 13:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT #052213 B-TS SHP0262 | 6/10/2013 | 15:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1306-110 | 6/10/2013 | 15:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1306-111 | 6/11/2013 | 10:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1306-112 | 6/11/2013 | 14:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1306-113 | 6/28/2013 | 15:05 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1307-100 | 7/1/2013 | 17:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 1 LOT071512 B-TS SHP0262 | 7/16/2013 | 9:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |

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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| SW BLANK | TRIP BLANK 3 LOT070512 B-TS SHP0262 | 7/16/2013 | 12:55 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | YOSD-1307-606 | 7/16/2013 | 14:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 2 LOT070512 B-TS SHP0262 | 7/16/2013 | 15:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT 070513 B-TS SHP0262 | 7/17/2013 | 11:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1307-608 | 7/17/2013 | 11:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-101 | 8/2/2013 | 7:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT073113 B-TS SHP0262 | 8/7/2013 | 16:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-103 | 8/7/2013 | 16:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-104 | 8/8/2013 | 10:15 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-105 | 8/8/2013 | 13:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-106 | 8/12/2013 | 13:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 4 LOT #082113 B-TS SHP0262 | 9/4/2013 | 8:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | YOSD-1309-107 | 9/4/2013 | 8:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 2 LOT #082113 B-TS SHP0262 | 9/4/2013 | 10:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | YOSD-1309-108 | 9/4/2013 | 10:15 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 3 LOT #082113 B-TS SHP0262 | 9/4/2013 | 11:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 1 LOT #082113 B-TS SHP0262 | 9/4/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 4 LOT111212 B-TS SHP0259 | 9/9/2013 | 10:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT082113 B-TS SHP0262 | 9/9/2013 | 13:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | YOSD-1309-137 | 9/9/2013 | 13:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT082113 B-TS SHP0262 | 9/10/2013 | 11:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 6 LOT082113 B-TS SHP0262 | 9/10/2013 | 13:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT082113 B-TS SHP0262 | 9/10/2013 | 15:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | YOSD-1309-138 | 9/11/2013 | 14:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 5 LOT082813 B-TS SHP0262 | 9/12/2013 | 11:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK LOT091013 B-TS SHP0262 | 9/13/2013 | 10:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |

**NOTES:**
**VQs - Validator Qualifiers**
**U - Blank Exceedance**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| SOIL BLANK | YOSD-1210-200 | 10/3/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-201 | 10/3/2012 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259B | 10/10/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-202 | 10/10/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-203 | 10/10/2012 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT092112 B-TS SHP0259 | 10/16/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-204 | 10/16/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-205 | 10/16/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259B | 10/19/2012 | 15:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1210-206 | 10/19/2012 | 15:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 0.29 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1210-207 | 10/19/2012 | 15:25 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 0.32 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259 | 10/25/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-208 | 10/25/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-209 | 10/25/2012 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259 | 10/26/2012 | 15:33 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1210-210 | 10/31/2012 | 9:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 0.75 | U | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1210-211 | 10/31/2012 | 9:32 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 1.0 | U | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-212 | 11/2/2012 | 10:42 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-213 | 11/2/2012 | 10:50 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259 | 11/7/2012 | 15:14 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-214 | 11/7/2012 | 15:14 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 3.7 | U | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-215 | 11/7/2012 | 15:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 5.4 | U | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-216 | 11/8/2012 | 15:32 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 1.3 | U | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-217 | 11/8/2012 | 15:39 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 0.74 | U | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-302 | 11/28/2012 | 10:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-301 | 11/28/2012 | 10:44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-303 | 11/28/2012 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-304 | 11/28/2012 | 15:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259A | 11/29/2012 | 11:38 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-401 | 11/29/2012 | 11:38 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-402 | 11/29/2012 | 11:43 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-403 | 11/30/2012 | 10:38 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-404 | 11/30/2012 | 10:43 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-405 | 11/30/2012 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-406 | 11/30/2012 | 12:35 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1304-100 | 4/11/2013 | 13:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262 | 4/19/2013 | 11:05 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1304-102 | 4/19/2013 | 11:05 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT #031913 B-TS SHP0262 | 4/23/2013 | 12:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1304-103 | 4/23/2013 | 12:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262A | 4/29/2013 | 16:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1304-104 | 4/29/2013 | 16:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-101 | 5/1/2013 | 14:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT031913 B-TS SHP0262 | 5/2/2013 | 17:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-102 | 5/2/2013 | 17:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 0.15 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-104 | 5/8/2013 | 16:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-105 | 5/15/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-106 | 5/20/2013 | 15:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-107 | 5/22/2013 | 13:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT050213 B-TS SHP0262 | 5/24/2013 | 14:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-108 | 5/24/2013 | 14:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT #042313 B-TS SHP0262 | 5/30/2013 | 14:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-109 | 5/30/2013 | 14:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 0.26 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT #051713 B-TS SHP0262 | 6/3/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT #051713 B-TS SHP0262 | 6/3/2013 | 15:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT #051713 B-TS SHP0262 | 6/3/2013 | 17:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262A-3 | 6/4/2013 | 9:43 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262A-4 | 6/4/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262A-2 | 6/4/2013 | 14:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262A-1 | 6/4/2013 | 15:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 5 LOT051713 B-TS SHP0262A-5 | 6/4/2013 | 16:52 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262 | 6/5/2013 | 9:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262 | 6/5/2013 | 11:58 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262 | 6/5/2013 | 16:24 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262 | 6/5/2013 | 17:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | YOSD-1306-311 | 6/5/2013 | 17:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 0.39 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262B | 6/6/2013 | 10:42 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262B | 6/6/2013 | 14:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262B | 6/6/2013 | 16:17 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262B | 6/6/2013 | 17:15 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | YOSD-1306-315 | 6/6/2013 | 17:15 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT052213 B-TS SHP0262 | 6/7/2013 | 10:12 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262D | 6/7/2013 | 13:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT #052213 B-TS SHP0262 | 6/10/2013 | 15:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1306-110 | 6/10/2013 | 15:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1306-111 | 6/11/2013 | 10:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 2.3 | U | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1306-112 | 6/11/2013 | 14:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 3.1 | U | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1306-113 | 6/28/2013 | 15:05 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1307-100 | 7/1/2013 | 17:10 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 3.3 | U | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 1 LOT071512 B-TS SHP0262 | 7/16/2013 | 9:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | |
| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | | | esult | s | s | esult | | | esult | s | s | esult | | |
| SW BLANK | TRIP BLANK 3 LOT070512 B-TS SHP0262 | 7/16/2013 | 12:55 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | YOSD-1307-606 | 7/16/2013 | 14:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | 6.9 | | J | < 1.0 | | | 2.7 | U | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 2 LOT070512 B-TS SHP0262 | 7/16/2013 | 15:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT 070513 B-TS SHP0262 | 7/17/2013 | 11:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1307-608 | 7/17/2013 | 11:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 3.6 | U | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-101 | 8/2/2013 | 7:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | 2.2 | U | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT073113 B-TS SHP0262 | 8/7/2013 | 16:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-103 | 8/7/2013 | 16:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-104 | 8/8/2013 | 10:15 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-105 | 8/8/2013 | 13:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-106 | 8/12/2013 | 13:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 4 LOT #082113 B-TS SHP0262 | 9/4/2013 | 8:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | YOSD-1309-107 | 9/4/2013 | 8:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 2 LOT #082113 B-TS SHP0262 | 9/4/2013 | 10:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | YOSD-1309-108 | 9/4/2013 | 10:15 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 3 LOT #082113 B-TS SHP0262 | 9/4/2013 | 11:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 1 LOT #082113 B-TS SHP0262 | 9/4/2013 | 12:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 4 LOT111212 B-TS SHP0259 | 9/9/2013 | 10:40 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT082113 B-TS SHP0262 | 9/9/2013 | 13:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | YOSD-1309-137 | 9/9/2013 | 13:30 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT082113 B-TS SHP0262 | 9/10/2013 | 11:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 6 LOT082113 B-TS SHP0262 | 9/10/2013 | 13:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT082113 B-TS SHP0262 | 9/10/2013 | 15:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | YOSD-1309-138 | 9/11/2013 | 14:20 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 5 LOT082813 B-TS SHP0262 | 9/12/2013 | 11:45 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK LOT091013 B-TS SHP0262 | 9/13/2013 | 10:00 | < 0.50 | | | < 1.0 | | | < 1.0 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 20 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |

**NOTES:**
**VQs - Validator Qualifiers**
**U - Blank Exceedance**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

| I H I | | | | H H | | | | | | I H , , H | | | I H , , H | | | I H H | | | I H H | | | , , I H | | | I H I | | | | | | | | | | | |
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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| SOIL BLANK | YOSD-1210-200 | 10/3/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-201 | 10/3/2012 | 13:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259B | 10/10/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-202 | 10/10/2012 | 9:40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-203 | 10/10/2012 | 10:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT092112 B-TS SHP0259 | 10/16/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-204 | 10/16/2012 | 10:10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-205 | 10/16/2012 | 13:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259B | 10/19/2012 | 15:20 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1210-206 | 10/19/2012 | 15:20 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1210-207 | 10/19/2012 | 15:25 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT 101612 B-TS SHP0259 | 10/25/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-208 | 10/25/2012 | 14:50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1210-209 | 10/25/2012 | 15:00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT 092112 B-TS SHP0259 | 10/26/2012 | 15:33 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1210-210 | 10/31/2012 | 9:20 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1210-211 | 10/31/2012 | 9:32 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-212 | 11/2/2012 | 10:42 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-213 | 11/2/2012 | 10:50 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259 | 11/7/2012 | 15:14 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-214 | 11/7/2012 | 15:14 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-215 | 11/7/2012 | 15:20 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-216 | 11/8/2012 | 15:32 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-217 | 11/8/2012 | 15:39 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-302 | 11/28/2012 | 10:41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-301 | 11/28/2012 | 10:44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-303 | 11/28/2012 | 15:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | YOSD-1211-304 | 11/28/2012 | 15:34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL BLANK | TRIP BLANK LOT102512 B-TS SHP0259A | 11/29/2012 | 11:38 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-401 | 11/29/2012 | 11:38 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-402 | 11/29/2012 | 11:43 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-403 | 11/30/2012 | 10:38 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-404 | 11/30/2012 | 10:43 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-405 | 11/30/2012 | 12:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1211-406 | 11/30/2012 | 12:35 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1304-100 | 4/11/2013 | 13:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262 | 4/19/2013 | 11:05 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1304-102 | 4/19/2013 | 11:05 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT #031913 B-TS SHP0262 | 4/23/2013 | 12:45 | < 0.50 | | | 0.18 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1304-103 | 4/23/2013 | 12:45 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT032813 B-TS SHP0262A | 4/29/2013 | 16:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1304-104 | 4/29/2013 | 16:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-101 | 5/1/2013 | 14:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT031913 B-TS SHP0262 | 5/2/2013 | 17:10 | < 0.50 | | | 0.28 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-102 | 5/2/2013 | 17:10 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-104 | 5/8/2013 | 16:45 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-105 | 5/15/2013 | 12:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-106 | 5/20/2013 | 15:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-107 | 5/22/2013 | 13:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT050213 B-TS SHP0262 | 5/24/2013 | 14:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-108 | 5/24/2013 | 14:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT #042313 B-TS SHP0262 | 5/30/2013 | 14:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1305-109 | 5/30/2013 | 14:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT #051713 B-TS SHP0262 | 6/3/2013 | 12:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT #051713 B-TS SHP0262 | 6/3/2013 | 15:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT #051713 B-TS SHP0262 | 6/3/2013 | 17:45 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262A-3 | 6/4/2013 | 9:43 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262A-4 | 6/4/2013 | 12:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262A-2 | 6/4/2013 | 14:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262A-1 | 6/4/2013 | 15:10 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 5 LOT051713 B-TS SHP0262A-5 | 6/4/2013 | 16:52 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262 | 6/5/2013 | 9:40 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262 | 6/5/2013 | 11:58 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262 | 6/5/2013 | 16:24 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262 | 6/5/2013 | 17:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | YOSD-1306-311 | 6/5/2013 | 17:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262B | 6/6/2013 | 10:42 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT051713 B-TS SHP0262B | 6/6/2013 | 14:20 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT051713 B-TS SHP0262B | 6/6/2013 | 16:17 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 4 LOT051713 B-TS SHP0262B | 6/6/2013 | 17:15 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | YOSD-1306-315 | 6/6/2013 | 17:15 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT052213 B-TS SHP0262 | 6/7/2013 | 10:12 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT051713 B-TS SHP0262D | 6/7/2013 | 13:10 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT #052213 B-TS SHP0262 | 6/10/2013 | 15:45 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1306-110 | 6/10/2013 | 15:45 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1306-111 | 6/11/2013 | 10:00 | < 0.50 | | | 0.15 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1306-112 | 6/11/2013 | 14:20 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1306-113 | 6/28/2013 | 15:05 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1307-100 | 7/1/2013 | 17:10 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 1 LOT071512 B-TS SHP0262 | 7/16/2013 | 9:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |

| I H I | | | | H H | | | | | | , , I H H | | | | | | I H H | | | , , I H | | | I H I | | | | | | | | |
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| et od | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nit | | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | |
| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| SW BLANK | TRIP BLANK 3 LOT070512 B-TS SHP0262 | 7/16/2013 | 12:55 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | YOSD-1307-606 | 7/16/2013 | 14:40 | < 0.50 | | | 0.20 | | J | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 2 LOT070512 B-TS SHP0262 | 7/16/2013 | 15:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT 070513 B-TS SHP0262 | 7/17/2013 | 11:45 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1307-608 | 7/17/2013 | 11:45 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-101 | 8/2/2013 | 7:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | TRIP BLANK LOT073113 B-TS SHP0262 | 8/7/2013 | 16:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-103 | 8/7/2013 | 16:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-104 | 8/8/2013 | 10:15 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-105 | 8/8/2013 | 13:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SOIL BLANK | YOSD-1308-106 | 8/12/2013 | 13:20 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 4 LOT #082113 B-TS SHP0262 | 9/4/2013 | 8:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | YOSD-1309-107 | 9/4/2013 | 8:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 2 LOT #082113 B-TS SHP0262 | 9/4/2013 | 10:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | YOSD-1309-108 | 9/4/2013 | 10:15 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 3 LOT #082113 B-TS SHP0262 | 9/4/2013 | 11:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| SW BLANK | TRIP BLANK 1 LOT #082113 B-TS SHP0262 | 9/4/2013 | 12:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 4 LOT111212 B-TS SHP0259 | 9/9/2013 | 10:40 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 1 LOT082113 B-TS SHP0262 | 9/9/2013 | 13:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | YOSD-1309-137 | 9/9/2013 | 13:30 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 3 LOT082113 B-TS SHP0262 | 9/10/2013 | 11:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 6 LOT082113 B-TS SHP0262 | 9/10/2013 | 13:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 2 LOT082113 B-TS SHP0262 | 9/10/2013 | 15:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | YOSD-1309-138 | 9/11/2013 | 14:20 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK 5 LOT082813 B-TS SHP0262 | 9/12/2013 | 11:45 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |
| GW BLANK | TRIP BLANK LOT091013 B-TS SHP0262 | 9/13/2013 | 10:00 | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |

**NOTES:**
**VQs - Validator Qualifiers**
**U - Blank Exceedance**

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | H | | | H | | | H | | | H | | | H | | |
| nit | | | | mg | | | mg | | | mg | | | mg | | | mg | | | mg | | | mg | | | mg | | | ug | | | ug | | | ug | | | ug | | | ug | | |
| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| POTABLE WATER | YOSD-1304-POT | 4/24/2013 | 14:14 | 0.007 | | | < 0.05 | | | < 0.001 | | | < 0.005 | | | < 0.001 | | | < 0.0001 | | | < 0.001 | | | < 0.001 | | | < 1.0 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | | < 0.50 | | |

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| nit | | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | |
| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| POTABLE WATER | YOSD-1304-POT | 4/24/2013 | 14:14 | < 0.50 | | | < 0.50 | | | < 1.0 | | | < 20 | | | < 20 | | | < 20 | | | < 20 | | | <300 | | |

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| nit | | | | mg | | | mg | | | mg | | | mg | | | mg | | | mg | | | mg | | | mg | | | ug | | | ug | | | ug | | | ug | | | ug | | | ug | | |
| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| DECON WATER | YOSD-1305-501 | 5/3/2013 | 12:40 | 0.028 | | | 0.66 | | | 0.002 | | | 0.062 | | | 10.0 | | | 0.0010 | | D | 0.002 | | | 0.002 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | |

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| DECON WATER | YOSD-1305-501 | 5/3/2013 | 12:40 | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | |

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| DECON WATER | YOSD-1305-501 | 5/3/2013 | 12:40 | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | 6.4 | | J | <200 | | |

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| DECON WATER | YOSD-1305-501 | 5/3/2013 | 12:40 | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | <10 | | | 7.1 | | | J |

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| DECON WATER | YOSD-1305-501 | 5/3/2013 | 12:40 | <10 | | | 7.1 | | J | 8650 | | * | 6950 | | * | 7550 | | * | 25500 | | * | 17 | | | <0.40 | | | <0.40 | | | <0.40 | | | 0.88 | | * | <0.40 | | | <0.40 | | | <0.40 | | |

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| DECON WATER | YOSD-1305-501 | 5/3/2013 | 12:40 | <0.40 | | | 0.57 | | | <0.40 | | | 0.60 | | | 2.2 | | | <0.40 | | | 4.8 | | | 5.6 | | | 1.1 | | |

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| PURGE WATER | YOSD-1309-500 | 9/20/2013 | 13:00 | 0.064 | | | 0.30 | | | < 0.001 | | | 0.027 | | | 0.283 | | | < 0.0001 | | | 0.002 | | | < 0.001 | | | 12 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | |

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| PURGE WATER | YOSD-1309-500 | 9/20/2013 | 13:00 | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | |

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| PURGE WATER | YOSD-1309-500 | 9/20/2013 | 13:00 | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | 29 | | | 48 | | J |

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| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| PURGE WATER | YOSD-1309-500 | 9/20/2013 | 13:00 | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | 1.5 | | J | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | <2.5 | | | 32 | | |

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| raction | | | | | | | | | | H | | | H | | | H | | | H | | |
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| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| PURGE WATER | YOSD-1309-500 | 9/20/2013 | 13:00 | 3.4 | | | 36 | | | 452000 | | * | 387000 | | * | 552000 | | * | 1510000 | | * |

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| raction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | H |
| nit | | | | | | | mg | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| SOIL WASTE | IDW-SB-100 | 1/7/2013 | 14:52 | 17 | | | 0.4 | | | 7 | | | 125 | | | <1 | | | 20 | | | 28 | | | 162 | | | <1 | | | 13 | | | <1 | | | <1 | | | 95 | | | <2.4 | | D |
| SOIL WASTE-COMPOSITE | IDW-SB-101 | 1/25/2013 | 12:30 | 16 | | | 1.6 | | | 9 | | | 208 | | | <1 | | | 31 | | | 86 | | | 463 | | | <1 | | | 21 | | | <5 | | | <5 | | | 66 | | | <2.4 | | D |
| SOIL WASTE | IDW-SB-102 | 5/31/2013 | 11:30 | 8.8 | | | 0.7 | | | 8 | | | 217 | | | <1 | | | 17 | | | | | | 1790 | | | <1 | | | | | | <1 | | | <1 | | | | | | <0.55 | | D |

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| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| SOIL WASTE | IDW-SB-100 | 1/7/2013 | 14:52 | 2.9 | | * | <1.2 | | D | 23 | | * | 9.1 | | | 4.8 | | | 14 | | | 31 | | * | 1270 | | * | 558 | | * | 2100 | | * | 4470 | | * | 7160 | | * | 2910 | | * | 776 | | |
| SOIL WASTE-COMPOSITE | IDW-SB-101 | 1/25/2013 | 12:30 | <1.2 | | D | <1.2 | | D | 22 | | * | 15 | | | 4.5 | | | 19 | | | 13 | | * | 746 | | * | 581 | | * | 1180 | | * | 2430 | | * | 10300 | | * | 3120 | | * | 1730 | | |
| SOIL WASTE | IDW-SB-102 | 5/31/2013 | 11:30 | <0.27 | | D | <0.27 | | D | <0.27 | | D | <0.27 | | D | <0.27 | | D | <0.27 | | D | 0.66 | | | 32 | | | <11 | | D | 29 | | | 114 | | * | 2460 | | * | 428 | | * | 572 | | |

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| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| SOIL WASTE | IDW-SB-100 | 1/7/2013 | 14:52 | 1750 | | * | 5820 | | | 105 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | 6.2 | | | <4.0 | | | <4.0 | | | <4.0 | | | 5.6 | | | <4.0 | | | <4.0 | | |
| SOIL WASTE-COMPOSITE | IDW-SB-101 | 1/25/2013 | 12:30 | 3130 | | * | 8760 | | | 40 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | 15 | | | <3.0 | | | <3.0 | | | <3.0 | | | 19 | | | <3.0 | | | <3.0 | | |
| SOIL WASTE | IDW-SB-102 | 5/31/2013 | 11:30 | 719 | | * | 1960 | | | 3550 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| SOIL WASTE | IDW-SB-100 | 1/7/2013 | 14:52 | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | |
| SOIL WASTE-COMPOSITE | IDW-SB-101 | 1/25/2013 | 12:30 | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | |
| SOIL WASTE | IDW-SB-102 | 5/31/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| SOIL WASTE | IDW-SB-100 | 1/7/2013 | 14:52 | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | 1.2 | | J | 1.2 | | J | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | |
| SOIL WASTE-COMPOSITE | IDW-SB-101 | 1/25/2013 | 12:30 | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | 1.8 | | J | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | |
| SOIL WASTE | IDW-SB-102 | 5/31/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
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| SOIL WASTE | IDW-SB-100 | 1/7/2013 | 14:52 | <4.0 | | | <4.0 | | | 3.7 | | J | <4.0 | | | <4.0 | | | <4.0 | | | <4.0 | | | 1.6 | | J | 1.3 | | J | <4.0 | | | | | | | | | | | |
| SOIL WASTE-COMPOSITE | IDW-SB-101 | 1/25/2013 | 12:30 | <3.0 | | | <3.0 | | | 7.5 | | | <3.0 | | | <3.0 | | | <3.0 | | | <3.0 | | | 4.7 | | | 1.2 | | J | <3.0 | | | 19 | | | 0.41 | | | <0.060 | | | 0.87 | | |
| SOIL WASTE | IDW-SB-102 | 5/31/2013 | 11:30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.069 | | | <0.067 | | | <0.067 | | | 0.16 | | |

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| SOIL WASTE | IDW-SB-100 | 1/7/2013 | 14:52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL WASTE-COMPOSITE | IDW-SB-101 | 1/25/2013 | 12:30 | <0.060 | | | <0.060 | | | <0.060 | | | <0.060 | | | <0.060 | | | <0.060 | | | <0.060 | | | 0.45 | | | 2.4 | | | <0.060 | | | 7.5 | | * | 4.9 | | | 0.81 | | |
| SOIL WASTE | IDW-SB-102 | 5/31/2013 | 11:30 | 0.12 | | | 0.073 | | * | 0.15 | | | 0.11 | | | 0.082 | | | 0.25 | | | <0.067 | | | 0.22 | | | 0.077 | | | 0.24 | | * | <0.067 | | | 0.16 | | | 0.30 | | |

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| FILL | YOSD-1301-100 | 1/4/2013 | 15:00 | 3.5 | | | 1 | | | 57 | | | <1 | | | 12 | | | 6 | | | <1 | | | <1 | | | <1 | | | <0.10 | | | <0.052 | | | <0.052 | | | <0.052 | | |
| FILL | YOSD-1311-FILL | 10/17/2013 | 12:40 | 5.4 | | | 2 | | | 92 | | | <1 | | | 8 | | | 7 | | | <1 | | | <1 | | | <1 | | | <0.11 | | | <0.053 | | | <0.053 | | | <0.053 | | |

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| raction | | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | | H | | |
| nit | | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | | mg g | | |
| I I | am le ode | ate | ime | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s | esult | s | s |
| FILL | YOSD-1301-100 | 1/4/2013 | 15:00 | <0.052 | | | <0.052 | | | <0.052 | | | <0.10 | | | <2.1 | | | <2.1 | | | <2.1 | | | <2.1 | | | <10 | | |
| FILL | YOSD-1311-FILL | 10/17/2013 | 12:40 | <0.053 | | | <0.053 | | | <0.053 | | | <0.11 | | | <2.1 | | | <2.1 | | | <2.1 | | | <2.1 | | | <11 | | |

**NOTES:**
**VQs - Validator Qualifiers (DATA IS NOT VALIDATED)**
**U - Blank Exceedance**

**LQs - Lab Qualifiers**
*** - Result exceeds the MCL (The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These limits may not apply to the samples.)**
**B - The analyte was detected in the method blank.**
**D - Analyte Reporting Limit increased due to sample matrix.**
**E - Estimated value. Result exceeds the instrument upper quantitation limit.**
**H - Analysis performed past recommended holding time.**
**J - Estimated value. The analyte was present but less than the reporting limit.**
**L - Lowest available reporting limit for the analytical method used.**

# APPENDIX H

# INVESTIGATION DERIVED WASTE DISPOSAL

**CITY OF BILLINGS PUBLIC WORKS DEPARTMENT**

**LIQUID WASTE/SEPTAGE PERMIT – MANIFEST** Manifest No. 39767

Domestic Septage Grease Trap Wastes Industrial/Other (attach Discharge Authorization)

No Appointment Appointment Date_____ Time_____

*This Section to be filled in by Generator*

Generator Business/Residence Name Hydrometrics

Address 550 1st Ave North Phone No. (406) 656-1172

Authorized Representative X James D. Shaffer

Description of Waste Wash Water from Neal Tank

Volume of Waste 100 gallons

"I certify that the information furnished herein is true, accurate and complete, and that any test results of the waste submitted to the Department accurately represent the waste presented for disposal, and, for nonseptage waste, that I have contacted the Department and received approval for disposal of this waste. I certify that the waste contains no materials prohibited by Section 26-606, BMCC or hazardous materials as defined by any applicable local, state or federal law. I understand that violation of any of the rules and regulations of the Department or ordinances and resolutions of the City will subject me to revocation of disposal privileges under this program and to any penalties available under the law."

Generator Signature X James D Shaffer Date 12/13/12

(Authorized Representative/Homeowner) (or a copy of contract authorizing removal of wastes)

*This Section to be filled in by Waste Hauler*

Waste Hauler Business Name Andersen Sewer

Waste Received by Hauler on 12/13/12 at 9:15 (AM) PM

Truck No. #21

"I certify that the information furnished herein is true, accurate and complete. I certify that I have not added any materials prohibited by Section 26-606, BMCC or hazardous or other untested or unauthorized materials to this waste and agree that I will not dispose of any hazardous materials as defined by applicable local, state or federal law. I understand that violation of any of the rules and regulations of the Department or ordinances and resolutions of the city will subject me to revocation of disposal privileges and to any penalties available under the law."

Driver/Operator Signature _____

*This Section to be filled in by Wastewater Plant Personnel*

Discharge Refused: Coupon Issue Missing Signatures/Authorization pH Issue No Appointment

Designated Discharge Location: Waste Disposal Station Grease Disposal Station Other_____

Volume: _____ (est gallons) Discharge Coupons attached: yes no #_____(1 per1000 gal)

If sampled, Sample ID # _____ pH _____(must be between 5.0 – 11.0)

Comment: _____

WWTP Employee Signature _____ Date 12/13/12 at 9:45 (AM) PM

*Signature verifies that the above named hauler delivered the described wastes in the designated volume for proper disposal*

** SEE BACK OF FORM FOR MATERIALS PROHIBITED UNDER SECTION 26-606 BMCC

Distribution:

White Copy – City Yellow Copy – Waste Hauler Pink Copy – Waste Generator

U-41-12 Rev. 121605

BILLINGS REGIONAL LANDFILL
P.O. BOX 1178
Billings,Mt. 59103

016567 HYDROMETRICS
5602 HESPER RD
BILLINGS MT 59106

RECEIVED
MAR 08 2013
BY:

| SITE | TICKET | GRID | WEIGHMASTER |
|---|---|---|---|
| 02 | 00719430 | AREA A | SCOTT MURDOCK |

| DATE IN | DATE OUT | TIME IN | TIME OUT | VEHICLE | ROLL OFF |
|---|---|---|---|---|---|
| 02/26/13 | 02/26/13 | 09:37 | 10:33 | | |

| REFERENCE | ORIGIN |
|---|---|
| | YELLOWSTONE COUNTY |

| | | | |
|---|---|---|---|
| Scale 1 Gross Wt. | 56140 | LB | Inbound - Charge ticket |
| Manual Tare Wt. | 44700 | LB | |
| Net Weight | 11440 | LB | |

| QUANTITY | UNIT | DESCRIPTION | RATE | EXTENSION | FEE | TOTAL |
|---|---|---|---|---|---|---|
| 5.72 | TON | SPECIAL WASTE/TON | 35.200 | 201.35 | 0.00 | 201.35 |

HOURS 8AM TO 530PM MONDAY THRU SUNDAY(CLOSED SUNDAY DEC-FEB)
This is to certify that this load does not contain any
hazardous materials, medical waste or liquids of any type.
A MINIMUM CHARGE OF $5.00 WILL APPLY

| NET AMOUNT |
|---|
| 201.35 |
| TENDERED |
| |
| CHANGE |
| |
| CHECK NO. |
| |

PRINT NAME: _____ SIGNATURE: _____

11108/002
KA

BILLINGS REGIONAL LANDFILL
P.O. BOX 1178
Billings,Mt. 59103

RECEIVED
JUN 25 2013
BY:

016567 HYDROMETRICS
5602 HESPER RD
BILLINGS MT 59106

| SITE | TICKET | GRID | WEIGHMASTER |
|---|---|---|---|
| 02 | 00739300 | AREA A | SCOTT MURDOCK |

| DATE IN | DATE OUT | TIME IN | TIME OUT | VEHICLE | ROLL OFF |
|---|---|---|---|---|---|
| 06/11/13 | 06/11/13 | 12:23 | 12:23 | | |

| REFERENCE | ORIGIN |
|---|---|
| | YELLOWSTONE COUNTY |

| | | | |
|---|---|---|---|
| Manual Gross Wt. | 25940 | LB | Inbound - Charge ticket |
| Manual Tare Wt. | 23040 | LB | |
| Net Weight | 2900 | LB | |

| QUANTITY | UNIT | DESCRIPTION | RATE | EXTENSION | FEE | TOTAL |
|---|---|---|---|---|---|---|
| 1.45 | TON | SPECIAL WASTE/TON | 35.200 | 51.05 | 0.00 | 51.05 |

HOURS 8AM TO 530PM MONDAY THRU SUNDAY(CLOSED SUNDAY DEC-FEB)
This is to certify that this load does not contain any
hazardous materials, medical waste or liquids of any type.
A MINIMUM CHARGE OF $5.00 WILL APPLY

| NET AMOUNT |
|---|
| 51.05 |
| TENDERED |
| |
| CHANGE |
| |
| CHECK NO. |
| |

PRINT NAME: Rodney Brady PSC SIGNATURE: Rodney Brady

11108/002
KA

BILLINGS REGIONAL LANDFILL
P.O. BOX 1178
Billings,Mt. 59103

016567 HYDROMETRICS
5602 HESPER RD
BILLINGS MT 59106

RECEIVED
JUN 25 2013
BY:

| SITE | TICKET | GRID | WEIGHMASTER |
|---|---|---|---|
| 02 | 00739729 | AREA A | SCOTT MURDOCK |

| DATE IN | DATE OUT | TIME IN | TIME OUT | VEHICLE | ROLL OFF |
|---|---|---|---|---|---|
| 06/12/13 | 06/12/13 | 16:34 | 16:34 | | |

| REFERENCE | ORIGIN |
|---|---|
| | YELLOWSTONE COUNTY |

| | | |
|---|---|---|
| Manual Gross Wt. | 25260 | LB |
| Manual Tare Wt. | 23040 | LB |
| Net Weight | 2220 | LB |

Inbound - Charge ticket

| QUANTITY | UNIT | DESCRIPTION | RATE | EXTENSION | FEE | TOTAL |
|---|---|---|---|---|---|---|
| 1.11 | TON | SPECIAL WASTE/TON | 35.200 | 39.05 | 0.00 | 39.05 |

HOURS 8AM TO 530PM MONDAY THRU SUNDAY(CLOSED SUNDAY DEC-FEB)
This is to certify that this load does not contain any
hazardous materials, medical waste or liquids of any type.
A MINIMUM CHARGE OF $5.00 WILL APPLY

| NET AMOUNT |
|---|
| 39.05 |
| TENDERED |
| |
| CHANGE |
| |
| CHECK NO. |
| |

PRINT NAME: Rodney Brady PSC SIGNATURE: Rodney Brady

11108/002
KA

BILLINGS REGIONAL LANDFILL
P.O. BOX 1178
Billings,Mt. 59103

016567 HYDROMETRICS
5602 HESPER RD
BILLINGS MT 59106

RECEIVED
JUN 25 2013
BY:

| SITE | TICKET | GRID | WEIGHMASTER |
|---|---|---|---|
| 02 | 00739609 | AREA A | SCOTT MURDOCK |

| DATE IN | DATE OUT | TIME IN | TIME OUT | VEHICLE | ROLL OFF |
|---|---|---|---|---|---|
| 06/12/13 | 06/12/13 | 12:45 | 12:45 | | |

| REFERENCE | ORIGIN |
|---|---|
| | YELLOWSTONE COUNTY |

| | | |
|---|---|---|
| Manual Gross Wt. | 25220 | LB |
| Manual Tare Wt. | 23040 | LB |
| Net Weight | 2180 | LB |

Inbound - Charge ticket

| QUANTITY | UNIT | DESCRIPTION | RATE | EXTENSION | FEE | TOTAL |
|---|---|---|---|---|---|---|
| 1.09 | TON | SPECIAL WASTE/TON | 35.200 | 38.35 | 0.00 | 38.35 |

HOURS 8AM TO 530PM MONDAY THRU SUNDAY(CLOSED SUNDAY DEC-FEB)
This is to certify that this load does not contain any
hazardous materials, medical waste or liquids of any type.
A MINIMUM CHARGE OF $5.00 WILL APPLY

| NET AMOUNT |
|---|
| 38.35 |
| TENDERED |
| |
| CHANGE |
| |
| CHECK NO. |
| |

PRINT NAME: Rodney Brady PSC SIGNATURE: Rodney Brady

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

**UNIFORM HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: MTR000207811
2. Page 1 of: 1
3. Emergency Response Phone: 406-596-1172
4. Manifest Tracking Number: 011445036 JJK

5. Generator's Name and Mailing Address
Yale Oil of So.Dakota c/o Hydrometrics
3020 Bozeman Ave.Attn:Mike Vigoot
Helena,MT 59601
Generator's Phone: 406 656-1172

Generator's Site Address (if different than mailing address)
700 First Ave.North
Billings,MT 59101

6. Transporter 1 Company Name: BSC Industrial Outsourcing LP
U.S. EPA ID Number: [illegible]

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Clean Harbors Grassy Mountain,LLC
3 mi.East,7mi.So. of Knolls,exit 41,I-80
Grantsville, UT 84029
Facility's Phone: 435-884-8900
U.S. EPA ID Number: UTD009139172

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit WT/Vol. | 13. Waste Codes |
|---|---|---|---|---|---|---|
| E | 1. NA3082, Hazardous waste, liquid, n.o.s., 9, PGIII (Lead/D008) ERG#171 | 1 | TK | 2976 | G | D008 |
| | 2. | | | | | |
| | 3. | | | | | |
| | 4. | | | | | |

14. Special Handling Instructions and Additional Information
1) CH642154B Bulk East Trench rinsae water w/lead
(CC#BE000018/ YA7721) S.O.# D960272297

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: KRIS ADLER
Signature: Kris Adler
Month 06 Day 25 Year 13

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Larry E Smuffer
Signature: Larry E Smuffer
Month 06 Day 25 Year 13
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4. 2013003960

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Stacy Chadwick
Signature: Stacy Chadwick
Month 6 Day 26 Year 13

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

BILLINGS REGIONAL LANDFILL
P.O. BOX 1178
Billings,Mt. 59103

scanned + emailed to Marta 8/7

016567 HYDROMETRICS
5602 HESPER RD
BILLINGS MT 59106

| SITE | TICKET | GRID | WEIGHMASTER |
|---|---|---|---|
| 02 | 00746479 | AREA A | PAT |

| DATE IN | DATE OUT | TIME IN | TIME OUT | VEHICLE | ROLL OFF |
|---|---|---|---|---|---|
| 07/12/13 | 07/12/13 | 12:52 | 13:12 | | |

| REFERENCE | ORIGIN |
|---|---|
| | CITY OF BILLINGS |

| | | | |
|---|---|---|---|
| Manual Gross Wt. | 54040 | LB | Inbound - Charge ticket |
| Manual Tare Wt. | 41120 | LB | |
| Net Weight | 12920 | LB | |

| QUANTITY | UNIT | DESCRIPTION | RATE | EXTENSION | FEE | TOTAL |
|---|---|---|---|---|---|---|
| 6.46 | TON C | & D BY TON | 15.500 | 100.15 | 0.00 | 100.15 |

HOURS 8AM TO 530PM MONDAY-SATURDAY-SUNDAYS 12PM-5PM MAY-SEPT
This is to certify that this load does not contain any hazardous materials, medical waste or liquids of any type.
A MINIMUM CHARGE OF $5.00 WILL APPLY

| NET AMOUNT |
|---|
| 100.15 |
| TENDERED |
| |
| CHANGE |
| |
| CHECK NO. |
| |

PRINT NAME: Ron Henry SIGNATURE: Ron Henry

Balch: Billings 7/31/2013
11108.00.002
$ 100.15

OK KA

Kris, please approve + put on my desk thanks

OK KA
11108/002

BILLINGS REGIONAL LANDFILL
P.O. BOX 1178
Billings,Mt. 59103

016567 HYDROMETRICS
5602 HESPER RD
BILLINGS MT 59106

| SITE | | WEIGHMASTER |
|---|---|---|
| 02 | 00753055 \| AREA A | SCOTT MURDOCK |

| DATE IN | DATE OUT | TIME IN | TIME OUT | VEHICLE | ROLL OFF |
|---|---|---|---|---|---|
| 08/12/13 | 08/12/13 | 13:09 | 13:28 | | |

| REFERENCE | ORIGIN |
|---|---|
| | YELLOWSTONE COUNTY |

Scale 1 Gross Wt. 51440 LB
Scale 1 Tare Wt. 41160 LB
Net Weight 10280 LB

Inbound - Charge ticket

| QUANTITY | UNIT | DESCRIPTION | RATE | EXTENSION | FEE | TOTAL |
|---|---|---|---|---|---|---|
| 5.14 | TON | C&D BY TON YC | 17.001 | 87.40 | 0.00 | 87.40 |

HOURS 8AM TO 530PM MONDAY-SATURDAY-SUNDAYS 12PM-5PM MAY-SEPT
This is to certify that this load does not contain any
hazardous materials, medical waste or liquids of any type.
A MINIMUM CHARGE OF $5.00 WILL APPLY

| NET AMOUNT |
|---|
| 87.40 |
| TENDERED |
| |
| CHANGE |
| |
| CHECK NO. |
| |

PRINT NAME: _____ SIGNATURE: _____

11108 100-
KA

BILLINGS REGIONAL LANDFILL
P.O. BOX 1178
Billings,Mt. 59103

016567 HYDROMETRICS
5602 HESPER RD
BILLINGS MT 59106

| SITE | TICKET | GRID | WEIGHMASTER |
|---|---|---|---|
| 02 | 00761600 | AREA A | SCOTT MURDOCK |

| DATE IN | DATE OUT | TIME IN | TIME OUT | VEHICLE | ROLL OFF |
|---|---|---|---|---|---|
| 09/19/13 | 09/19/13 | 10:09 | 10:23 | | |

| REFERENCE | ORIGIN |
|---|---|
| | YELLOWSTONE COUNTY |

| | | | |
|---|---|---|---|
| Scale 1 Gross Wt. | 27100 | LB | Inbound - Charge ticket |
| Scale 1 Tare Wt. | 15300 | LB | |
| Net Weight | 11800 | LB | |

| QUANTITY | UNIT | DESCRIPTION | RATE | EXTENSION | FEE | TOTAL |
|---|---|---|---|---|---|---|
| 5.90 | TON | SPECIAL WASTE/TON | 36.080 | 212.85 | 0.00 | 212.85 |

HOURS 8AM TO 530PM MONDAY-SATURDAY-SUNDAYS 12PM-5PM MAY-SEPT
This is to certify that this load does not contain any
hazardous materials, medical waste or liquids of any type.
A MINIMUM CHARGE OF $5.00 WILL APPLY

| NET AMOUNT |
|---|
| 212.85 |
| TENDERED |
| |
| CHANGE |
| |
| CHECK NO. |
| |

PRINT NAME: _____ SIGNATURE: _____

BILLINGS REGIONAL LANDFILL
P.O. BOX 1178
Billings,Mt. 59103

016567 HYDROMETRICS
5602 HESPER RD
BILLINGS MT 59106

| SITE | TICKET | GRID | WEIGHMASTER |
|---|---|---|---|
| 02 | 00761643 | AREA D | SCOTT MURDOCK |

| DATE IN | DATE OUT | TIME IN | TIME OUT | VEHICLE | ROLL OFF |
|---|---|---|---|---|---|
| 09/19/13 | 09/19/13 | 11:51 | 11:51 | | |

| REFERENCE | ORIGIN |
|---|---|
| | YELLOWSTONE COUNTY |

| | | | |
|---|---|---|---|
| Scale 1 Gross Wt. | 27240 | LB | Inbound - Charge ticket |
| Manual Tare Wt. | 15300 | LB | |
| Net Weight | 11940 | LB | |

| QUANTITY | UNIT | DESCRIPTION | RATE | EXTENSION | FEE | TOTAL |
|---|---|---|---|---|---|---|
| 5.97 | TON | SPECIAL WASTE/TON | 36.080 | 215.40 | 0.00 | 215.40 |

HOURS 8AM TO 530PM MONDAY-SATURDAY-SUNDAYS 12PM-5PM MAY-SEPT
This is to certify that this load does not contain any
hazardous materials, medical waste or liquids of any type.
A MINIMUM CHARGE OF $5.00 WILL APPLY

| NET AMOUNT |
|---|
| 215.40 |
| TENDERED |
| |
| CHANGE |
| |
| CHECK NO. |
| |

PRINT NAME: _____ SIGNATURE: _____

# APPENDIX I

# LABORATORY ANALYTICAL REPORTS
# (LOCATED ON THE MAIN CD
# IN THE FRONT REPORT POCKET)

# APPENDIX J

# DATA VALIDATION SUMMARIES

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/02/2012** |
| **Verified By/Date Verified: Angela Roddy 12/19/2012** | **Sample End Date: 10/03/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 77-SS-A | 10/2/2012 | B12100377 | B12100377-001 |
| 2 | Soil | 77-SS-A-Sieved | 10/2/2012 | B12100377 | B12100377-002 |
| 3 | Soil | 77-SS-B | 10/2/2012 | B12100377 | B12100377-003 |
| 4 | Soil | 77-SS-B-Sieved | 10/2/2012 | B12100377 | B12100377-004 |
| 5 | Soil | 77-SS-C | 10/2/2012 | B12100377 | B12100377-005 |
| 6 | Soil | 77-SS-C-Sieved | 10/2/2012 | B12100377 | B12100377-006 |
| 7 | Soil | 89-SS-A | 10/2/2012 | B12100377 | B12100377-007 |
| 8 | Soil | 89-SS-A-Sieved | 10/2/2012 | B12100377 | B12100377-008 |
| 9 | Soil | 90-SS-A | 10/2/2012 | B12100377 | B12100377-009 |
| 10 | Soil | 90-SS-A-Sieved | 10/2/2012 | B12100377 | B12100377-010 |
| 11 | Soil | 91-SS-A | 10/2/2012 | B12100377 | B12100377-011 |
| 12 | Soil | 91-SS-A-Sieved | 10/2/2012 | B12100377 | B12100377-012 |
| 13 | Soil | 91-SS-B | 10/2/2012 | B12100377 | B12100377-013 |
| 14 | Soil | 91-SS-B-Sieved | 10/2/2012 | B12100377 | B12100377-014 |
| 15 | Soil | 91-SS-C | 10/2/2012 | B12100377 | B12100377-015 |
| 16 | Soil | 91-SS-C-Sieved | 10/2/2012 | B12100377 | B12100377-016 |
| 17 | Soil | 92-SS-A | 10/2/2012 | B12100377 | B12100377-017 |
| 18 | Soil | 92-SS-A-Sieved | 10/2/2012 | B12100377 | B12100377-018 |
| 19 | Soil | 80-SS-A | 10/2/2012 | B12100377 | B12100377-019 |
| 20 | Soil | 80-SS-A-Sieved | 10/2/2012 | B12100377 | B12100377-020 |
| 21 | Soil | 79-SS-A | 10/2/2012 | B12100377 | B12100377-021 |
| 22 | Soil | 79-SS-A-Sieved | 10/2/2012 | B12100377 | B12100377-022 |
| 23 | Soil | 78-SS-A | 10/2/2012 | B12100377 | B12100377-023 |
| 24 | Soil | 78-SS-A-Sieved | 10/2/2012 | B12100377 | B12100377-024 |
| 25 | Water-Rinsate Blank | YOSD-1210-200 | 10/3/2012 | B12100516 | B12100516-001 |
| 26 | Water-DI Blank | YOSD-1210-201 | 10/3/2012 | B12100516 | B12100516-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12100377 and B12100516*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % percent recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

N/A

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Samples 79-SS-A, 78-SS-A were originally written SS-79-A, SS-78-A respectively; however, these were corrected and initialed. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Cooler 1 arrived with a temperature of 0.7°C. Cooler 2 with water samples arrived with a temperature of 0.7°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Arsenic (Method SW6020) was detected in lab QC Method Blank MB-66011. The associated soil samples do not require a qualification because Arsenic detections were > 10x the method blank reporting limit. Barium and Lead (Method E200.8) were detected in lab QC Method Blank MB-66015. However, a validation qualifier is not required because these analytes were non-detected in the associated water blanks. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | **X** | Yes | | No | AR | Initials |
| Comments: C5 to C8 Aliphatics (MA-VPH) was detected in DI water blank YOSD-1210-201 with a result of 17 ug/L. It was flagged with a laboratory qualifier of "J". No validation qualifiers were placed on this sample, due to being less than reporting limit. In addition, C5 to C8 Aliphatics was not detected in the Rinsate blank YOSD-1210-200. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: A Trip Blank was not provided for the aqueous samples (field blanks). Trip Blanks are not required for associated soil samples. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: For the following six samples: 91-SS-A, 91-SS-B, 91-SS-C, 92-SS-A, 80-SS-A, and 79-SS-A, the laboratory surrogate Nitrobenzene-d5 (EPA method SW8270C) spike recovery was above control limits. The analyte was flagged by the laboratory with an "S". The high recovery could be due to sample matrix of raw samples. A validation qualifier was not necessary because two other surrogates were within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % recoveries for all analytes were within laboratory control charted QC limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: The Lab QC matrix spike and matrix spike duplicate associated with sample number B12100637-001 contained % recoveries (71% and 66% respectively) less than control limits (75-125%) for Chromium (Method SW6010B). A laboratory qualifier of "S" was placed on these results. A validation qualifier was not used because the Post Digestion/Distillation Spike for Chromium was within control limits. In addition, the QC sample used was not a project sample and could be related to that particular sample only. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: Field duplicate samples were not collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/03/2012** |
| **Verified By/Date Verified: Angela Roddy 12/19/2012** | **Sample End Date: 10/03/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 93-SS-A | 10/3/2012 | B12100508 | B12100508-001 |
| 2 | Soil | 93-SS-A-Sieved | 10/3/2012 | B12100508 | B12100508-002 |
| 3 | Soil | 93-SS-B | 10/3/2012 | B12100508 | B12100508-003 |
| 4 | Soil | 93-SS-B Sieved | 10/3/2012 | B12100508 | B12100508-004 |
| 5 | Soil | 93-SS-C | 10/3/2012 | B12100508 | B12100508-005 |
| 6 | Soil | 93-SS-C Sieved | 10/3/2012 | B12100508 | B12100508-006 |
| 7 | Soil | 94-SS-A | 10/3/2012 | B12100508 | B12100508-007 |
| 8 | Soil | 94-SS-A Sieved | 10/3/2012 | B12100508 | B12100508-008 |
| 9 | Soil | 94-SS-AD | 10/3/2012 | B12100508 | B12100508-009 |
| 10 | Soil | 94-SS-AD Sieved | 10/3/2012 | B12100508 | B12100508-010 |
| 11 | Soil | 95-SS-A | 10/3/2012 | B12100508 | B12100508-011 |
| 12 | Soil | 95-SS-A Sieved | 10/3/2012 | B12100508 | B12100508-012 |
| 13 | Soil | 96-SS-A | 10/3/2012 | B12100508 | B12100508-013 |
| 14 | Soil | 96-SS-A Sieved | 10/3/2012 | B12100508 | B12100508-014 |
| 15 | Soil | 106-SS-A | 10/3/2012 | B12100508 | B12100508-015 |
| 16 | Soil | 106-SS-A Sieved | 10/3/2012 | B12100508 | B12100508-016 |
| 17 | Soil | 107-SS-A | 10/3/2012 | B12100508 | B12100508-017 |
| 18 | Soil | 107-SS-A Sieved | 10/3/2012 | B12100508 | B12100508-018 |
| 19 | Water-Rinsate Blank | YOSD-1210-200 | 10/3/2012 | B12100516 | B12100516-001 |
| 20 | Water-DI Blank | YOSD-1210-201 | 10/3/2012 | B12100516 | B12100516-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12100508 and B12100516*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % percent recovery is not calculated. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

N/A

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Cooler 1 with soil samples arrived with a temperature of 0.6°C. Cooler 2 with water samples arrived at 0.7°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Barium, Cadmium, Chromium (Method SW6010B); and Arsenic (Method SW6020) were detected in lab QC Method Blank MB-66030. Lead (Method SW6020) was detected in lab QC Method Blank MB-66146. The associated soil samples do not require a qualification because Arsenic, Barium, and Chromium detections were > 10x the method blank reporting limit and Cadmium was not detected in soil samples. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: C5 to C8 Aliphatics (MA-VPH) was detected in DI water blank YOSD-1210-201 with a result of 17 ug/L. It was flagged with a laboratory qualifier of "J". No validation qualifiers were placed on this sample, due to being less than reporting limit. In addition, C5 to C8 Aliphatics was not detected in the Rinsate blank YOSD-1210-200. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: A Trip Blank was not provided for the aqueous samples (field blanks). Trip Blanks are not required for associated soil samples. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: For the following three samples: 96-SS-A, 106-SS-A, and 107-SS-A, the laboratory surrogate Nitrobenzene-d5 (EPA method SW8270C) spike recovery was above control limits. The analyte was flagged by the laboratory with an "S". The high recovery could be due to sample matrix of raw samples. A validation qualifier was not necessary because two other surrogates were within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % recoveries for all analytes were within laboratory control charted QC limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: The Lab QC matrix spike B12100922-004AMS3 contained a % recovery (67%) less than control limits (75-125%) for Lead (Method SW6020). A laboratory qualifier of "S" was placed on these results. A validation qualifier was not necessary because the Laboratory Fortified Blank and Standard Reference Material tested were within control limits. In addition, the QC sample used was not a project sample and could be related to that particular sample only. Lab QC matrix spike B12100508-011ALMS and matrix spike duplicate B12100508-011ALMSD contained % recoveries above control limits for analytes Indeno(1, 2, 3-cd)pyrene, and Dibenzo(a, h)anthracene using Method SW8270C. A laboratory qualifier of "S" was placed on these results. A validation qualifier was not placed on associated soil samples that detected these analytes because the LCS was within control limits. In addition, the associated soil samples did not detect the analyte Dibenzo(a, h)anthracene. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: All RPDs were within limits for samples 94-SS-A and 94-SS-AD with the exception of the EPH-Screen, which when manually calculated, the RPD was 111%, which is outside the limits. However, a validation qualifier was not used because the test is a screen. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/04/2012** |
| **Verified By/Date Verified: Angela Roddy 12/19/2012** | **Sample End Date: 10/10/2012** |

| **Samples Analyzed** | | | | | |
|---|---|---|---|---|---|
| | **Matrix** | **Sample ID** | **Date Sampled** | **Lab Project No.** | **Lab Sample ID** |
| 1 | Soil | 105-SS-A | 10/4/2012 | B12100622 | B12100622-001 |
| 2 | Soil | 105-SS-A Sieved | 10/4/2012 | B12100622 | B12100622-002 |
| 3 | Soil | 104-SS-A | 10/4/2012 | B12100622 | B12100622-003 |
| 4 | Soil | 104-SS-A Sieved | 10/4/2012 | B12100622 | B12100622-004 |
| 5 | Soil | 88-SS-A | 10/4/2012 | B12100622 | B12100622-005 |
| 6 | Soil | 88-SS-A Sieved | 10/4/2012 | B12100622 | B12100622-006 |
| 7 | Soil | 71-SS-A | 10/4/2012 | B12100622 | B12100622-007 |
| 8 | Soil | 71-SS-A Sieved | 10/4/2012 | B12100622 | B12100622-008 |
| 9 | Soil | 71-SS-B | 10/4/2012 | B12100622 | B12100622-009 |
| 10 | Soil | 71-SS-B Sieved | 10/4/2012 | B12100622 | B12100622-010 |
| 11 | Soil | 71-SS-C | 10/4/2012 | B12100622 | B12100622-011 |
| 12 | Soil | 71-SS-C Sieved | 10/4/2012 | B12100622 | B12100622-012 |
| 13 | Water-Rinsate Blank | YOSD-1210-202 | 10/10/2012 | B121001018 | B12101018-001 |
| 14 | Water-DI Blank | YOSD-1210-203 | 10/10/2012 | B121001018 | B12101018-002 |
| 15 | Water-Trip Blank | TB092112TSSHP0259 | 10/10/2012 | B121001018 | B12101018-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12100622 and B12101018*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

A The analyte level was greater than four times the spike level. In accordance with the method % percent recovery is not calculated.

S Spike recovery outside of advisory limits.

**Validation qualifiers used in this review:**

U Blank Exceedance

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 arrived with a temperature of 0.3°C. Samples were intact. Cooler 2 arrived with a temperature of 0.2°C with the water blanks. No custody seals on coolers, however, they were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Arsenic, Chromium, Lead, and Silver (Method SW6020) were detected in lab QC Method Blank MB-66031. The associated soil samples do not require a qualification because Arsenic, Chromium, and Lead detections were > 10x the method blank reporting limit and Silver was not detected in soil samples. Arsenic and Lead (Method E200.8) were detected in lab QC Method Blank MB-66173. The associated water samples do not require a qualification because Arsenic and Lead were not detected. Naphthalene (Method SW8270C) was detected in lab QC Method Blank MB6683866282-66148. The associated water samples do not require a qualification because Naphthalene was not detected. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Fluoranthene and Pyrene (Method SW8270C) were detected in the two following samples: YOSD-1210-202, Rinsate field blank, and YOSD-1210-203, DI water blank. A validation qualifier "U" is given to both blanks. The associated soil samples were not tested for these analytes, not needing a validation qualifier. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All surrogate recoveries were within control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % recoveries for all analytes were within laboratory control charted QC limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: The Lab QC matrix spike B12100914-001AMS3 and matrix spike duplicate B12100914-011AMSD contained % recoveries below control limits for the analyte Lead (Method SW6010B). A laboratory qualifier of "S" was placed on these results A validation qualifier was not placed on the associated soil samples because the Post Digestion/Distillation Spike was within control limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind field duplicates were collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of "A" was put on the data; in accordance with the method, % recovery is not calculated.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| Validator Qualified Analytical Results | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** |
| YOSD-1210-203 | Water | B12101018-002 | SW8270C | Fluoranthene | 0.22 | ug/L | U |
| YOSD-1210-203 | Water | B12101018-002 | SW8270C | Pyrene | 0.22 | ug/L | U |
| YOSD-1210-202 | Water | B12101018-001 | SW8270C | Fluoranthene | 0.25 | ug/L | U |
| YOSD-1210-202 | Water | B12101018-001 | SW8270C | Pyrene | 0.27 | ug/L | U |
| Validation Qualifer Definitions: | | | | | | | |
| U | Blank Exceedance | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/05/2012** |
| **Verified By/Date Verified: Angela Roddy 12/19/2012** | **Sample End Date: 10/10/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| 1 | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 2 | Soil | 52-SS-A | 10/5/2012 | B12100653 | B12100653-001 |
| 3 | Soil | 52-SS-A Sieved | 10/5/2012 | B12100653 | B12100653-002 |
| 4 | Soil | 74-SS-A | 10/5/2012 | B12100653 | B12100653-003 |
| 5 | Soil | 74-SS-A Sieved | 10/5/2012 | B12100653 | B12100653-004 |
| 6 | Soil | 75-SS-A | 10/5/2012 | B12100653 | B12100653-005 |
| 7 | Soil | 75-SS-A Sieved | 10/5/2012 | B12100653 | B12100653-006 |
| 8 | Soil | 75-SS-B | 10/5/2012 | B12100653 | B12100653-007 |
| 9 | Soil | 75-SS-B Sieved | 10/5/2012 | B12100653 | B12100653-008 |
| 10 | Soil | 75-SS-C | 10/5/2012 | B12100653 | B12100653-009 |
| 11 | Soil | 75-SS-C Sieved | 10/5/2012 | B12100653 | B12100653-010 |
| 12 | Water-Rinsate Blank | YOSD-1210-202 | 10/10/2012 | B12101018 | B12101018-001 |
| 13 | Water-DI Blank | YOSD-1210-203 | 10/10/2012 | B12101018 | B12101018-002 |
| 14 | Water-Trip Blank | TB092112TSSHP0259 | 10/10/2012 | B12101018 | B12101018-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12100653 and B12101018*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % percent recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 arrived with a temperature of 0.5°C. Samples were intact. Cooler 2 arrived with a temperature of 0.2°C with the water blanks. No custody seals on coolers, however, they were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Chromium and Silver (Method SW6020 were detected in Method Blank MB-66031. The associated soil samples do not require a qualification because Chromium detections were >10x the method blank reporting limit and also, Silver was not detected in the soil samples. Arsenic (Method SW6020) was detected in lab QC Method Blank MB-66031. The associated soil samples do not require a qualification because Arsenic detections were > 10x the method blank reporting limit. Arsenic and Lead (Method E200.8) were detected in lab QC Method Blank MB-66173. The associated water samples do not require a qualification because Arsenic and Lead were not detected. Naphthalene (Method SW8270C) was detected in lab QC Method Blank MB6683866282-66148. The associated water samples do not require a qualification because Naphthalene was not detected. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Fluoranthene and Pyrene (Method SW8270C) were detected in the two following samples: YOSD-1210-202, Rinsate field blank, and YOSD-1210-203, DI water blank. A validation qualifier "U" was given to the blanks only, as raw soil samples had values >5x the reporting limit for these analytes. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All surrogate recoveries were within control limits. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % recoveries for all analytes were within laboratory control charted QC limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: For QA/QC sample B12100914-001AMS3 and B12100914-001AMSD the laboratory flagged with qualifier "S", with the spike recovery outside of advisory limits for the analyte Lead. No validation qualifier was used because the post digestion/distillation spike was within control limits. The recovery could be related to that QC sample matrix. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: For Lab QC sample B12100653-005ALMS2D the analyte Dibenzo(a, h)anthracene was flagged with a laboratory qualifier "R" for RPD being outside of control limits. However, it is not validated with a qualifier because another MS/MSD was run, and it was within control limits. In addition, the LCS was within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind field duplicates were collected with this batch of data. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of "A" was put on the data; in accordance with the method, % percent recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

**Validator Qualified Analytical Results**

| Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag |
|---|---|---|---|---|---|---|---|
| YOSD-1210-203 | Water | B12101018-002 | SW8270C | Fluoranthene | 0.22 | ug/L | U |
| YOSD-1210-203 | Water | B12101018-002 | SW8270C | Pyrene | 0.22 | ug/L | U |
| YOSD-1210-202 | Water | B12101018-001 | SW8270C | Fluoranthene | 0.25 | ug/L | U |
| YOSD-1210-202 | Water | B12101018-001 | SW8270C | Pyrene | 0.27 | ug/L | U |

| Validation Qualifer Definitions: | |
|---|---|
| U | Blank Exceedance |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/09/2012** |
| **Verified By/Date Verified: Angela Roddy 01/02/2013** | **Sample End Date: 10/10/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 102-SS-A | 10/9/2012 | B12100873 | B12100873-001 |
| 2 | Soil | 102-SS-A Sieved | 10/9/2012 | B12100873 | B12100873-002 |
| 3 | Soil | 102-SS-B | 10/9/2012 | B12100873 | B12100873-003 |
| 4 | Soil | 102-SS-B Sieved | 10/9/2012 | B12100873 | B12100873-004 |
| 5 | Soil | 102-SS-C | 10/9/2012 | B12100873 | B12100873-005 |
| 6 | Soil | 102-SS-C Sieved | 10/9/2012 | B12100873 | B12100873-006 |
| 7 | Soil | 102-SS-CD | 10/9/2012 | B12100873 | B12100873-007 |
| 8 | Soil | 102-SS-CD Sieved | 10/9/2012 | B12100873 | B12100873-008 |
| 9 | Soil | 103-SS-A | 10/9/2012 | B12100873 | B12100873-009 |
| 10 | Soil | 103-SS-A Sieved | 10/9/2012 | B12100873 | B12100873-010 |
| 11 | Soil | 87-SS-A | 10/9/2012 | B12100873 | B12100873-011 |
| 12 | Soil | 87-SS-A Sieved | 10/9/2012 | B12100873 | B12100873-012 |
| 13 | Soil | 66-SS-A | 10/9/2012 | B12100873 | B12100873-013 |
| 14 | Soil | 66-SS-A Sieved | 10/9/2012 | B12100873 | B12100873-014 |
| 15 | Water-Rinsate Blank | YOSD-1210-202 | 10/10/2012 | B12101018 | B12101018-001 |
| 16 | Water-DI Blank | YOSD-1210-203 | 10/10/2012 | B12101018 | B12101018-002 |
| 17 | Water-Trip Blank | TB092112TSSHP0259 | 10/10/2012 | B12101018 | B12101018-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12100873 and B12101018*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

A The analyte level was greater than four times the spike level. In accordance with the method % percent recovery is not calculated.

N The analyte concentration was not sufficiently high to calculate an RPD.

S Spike recovery was outside of advisory limits.

**Validation qualifiers used in this review:**

U Blank Exceedance

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 arrived with a temperature of 0.2°C. Samples were intact. Cooler 2 arrived with a temperature of 0.2°C with the water blanks. No custody seals on coolers, however, they were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Arsenic and Selenium (Method SW6020) were detected in Lab QC Method Blank MB-66224. The associated soil samples do not require a qualification because Arsenic was > 10x the method blank reporting limit and Selenium was not detected in soil samples. Arsenic and Lead (Method E200.8) were detected in lab QC Method Blank MB-66173. The associated water samples do not require a qualification because Arsenic and Lead were not detected. Naphthalene (Method SW8270C) was detected in lab QC Method Blank MB6683866282-66148. The associated water samples do not require a qualification because Naphthalene was not detected. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Fluoranthene and Pyrene (Method SW8270C) were detected in the two following samples: YOSD-1210-202, Rinsate field blank, and YOSD-1210-203, DI water blank. A validation qualifier "U" was given to the blanks only, as raw soil samples had values >5x the reporting limit for these analytes. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All surrogate recoveries were within control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % recoveries for all analytes were within laboratory control charted QC limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: For QA/QC sample matrix spike B12100789-003AMS and matrix spike duplicate B12100789-003AMSD the analyte Toluene spike recovery was outside of limits. A laboratory qualifier of "S" was placed on this sample. No validation qualifier is used because it was just below control limits (69%) of (70-120%). In addition, the LCS was within control limits for Toluene. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments The MS/MSD RPDs were all within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: All RPDs for sample 102-SS-C and its duplicate 102-SS-CD were within limits. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of "A" was put on the data; in accordance with the method, % recovery is not calculated.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| Validator Qualified Analytical Results | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** |
| YOSD-1210-203 | Water | B12101018-002 | SW8270C | Fluoranthene | 0.22 | ug/L | U |
| YOSD-1210-203 | Water | B12101018-002 | SW8270C | Pyrene | 0.22 | ug/L | U |
| YOSD-1210-202 | Water | B12101018-001 | SW8270C | Fluoranthene | 0.25 | ug/L | U |
| YOSD-1210-202 | Water | B12101018-001 | SW8270C | Pyrene | 0.27 | ug/L | U |
| Validation Qualifer Definitions: | | | | | | | |
| U | Blank Exceedance | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/10/2012** |
| **Verified By/Date Verified: Angela Roddy 01/02/2013** | **Sample End Date: 10/10/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 65-SS-A | 10/10/2012 | B12101133 | B12101133-001 |
| 2 | Soil | 65-SS-A-Sieved | 10/10/2012 | B12101133 | B12101133-002 |
| 3 | Soil | 65-SS-B | 10/10/2012 | B12101133 | B12101133-003 |
| 4 | Soil | 65-SS-B-Sieved | 10/10/2012 | B12101133 | B12101133-004 |
| 5 | Soil | 65-SS-C | 10/10/2012 | B12101133 | B12101133-005 |
| 6 | Soil | 65-SS-C-Sieved | 10/10/2012 | B12101133 | B12101133-006 |
| 7 | Soil | 64-SS-A | 10/10/2012 | B12101133 | B12101133-007 |
| 8 | Soil | 64-SS-A-Sieved | 10/10/2012 | B12101133 | B12101133-008 |
| 9 | Soil | 76-SS-A | 10/10/2012 | B12101133 | B12101133-009 |
| 10 | Soil | 76-SS-A-Sieved | 10/10/2012 | B12101133 | B12101133-010 |
| 11 | Water-Rinsate Blank | YOSD-1210-202 | 10/10/2012 | B12101018 | B12101018-001 |
| 12 | Water-DI Blank | YOSD-1210-203 | 10/10/2012 | B12101018 | B12101018-002 |
| 13 | Water-Trip Blank | TB092112TSSHP0259 | 10/10/2012 | B12101018 | B12101018-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12101133 and B12101018*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| 1 | Surrogate addition was inadvertently omitted at sample extraction. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 arrived with a temperature of 0.8°C. Samples were intact. Cooler 2 arrived with a temperature of 0.2°C with the water blanks. No custody seals on coolers, however, they were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Barium, Chromium, Lead (Method SW6010B) and Arsenic and Selenium (Method SW6020) were detected in Lab QC Method Blank MB-66265. The associated soil samples do not require a qualification because Arsenic, Barium, Chromium, and Lead were > 10x the method blank reporting and Selenium was not detected in associated soil samples. Arsenic and Lead (Method E200.8) were detected in lab QC Method Blank MB-66173. The associated water samples do not require a qualification because Arsenic and Lead were not detected. Naphthalene (Method SW8270C) was detected in lab QC Method Blank MB6683866282-66148. The associated water samples do not require a qualification because Naphthalene was not detected. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Fluoranthene and Pyrene (Method SW8270C) were detected in the two following samples: YOSD-1210-202, Rinsate field blank, and YOSD-1210-203, DI water blank. A validation qualifier "U" was given to the blanks only, as raw soil samples had values >5x the reporting limit for these analytes. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 64-SS-A was flagged with laboratory qualifier "1" because the VPH Aromatics and VPH Aliphatics Surrogate addition was inadvertently omitted at sample extraction. No validation qualifier was used because the analyte Total Purgeable Hydrocarbons was nondetected in this sample, for which the surrogates omitted were related. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % recoveries for all analytes were within laboratory control charted QC limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD % percent recoveries were within control limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD RPDs were all within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind field duplicates were collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| Validator Qualified Analytical Results | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** |
| YOSD-1210-203 | Water | B12101018-002 | SW8270C | Fluoranthene | 0.22 | ug/L | U |
| YOSD-1210-203 | Water | B12101018-002 | SW8270C | Pyrene | 0.22 | ug/L | U |
| YOSD-1210-202 | Water | B12101018-001 | SW8270C | Fluoranthene | 0.25 | ug/L | U |
| YOSD-1210-202 | Water | B12101018-001 | SW8270C | Pyrene | 0.27 | ug/L | U |
| Validation Qualifer Definitions: | | | | | | | |
| U | Blank Exceedance | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/11/2012** |
| **Verified By/Date Verified: Angela Roddy 01/02/2013** | **Sample End Date: 10/16/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 108-SS-A | 10/11/2012 | B12101175 | B12101175-001 |
| 2 | Soil | 108-SS-A Sieved | 10/11/2012 | B12101175 | B12101175-002 |
| 3 | Soil | 109-SS-A | 10/11/2012 | B12101175 | B12101175-003 |
| 4 | Soil | 109-SS-A Sieved | 10/11/2012 | B12101175 | B12101175-004 |
| 5 | Soil | 101-SS-A | 10/11/2012 | B12101175 | B12101175-005 |
| 6 | Soil | 101-SS-A Sieved | 10/11/2012 | B12101175 | B12101175-006 |
| 7 | Soil | 86-SS-A | 10/11/2012 | B12101175 | B12101175-007 |
| 8 | Soil | 86-SS-A Sieved | 10/11/2012 | B12101175 | B12101175-008 |
| 9 | Soil | 85-SS-A | 10/11/2012 | B12101175 | B12101175-009 |
| 10 | Soil | 85-SS-A Sieved | 10/11/2012 | B12101175 | B12101175-010 |
| 11 | Soil | 98-SS-A | 10/11/2012 | B12101175 | B12101175-011 |
| 12 | Soil | 98-SS-A Sieved | 10/11/2012 | B12101175 | B12101175-012 |
| 13 | Soil | 81-SS-A | 10/11/2012 | B12101175 | B12101175-013 |
| 14 | Soil | 81-SS-A Sieved | 10/11/2012 | B12101175 | B12101175-014 |
| 15 | Water-Rinsate Blank | YOSD-1210-204 | 10/16/2012 | B12101603 | B12101603-001 |
| 16 | Water-DI Blank | YOSD-1210-205 | 10/16/2012 | B12101603 | B12101603-002 |
| 17 | Water-Trip Blank | TB092112BTSSHP0259 | 10/16/2012 | B12101603 | B12101603-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12101175 and B12101603*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| VERIFICATION CRITERIA CHECK | |
|---|---|
| **Laboratory qualifiers used in this review:** | |
| * | MCL Exceedance |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |
| **Validation qualifiers used in this review:** | |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 arrived with a temperature of 1.0°C. Samples were intact. Cooler 2 arrived with a temperature of 0.2°C with the water blanks. No custody seals on coolers, however, they were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Arsenic and Selenium (Method SW6020) were detected in Method Blank 66265. No validation qualifier was used because soil samples had values of Arsenic that were >10x the method blank reporting limit, and also, Selenium was not detected in associated soil samples. Arsenic, Barium, and Selenium (Method E200.8) were detected in Lab QC Method Blank MB-66312. The associated water samples do not require a qualification because Arsenic, Barium, and Selenium were not detected in water samples. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C) was detected in the two following samples: YOSD-1210-204, Rinsate field blank, and YOSD-1210-205, DI water blank. A validation qualifier "U" is given to both blanks for this analyte only, as raw soil samples were non-detect for this analyte. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: For sample 81-SS-A the % Recovery for the surrogate Terphenyl-d14 (SW8270C) was just above control limits, and the laboratory flagged it with qualifier "S". A validation qualifier was not necessary because two other surrogates were within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % recoveries for all analytes were within laboratory control charted QC limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QA/QC matrix spike B12101638-001AMS and matrix spike duplicate B12101638-001AMSD were flagged with laboratory qualifier "S" for spike recovery of the analyte Mercury being outside of control limits. No validation qualifier was used because the water samples associated with this Lab QC did not detect the analyte Mercury. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD RPDs were all within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind field duplicates were collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.
- In the event an RPD was outside of laboratory control limits, a laboratory qualifier "R" was put on the data. However, the control limits are more stringent than QAPP and are not validator qualified.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| Validator Qualified Analytical Results | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** |
| YOSD-1210-204 | Water | B12101603-001 | SW8270C | Naphthalene | 0.26 | ug/L | U |
| YOSD-1210-205 | Water | B12101603-002 | SW8270C | Naphthalene | 0.29 | ug/L | U |
| Validation Qualifer Definitions: | | | | | | | |
| U | Blank Exceedance | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/12/2012** |
| **Verified By/Date Verified: Angela Roddy 01/02/2013** | **Sample End Date: 10/16/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 100-SS-A | 10/12/2012 | B12101303 | B12101303-001 |
| 2 | Soil | 100-SS-A Sieved | 10/12/2012 | B12101303 | B12101303-002 |
| 3 | Soil | 99-SS-A | 10/12/2012 | B12101303 | B12101303-003 |
| 4 | Soil | 99-SS-A Sieved | 10/12/2012 | B12101303 | B12101303-004 |
| 5 | Soil | 99-SS-B | 10/12/2012 | B12101303 | B12101303-005 |
| 6 | Soil | 99-SS-B Sieved | 10/12/2012 | B12101303 | B12101303-006 |
| 7 | Soil | 99-SS-C | 10/12/2012 | B12101303 | B12101303-007 |
| 8 | Soil | 99-SS-C Sieved | 10/12/2012 | B12101303 | B12101303-008 |
| 9 | Soil | 97-SS-A | 10/12/2012 | B12101303 | B12101303-009 |
| 10 | Soil | 97-SS-A Sieved | 10/12/2012 | B12101303 | B12101303-010 |
| 11 | Soil | 97-SS-B | 10/12/2012 | B12101303 | B12101303-011 |
| 12 | Soil | 97-SS-B Sieved | 10/12/2012 | B12101303 | B12101303-012 |
| 13 | Soil | 97-SS-C | 10/12/2012 | B12101303 | B12101303-013 |
| 14 | Soil | 97-SS-C Sieved | 10/12/2012 | B12101303 | B12101303-014 |
| 15 | Water-Rinsate Blank | YOSD-1210-204 | 10/16/2012 | B12101603 | B12101603-001 |
| 16 | Water-DI Blank | YOSD-1210-205 | 10/16/2012 | B12101603 | B12101603-002 |
| 17 | Water-Trip Blank | TB092112BTSSHP0259 | 10/16/2012 | B12101603 | B12101603-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12101303 and B12101603*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Coolers arrived with a temperature of 0.2°C. The custody seals were not present, however, coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Lead (Method SW6010B) was detected in Method Blank MB-66417. A validation qualifier was not used because associated soil sample values for Lead were >10x the method blank reporting limit. Arsenic, Barium, and Selenium (Method E200.8) were detected in Lab QC Method Blank MB-66312. The associated water samples do not require a qualification because Arsenic, Barium, and Selenium were not detected. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C) was detected in the two following samples: YOSD-1210-204, Rinsate field blank, and YOSD-1210-205, DI water blank. A validation qualifier "U" is given to both blanks for this analyte, as the raw soil sample values were either non-detect or >5x the reporting limit for this analyte. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Two samples, 99-SS-B and 99-SS-C the % Recovery for the surrogate Nitrobenzene-d5 was outside of control limits, and the laboratory flagged it with qualifier "S". A validation qualifier was not necessary because two other surrogates were within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % recoveries for all analytes were within laboratory control charted QC limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QA/QC matrix spike B12101303-013AMS3 was flagged with laboratory qualifier "S" for spike recovery of the analyte Barium being outside of control limits. No validation qualifier was used because its post distillation spike was within control limits. Lab QC matrix spike B12101920-004AMSD3 was flagged with laboratory qualifier "S" for spike recovery of the analyte Lead being outside of control limits. No validation qualifier is used because its post distillation spike was within control limits. For QA/QC matrix spike B12101303-001AMS and matrix spike duplicate B12101303-001AMSD were flagged with the laboratory qualifier "S" for spike recovery being outside of control limits for the analytes Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(k)fluoranthene, and Indeno(1, 2, 3-cd)pyrene. A validation qualifier was not necessary because the LCS was within limits. A note from the laboratory indicates there was non-homogeneity in the sample matrix. Lab QA/QC matrix spike B12101638-001AMS and matrix spike duplicate B12101638-001AMSD were flagged with laboratory qualifier "S" for spike recovery of the analyte Mercury being outside of control limits. No validation qualifier was used because the water samples associated with this Lab QC did not detect the analyte Mercury. | | | | | | |
| Were MS/MSD RPDs within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: For Lab QC matrix spike B12101303-001AMS and matrix spike duplicate B12101303-001AMSD were flagged with the laboratory qualifier "R" for RPD being outside of lab control limits and project RPD limits for analytes Fluoranthene, Phenanthrene, and Pyrene (SW8270C). A validation qualifier was not necessary because the LCS was within limits for this method. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind field duplicates were collected with this batch of data. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

**Validator Qualified Analytical Results**

| Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag |
|---|---|---|---|---|---|---|---|
| YOSD-1210-204 | Water | B12101603-001 | SW8270C | Naphthalene | 0.26 | ug/L | U |
| YOSD-1210-205 | Water | B12101603-002 | SW8270C | Naphthalene | 0.29 | ug/L | U |

| Validation Qualifer Definitions: | |
|---|---|
| U | Blank Exceedance |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/16/2012** |
| **Verified By/Date Verified: Angela Roddy 01/02/2013** | **Sample End Date: 10/16/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 82-SS-A | 10/16/2012 | B12101605 | B12101605-001 |
| 2 | Soil | 82-SS-A Sieved | 10/16/2012 | B12101605 | B12101605-002 |
| 3 | Soil | 82-SS-B | 10/16/2012 | B12101605 | B12101605-003 |
| 4 | Soil | 82-SS-B Sieved | 10/16/2012 | B12101605 | B12101605-004 |
| 5 | Soil | 82-SS-C | 10/16/2012 | B12101605 | B12101605-005 |
| 6 | Soil | 82-SS-C Sieved | 10/16/2012 | B12101605 | B12101605-006 |
| 7 | Soil | 83-SS-A | 10/16/2012 | B12101605 | B12101605-007 |
| 8 | Soil | 83-SS-A Sieved | 10/16/2012 | B12101605 | B12101605-008 |
| 9 | Soil | 84-SS-A | 10/16/2012 | B12101605 | B12101605-009 |
| 10 | Soil | 84-SS-A Sieved | 10/16/2012 | B12101605 | B12101605-010 |
| 11 | Soil | 84-SS-B | 10/16/2012 | B12101605 | B12101605-011 |
| 12 | Soil | 84-SS-B Sieved | 10/16/2012 | B12101605 | B12101605-012 |
| 13 | Soil | 84-SS-C | 10/16/2012 | B12101605 | B12101605-013 |
| 14 | Soil | 84-SS-C Sieved | 10/16/2012 | B12101605 | B12101605-014 |
| 15 | Water-Rinsate Blank | YOSD-1210-204 | 10/16/2012 | B12101603 | B12101603-001 |
| 16 | Water-DI Blank | YOSD-1210-205 | 10/16/2012 | B12101603 | B12101603-002 |
| 17 | Water-Trip Blank | TB092112BTSSHP0259 | 10/16/2012 | B12101603 | B12101603-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12101605 and B12101603*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 with soil samples arrived with a temperature of 0.6°C. Cooler 2 with water samples arrived with a temperature of 0.2°C. The custody seals were not present, however, coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Arsenic, Barium, and Selenium (Method E200.8) were detected in Lab QC Method Blank MB-66312. The associated water samples do not require a qualification because Arsenic, Barium, and Selenium were not detected. Barium (Method SW6010B) and Arsenic (Method SW6020) were detected in Method Blank MB-66322. No laboratory qualifier was used. No validation qualifier was used here because values for Arsenic and Barium were >10x the reporting limit for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C) was detected in the two following samples: YOSD-1210-204, Rinsate field blank, and YOSD-1210-205, DI water blank. A validation qualifier "U" is given to both blanks for this analyte, as the raw soil sample values were either non-detect or >5x the reporting limit for this analyte. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All surrogate recoveries were within control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % recoveries for all analytes were within laboratory control charted QC limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12101615-002AMS3 was flagged with laboratory qualifier "S" for spike recovery of the analyte Barium being outside of control limits. No validation qualifier is used because the post distillation spike was within control limits. Lab QC matrix spike duplicate B12101686-010AMSD was flagged with laboratory qualifier "S" for spike recovery of the analyte Lead being outside of control limits. No validation qualifier is used because the post distillation spike was within control limits. Lab QC matrix spike B12101605-001AMS was flagged with laboratory qualifier "S" for spike recovery of the analyte Total Extracted Hydrocarbons (TEH) using method SW8015M being outside of control limits. A validation qualifier is not used because this method is a screening. Lab QA/QC matrix spike B12101638-001AMS and matrix spike duplicate B12101638-001AMSD were flagged with laboratory qualifier "S" for spike recovery of the analyte Mercury being outside of control limits. No validation qualifier was used because the water samples associated with this Lab QC did not detect the analyte Mercury. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind field duplicates were collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| Validator Qualified Analytical Results | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** |
| YOSD-1210-204 | Water | B12101603-001 | SW8270C | Naphthalene | 0.26 | ug/L | U |
| YOSD-1210-205 | Water | B12101603-002 | SW8270C | Naphthalene | 0.29 | ug/L | U |
| Validation Qualifer Definitions: | | | | | | | |
| U | Blank Exceedance | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/17/2012** |
| **Verified By/Date Verified: Angela Roddy 01/03/2013** | **Sample End Date: 10/19/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 67-SS-A | 10/17/2012 | B12101608 | B12101608-001 |
| 2 | Soil | 67-SS-A Sieved | 10/17/2012 | B12101608 | B12101608-002 |
| 3 | Soil | 67-SS-B | 10/17/2012 | B12101608 | B12101608-003 |
| 4 | Soil | 67-SS-B Sieved | 10/17/2012 | B12101608 | B12101608-004 |
| 5 | Soil | 67-SS-C | 10/17/2012 | B12101608 | B12101608-005 |
| 6 | Soil | 67-SS-C Sieved | 10/17/2012 | B12101608 | B12101608-006 |
| 7 | Soil | 68-SS-A | 10/17/2012 | B12101608 | B12101608-007 |
| 8 | Soil | 68-SS-A Sieved | 10/17/2012 | B12101608 | B12101608-008 |
| 9 | Soil | 69-SS-A | 10/17/2012 | B12101608 | B12101608-009 |
| 10 | Soil | 69-SS-A Sieved | 10/17/2012 | B12101608 | B12101608-010 |
| 11 | Soil | 69-SS-B | 10/17/2012 | B12101608 | B12101608-011 |
| 12 | Soil | 69-SS-B Sieved | 10/17/2012 | B12101608 | B12101608-012 |
| 13 | Soil | 69-SS-C | 10/17/2012 | B12101608 | B12101608-013 |
| 14 | Soil | 69-SS-C Sieved | 10/17/2012 | B12101608 | B12101608-014 |
| 15 | Soil | 70-SS-A | 10/17/2012 | B12101608 | B12101608-015 |
| 16 | Soil | 70-SS-A Sieved | 10/17/2012 | B12101608 | B12101608-016 |
| 17 | Water-Rinsate Blank | YOSD-1210-206 | 10/19/2012 | B12101955 | B12101955-001 |
| 18 | Water-DI Blank | YOSD-1210-207 | 10/19/2012 | B12101955 | B12101955-002 |
| 19 | Water-Trip Blank | TB101612BTSSHP0259 | 10/19/2012 | B12101955 | B12101955-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1. Volatiles (VOC)-SW8260B*

- *Laboratory Project Ids: B12101608 and B12101955*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| VERIFICATION CRITERIA CHECK | |
|---|---|
| **Laboratory qualifiers used in this review:** | |
| * | MCL Exceedance |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |
| **Validation qualifiers used in this review:** | |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 arrived with a temperature of 0.8°C. Samples were intact. Cooler 2 arrived with a temperature of 2.2°C with the water blanks. No custody seals on coolers, however, they were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Chromium (Method SW6010B) was detected in Lab QC Method Blank MB-66417. No laboratory qualifier was used. No validation qualifier was used here because all raw soil samples had values >10x the reporting limit for Chromium. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C) was detected in the two following samples: YOSD-1210-206, Rinsate field blank, and YOSD-1210-207, DI water blank. A validation qualifier "U" is given to both blanks for this analyte, as well as raw soil samples with values <5x the reporting limit. Chloroform and Methylene chloride (SW8260B) were also detected in blanks YOSD-1210-206 and YOSD-1210-207 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because these are estimated values and are below the reporting limits. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All surrogate recoveries were within control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % recoveries for all analytes were within laboratory control charted QC limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12101605-001AMS was flagged with laboratory qualifier "S" for spike recovery of the analyte Total Extracted Hydrocarbons (TEH) using Method SW8015M being outside of control limits. A validation qualifier is not indicated because the method used is a screen. Lab QC matrix spike duplicate B12101686-010AMSD3 was flagged with laboratory qualifier "S" for spike recovery of the analyte Lead being outside of control limits. A validation qualifier is not indicated because the post distillation spike was within control limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD RPDs were all within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind field duplicates were collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| Validator Qualified Analytical Results | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** |
| 67-SS-A | Soil | B12101608-001 | SW8270C | Naphthalene | 0.0083 | mg/kg | U |
| 69-SS-A | Soil | B12101608-009 | SW8270C | Naphthalene | 0.0093 | mg/kg | U |
| 69-SS-B | Soil | B12101608-011 | SW8270C | Naphthalene | 0.013 | mg/kg | U |
| 69-SS-C | Soil | B12101608-013 | SW8270C | Naphthalene | 0.0048 | mg/kg | U |
| YOSD-1210-207 | Water | B12101955-002 | SW8270C | Naphthalene | 0.33 | ug/L | U |
| YOSD-1210-206 | Water | B12101955-001 | SW8270C | Naphthalene | 0.29 | ug/L | U |
| Validation Qualifer Definitions: | | | | | | | |
| U | Blank Exceedance | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/18/2012** |
| **Verified By/Date Verified: Angela Roddy 01/03/2013** | **Sample End Date: 10/19/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 70N-SS-A | 10/18/2012 | B12101795 | B12101795-001 |
| 2 | Soil | 70N-SS-A Sieved | 10/18/2012 | B12101795 | B12101795-002 |
| 3 | Soil | 70N-SS-AD | 10/18/2012 | B12101795 | B12101795-003 |
| 4 | Soil | 70N-SS-AD Sieved | 10/18/2012 | B12101795 | B12101795-004 |
| 5 | Soil | 35-SS-A | 10/18/2012 | B12101795 | B12101795-005 |
| 6 | Soil | 35-SS-A Sieved | 10/18/2012 | B12101795 | B12101795-006 |
| 7 | Soil | 34-SS-A | 10/18/2012 | B12101795 | B12101795-007 |
| 8 | Soil | 34-SS-A Sieved | 10/18/2012 | B12101795 | B12101795-008 |
| 9 | Soil | 48-SS-A | 10/18/2012 | B12101795 | B12101795-009 |
| 10 | Soil | 48-SS-A Sieved | 10/18/2012 | B12101795 | B12101795-010 |
| 11 | Soil | 47-SS-A | 10/18/2012 | B12101795 | B12101795-011 |
| 12 | Soil | 47-SS-A Sieved | 10/18/2012 | B12101795 | B12101795-012 |
| 13 | Soil | 47-SS-B | 10/18/2012 | B12101795 | B12101795-013 |
| 14 | Soil | 47-SS-B Sieved | 10/18/2012 | B12101795 | B12101795-014 |
| 15 | Soil | 47-SS-C | 10/18/2012 | B12101795 | B12101795-015 |
| 16 | Soil | 47-SS-C Sieved | 10/18/2012 | B12101795 | B12101795-016 |
| 17 | Soil | 47-SS-CD | 10/18/2012 | B12101795 | B12101795-017 |
| 18 | Soil | 47-SS-CD Sieved | 10/18/2012 | B12101795 | B12101795-018 |
| 19 | Water-Rinsate Blank | YOSD-1210-206 | 10/19/2012 | B12101955 | B12101955-001 |
| 20 | Water-DI Blank | YOSD-1210-207 | 10/19/2012 | B12101955 | B12101955-002 |
| 21 | Water-Trip Blank | TB101612BTSSHP0259 | 10/19/2012 | B12101955 | B12101955-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1. Volatiles (VOC)-SW8260B*

- *Laboratory Project Ids: B12101795 and B12101955*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| VERIFICATION CRITERIA CHECK | |
|---|---|
| **Laboratory qualifiers used in this review:** | |
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % percent recovery is not calculated. |
| D | RL increased due to sample matrix |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Surrogates were diluted out. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |
| **Validation qualifiers used in this review:** | |
| U | Blank Exceedance |
| J | QC Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 arrived with a temperature of 0.2°C. Samples were intact. Cooler 2 arrived with a temperature of 2.2°C with the water blanks. No custody seals on coolers, however, they were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory blank samples were free of target analyte contamination. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C) was detected in the two following samples: YOSD-1210-206, Rinsate field blank, and YOSD-1210-207, DI water blank. A validation qualifier "U" is given to both blanks for this analyte, as well as raw soil samples with values <5x the reporting limit. Chloroform and Methylene chloride (SW8260B) were also detected in blanks YOSD-1210-206 and YOSD-1210-207 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because these are estimated values and are below the reporting limits. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review. | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Samples 47-SS-C and 47-SS-CD were flagged with laboratory qualifier "S" for the surrogate Terphenyl-d14 (SW8270C) being above control limits. A validation qualifier was not necessary because two other surrogates were within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % recoveries for all analytes were within laboratory control charted QC limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12101795-001AMS and matrix spike duplicate B12101795-001AMSD were flagged with laboratory qualifier "S" for spike recovery of the analytes Anthracene, Benzo(a)anthracene, Benzo(k)fluoranthene, Dibenzo(a, h)anthracene, and Phenanthrene (Method SW8270C). The laboratory notes that the sample extract was diluted 5 times at analysis due to target and non-target compound sample matrix interference. No validation qualifier was used because of sample matrix interference. In addition, the LCS was within control limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12101795-001AMS and matrix spike duplicate B12101795-001AMSD were flagged with laboratory qualifier "R" for RPD exceeding advisory limit for the analyte Acenaphthylene. However, all raw samples were non-detected for this analyte, and therefore no validation qualifier is needed. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Blind field duplicates 70N-SS-A/70N-SS-AD and 47-SS-C/47-SS-CD were collected. For sample duplicates 47-SS-C/47-SS-CD the RPD for the analyte Barium as out of control limits at 52% using Method SW6010B. A validation qualifier "J" was put on all associated soil samples. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of "A" was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.
- In the event a surrogate was diluted out from a dilution, a laboratory qualifier "O" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| 34-SS-A | Soil | B12101795-007 | SW6010B | Barium | 177 | mg/kg | J | RPD |
| 35-SS-A | Soil | B12101795-005 | SW6010B | Barium | 151 | mg/kg | J | RPD |
| 47-SS-A | Soil | B12101795-011 | SW6010B | Barium | 2940 | mg/kg | J | RPD |
| 47-SS-B | Soil | B12101795-013 | SW6010B | Barium | 2580 | mg/kg | J | RPD |
| 47-SS-C | Soil | B12101795-015 | SW6010B | Barium | 1510 | mg/kg | J | RPD |
| 47-SS-CD | Soil | B12101795-017 | SW6010B | Barium | 883 | mg/kg | J | RPD |
| 48-SS-A | Soil | B12101795-009 | SW6010B | Barium | 1410 | mg/kg | J | RPD |
| 70N-SS-A | Soil | B12101795-001 | SW8270C | Naphthalene | 0.05 | mg/kg | U | |
| YOSD-1210-207 | Water | B12101955-002 | SW8270C | Naphthalene | 0.33 | ug/L | U | |
| YOSD-1210-206 | Water | B12101955-001 | SW8270C | Naphthalene | 0.29 | ug/L | U | |

| Validation Qualifer Definitions: | |
|---|---|
| U | Blank Exceedance |
| J | QC Exceedance |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/19/2012** |
| **Verified By/Date Verified: Angela Roddy 01/03/2013** | **Sample End Date: 10/19/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 32-SS-A | 10/19/2012 | B12101953 | B12101953-001 |
| 2 | Soil | 32-SS-A Sieved | 10/19/2012 | B12101953 | B12101953-002 |
| 3 | Soil | 58-SS-A | 10/19/2012 | B12101953 | B12101953-003 |
| 4 | Soil | 58-SS-A Sieved | 10/19/2012 | B12101953 | B12101953-004 |
| 5 | Soil | 10-SS-A | 10/19/2012 | B12101953 | B12101953-005 |
| 6 | Soil | 10-SS-A Sieved | 10/19/2012 | B12101953 | B12101953-006 |
| 7 | Soil | 10-SS-B | 10/19/2012 | B12101953 | B12101953-007 |
| 8 | Soil | 10-SS-B Sieved | 10/19/2012 | B12101953 | B12101953-008 |
| 9 | Soil | 10-SS-C | 10/19/2012 | B12101953 | B12101953-009 |
| 10 | Soil | 10-SS-C Sieved | 10/19/2012 | B12101953 | B12101953-010 |
| 11 | Water-Rinsate Blank | YOSD-1210-206 | 10/19/2012 | B12101955 | B12101955-001 |
| 12 | Water-DI Blank | YOSD-1210-207 | 10/19/2012 | B12101955 | B12101955-002 |
| 13 | Water-Trip Blank | TB101612BTSSHP0259 | 10/19/2012 | B12101955 | B12101955-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatiles (VOC)-SW8260B. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12101953 and B12101955*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| B | The analyte was detected in the method blank. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 arrived with a temperature of 2.2°C. Samples were intact. Cooler 2 arrived with a temperature of 2.2°C with the water blanks. No custody seals on coolers, however, they were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C) was detected in Method Blank MB-66891-66574-66461. A laboratory qualifier "B" flagged for associated raw samples. A validation qualifier "U" was placed on associated raw samples with values <5x the reporting limit indicating Blank Exceedance. Silver (Method SW6010B) was detected in Method Blank MB-66534. No laboratory qualifier was used. No validation qualifier is used because the analyte Silver was nondetected in the raw samples. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C) was detected in the two following samples: YOSD-1210-206, Rinsate field blank, and YOSD-1210-207, DI water blank. A validation qualifier "U" is given to both blanks for this analyte, as well as raw soil samples with values <5x the reporting limit. Chloroform and Methylene chloride (SW8260B) were also detected in blanks YOSD-1210-206 and YOSD-1210-207 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because these are estimated values and are below the reporting limits. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All surrogate recoveries were within control limits. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS-66451 was flagged with laboratory qualifier "S" for the analyte Chloroethane (Method SW8260B) being just below control limits. A validation qualifier was not necessary because raw soil samples were non-detect for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12102169-001AMS3 was flagged with laboratory qualifier "S" for the analyte Barium (SW6010B) being outside of control limits. However, no validation qualifier was used because the post distillation spike was within limits. Lab QC matrix spike B12101953-007AMS was flagged with the laboratory qualifier "S" for the analyte Chloroethane (SW8260B) being just below control limits. A validation qualifier was not necessary because raw soil samples were non-detect for this analyte. Lab QC matrix spike B12101953-001AMS and matrix spike duplicate were flagged with laboratory qualifier "S" for spike recovery of the analyte Total Extracted Hydrocarbons (TEH) using method SW8015M being outside of control limits. A validation qualifier is not used because this is a screening method. However, for the same matrix spike and matrix spike duplicate, the laboratory flagged the analytes C19 to C36 Aliphatics and Total Extracted Hydrocarbons (TEH) using method MA-EPH with the qualifier "S" for spike recovery being outside of control limits. A validation qualifier is not used because the LCS was within control limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind field duplicates were collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** |
| 32-SS-A | Soil | B12101953-001 | SW8270C | Naphthalene | 0.012 | mg/kg-dry | U |
| 58-SS-A | Soil | B12101953-003 | SW8270C | Naphthalene | 0.0081 | mg/kg-dry | U |
| 10-SS-A | Soil | B12101953-005 | SW8270C | Naphthalene | 0.012 | mg/kg-dry | U |
| 10-SS-C | Soil | B12101953-009 | SW8270C | Naphthalene | 0.0052 | mg/kg-dry | U |
| YOSD-1210-207 | Water | B12101955-002 | SW8270C | Naphthalene | 0.33 | ug/L | U |
| YOSD-1210-206 | Water | B12101955-001 | SW8270C | Naphthalene | 0.29 | ug/L | U |
| Validation Qualifer Definitions: | | | | | | | |
| U | Blank Exceedance | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/23/2012** |
| **Verified By/Date Verified: Angela Roddy 01/09/2013** | **Sample End Date: 10/25/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 58-SS-B | 10/23/2012 | B12102188 | B12102188-001 |
| 2 | Soil | 58-SS-B Sieved | 10/23/2012 | B12102188 | B12102188-002 |
| 3 | Soil | 58-SS-C | 10/23/2012 | B12102188 | B12102188-003 |
| 4 | Soil | 58-SS-C Sieved | 10/23/2012 | B12102188 | B12102188-004 |
| 5 | Soil | 57-SS-A | 10/23/2012 | B12102188 | B12102188-005 |
| 6 | Soil | 57-SS-A Sieved | 10/23/2012 | B12102188 | B12102188-006 |
| 7 | Soil | 56-SS-A | 10/23/2012 | B12102188 | B12102188-007 |
| 8 | Soil | 56-SS-A Sieved | 10/23/2012 | B12102188 | B12102188-008 |
| 9 | Soil | 56-SS-B | 10/23/2012 | B12102188 | B12102188-009 |
| 10 | Soil | 56-SS-B Sieved | 10/23/2012 | B12102188 | B12102188-010 |
| 11 | Soil | 56-SS-C | 10/23/2012 | B12102188 | B12102188-011 |
| 12 | Soil | 56-SS-C Sieved | 10/23/2012 | B12102188 | B12102188-012 |
| 13 | Soil | 55-SS-A | 10/23/2012 | B12102188 | B12102188-013 |
| 14 | Soil | 55-SS-A Sieved | 10/23/2012 | B12102188 | B12102188-014 |
| 15 | Soil | 54-SS-A | 10/23/2012 | B12102188 | B12102188-015 |
| 16 | Soil | 54-SS-A Sieved | 10/23/2012 | B12102188 | B12102188-016 |
| 17 | Soil | 54-SS-B | 10/23/2012 | B12102188 | B12102188-017 |
| 18 | Soil | 54-SS-B Sieved | 10/23/2012 | B12102188 | B12102188-018 |
| 19 | Soil | 54-SS-C | 10/23/2012 | B12102188 | B12102188-019 |
| 20 | Soil | 54-SS-C Sieved | 10/23/2012 | B12102188 | B12102188-020 |
| 21 | Water-DI Blank | YOSD-1210-208 | 10/25/2012 | B12102368 | B12102368-001 |
| 22 | Water-Rinsate Blank | YOSD-1210-209 | 10/25/2012 | B12102368 | B12102368-002 |
| 23 | Water-Trip Blank | TB101612BTSSHP0259 | 10/25/2012 | B12102368 | B12102368-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12102188 and B12102368*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| VERIFICATION CRITERIA CHECK | |
|---|---|
| **Laboratory qualifiers used in this review:** | |
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % percent recovery is not calculated. |
| E | Estimated value. Result exceeds the instrument upper quantitation limit. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |
| **Validation qualifiers used in this review:** | |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 arrived with a temperature of 0.6°C. Samples were intact. Cooler 2 arrived with a temperature of 0.8°C with the water blanks. No custody seals on coolers, however, they were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. Lab QC sample matrix spike B12102188-003AMS and matrix spike duplicate B12102188-003AMSD were flagged for the analytes Benzo(a)anthracene, Benzo(a)pyrene, Benzo(g, h, i)perylene, Benzo(k)fluoranthene, Chrysene, and Phenanthrene with the laboratory qualifier "E" as an estimated value because the results exceed the instrument upper quantitation limit (Method SW8270C). No validation qualifier was used because the spike recoveries are reflective of a non-homogenous sample matrix. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Lead (Method SW6010B) was detected in Method Blank MB-66817. A laboratory qualifier was not used. A validation qualifier was not needed because Lead values were >10x the detection limit. Selenium and Silver (Method SW6020) were detected in Method Blank MB-66705. No laboratory qualifier was used. No validation qualifier is used because Selenium and Silver were not detected in the raw samples. Arsenic, Barium, Lead, and Selenium (Method E200.8) were detected in Method Blank (MB-66595). No validation qualifier was used because raw water samples values were nondetect for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Lead (Method E200.8) was detected in Rinsate Blank YOSD-1210-209. A validation qualifier "U" was placed on this analyte. A validation qualifier was not necessary for associated raw soil samples because values for lead were >10x the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Samples 56-SS-B and 56-SS-C were flagged with laboratory qualifier "S" for the surrogate Terphenyl-d14 being above control limits. A validation qualifier was not necessary because two other surrogates were within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12102188-003AMS and matrix spike duplicate were flagged with laboratory qualifier "S" for spike recovery of the analytes Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenzo(ah)anthracene, and Phenanthrene (Method SW8270C) being outside of control limits. A validation qualifier is not used because the spike recoveries indicate a non-homogenous sample matrix. Additionally, the LCS was within limits. Lab QC matrix spike supplicate B12102216-013AMSD was flagged with laboratory qualifier "S" for the analyte Barium (Method SW6020) being outside of control limits. No validation qualifier was used because the matrix spike and laboratory fortified blank were within limits. The post digestion spike was flagged with laboratory qualifier "A" for the analyte level being 4 times the spike level, and no % recovery was calculated. Lab QC matrix spike duplicate B12102216-013AMSD was flagged with laboratory qualifier "S" for the analyte TPH being just below control limits. No validation qualifier was used because the LCS was within limits. Lab QC matrix spike duplicate B12102188-001AMSD was flagged with laboratory qualifier "S" for the analytes n-Nonane and n-Decane (Method MA-EPH) being below control limits. No validation qualifier was used because the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind field duplicates were collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Validator Qualified Analytical Results**

| Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag |
|---|---|---|---|---|---|---|---|
| YOSD-1210-209 | Water | B12102368-002 | E200.8 | LEAD | 0.001 | mg/L | U |

| Validation Qualifer Definitions: | |
|---|---|
| U | Blank Exceedance |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/24/2012** |
| **Verified By/Date Verified: Angela Roddy 01/09/2013** | **Sample End Date: 10/25/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 53-SS-A | 10/24/2012 | B12102216 | B12102216-001 |
| 2 | Soil | 53-SS-A-Sieved | 10/24/2012 | B12102216 | B12102216-002 |
| 3 | Soil | 59-SS-A | 10/24/2012 | B12102216 | B12102216-003 |
| 4 | Soil | 59-SS-A-Sieved | 10/24/2012 | B12102216 | B12102216-004 |
| 5 | Soil | 60-SS-A | 10/24/2012 | B12102216 | B12102216-005 |
| 6 | Soil | 60-SS-A-Sieved | 10/24/2012 | B12102216 | B12102216-006 |
| 7 | Soil | 72-SS-A | 10/24/2012 | B12102216 | B12102216-007 |
| 8 | Soil | 72-SS-A-Sieved | 10/24/2012 | B12102216 | B12102216-008 |
| 9 | Soil | 63-SS-A | 10/24/2012 | B12102216 | B12102216-009 |
| 10 | Soil | 63-SS-A-Sieved | 10/24/2012 | B12102216 | B12102216-010 |
| 11 | Soil | 63-SS-AD | 10/24/2012 | B12102216 | B12102216-011 |
| 12 | Soil | 63-SS-AD-Sieved | 10/24/2012 | B12102216 | B12102216-012 |
| 13 | Soil | 62-SS-A | 10/24/2012 | B12102216 | B12102216-013 |
| 14 | Soil | 62-SS-A-Sieved | 10/24/2012 | B12102216 | B12102216-014 |
| 15 | Water-DI Blank | YOSD-1210-208 | 10/25/2012 | B12102368 | B12102368-001 |
| 16 | Water-Rinsate Blank | YOSD-1210-209 | 10/25/2012 | B12102368 | B12102368-002 |
| 17 | Water-Trip Blank | TB101612BTSSHP0259 | 10/25/2012 | B12102368 | B12102368-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12102216 and B12102368*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| VERIFICATION CRITERIA CHECK | |
|---|---|
| **Laboratory qualifiers used in this review:** | |
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| E | Estimated value. Result exceeds the instrument upper quantitation limit. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |
| **Validation qualifiers used in this review:** | |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 arrived with a temperature of 1.0°C. Samples were intact. Cooler 2 arrived with a temperature of 0.8°C with the water blanks. No custody seals on coolers, however, they were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Barium and Silver (Method SW6010B) were detected in Method Blank MB-66705. A laboratory qualifier was not used. A validation qualifier was not used for associated raw samples because raw samples were >10x the reporting limit for Barium; the analyte Silver was not detected in raw samples. Also, Selenium and Lead (Method SW6020) were detected in Method Blank MB-66705. No laboratory qualifier was used. No validation qualifier was used because the analytes Lead and Selenium were either not detected or >10x the reporting limit in the raw samples. Lead (SW6010B) was detected in Method Blank MB-66817. No validation qualifier was used because raw samples were >10x the reporting limit for Lead. Arsenic, Barium, Lead, and Selenium (Method E200.8) were detected in Method Blank MB-66595. No validation qualifier was used because raw water sample values were nondetect for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Lead (Method E200.8) was detected in Rinsate Blank YOSD-1210-209. A validation qualifier "U" was placed on this analyte. A validation qualifier was not necessary for associated raw soil samples because values for lead were >10x the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Samples 63-SS-A and 63-SS-AD were flagged with laboratory qualifier "S" for the surrogate Nitrobenzene-d5 (SW8270C) being above control limits. A validation was not necessary because two other surrogates were within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12102188-003AMS and matrix spike duplicate B12102188-003AMSD were flagged with laboratory qualifier "S" for spike recovery of the analytes Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenzo(ah)anthracene, and Phenanthrene (Method SW8270C) being outside of control limits. A validation qualifier is not used because the spike recoveries indicate a non-homogenous sample matrix. Additionally, the LCS was within limits. Lab QC matrix spike supplicate B12102216-013AMSD was flagged with laboratory qualifier "S" for the analyte Barium (Method SW6020) being outside of control limits. No validation qualifier was used because the matrix spike and laboratory fortified blank were within limits. The post digestion spike was flagged with laboratory qualifier "A" for the analyte level being 4 times the spike level, and no % recovery was calculated. Lab QC matrix spike duplicate B12102216-013AMSD was flagged with laboratory qualifier "S" for the analyte TPH being just below control limits. No validation qualifier was used because the LCS was within limits. Lab QC matrix spike duplicate B12102188-001AMSD was flagged with laboratory qualifier "S" for the analytes n-Nonane and n-Decane (Method MA-EPH) being below control limits. No validation qualifier was used because the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: All blind field duplicate RPDs were within control limits. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Validator Qualified Analytical Results**

| Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag |
|---|---|---|---|---|---|---|---|
| YOSD-1210-209 | Water | B12102368-002 | E200.8 | LEAD | 0.001 | mg/L | U |

| Validation Qualifer Definitions: | |
|---|---|
| U | Blank Exceedance |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/25/2012** |
| **Verified By/Date Verified: Angela Roddy 01/09/2013** | **Sample End Date: 10/25/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 61-SS-A | 10/25/2012 | B12102349 | B12102349-001 |
| 2 | Soil | 61-SS-A Sieved | 10/25/2012 | B12102349 | B12102349-002 |
| 3 | Soil | 61-SS-B | 10/25/2012 | B12102349 | B12102349-003 |
| 4 | Soil | 61-SS-B Sieved | 10/25/2012 | B12102349 | B12102349-004 |
| 5 | Soil | 61-SS-C | 10/25/2012 | B12102349 | B12102349-005 |
| 6 | Soil | 61-SS-C Sieved | 10/25/2012 | B12102349 | B12102349-006 |
| 7 | Soil | 73-SS-A | 10/25/2012 | B12102349 | B12102349-007 |
| 8 | Soil | 73-SS-A Sieved | 10/25/2012 | B12102349 | B12102349-008 |
| 9 | Soil | 33-SS-A | 10/25/2012 | B12102349 | B12102349-009 |
| 10 | Soil | 33-SS-A Sieved | 10/25/2012 | B12102349 | B12102349-010 |
| 11 | Soil | 49-SS-A | 10/25/2012 | B12102349 | B12102349-011 |
| 12 | Soil | 49-SS-A Sieved | 10/25/2012 | B12102349 | B12102349-012 |
| 13 | Soil | 50-SS-A | 10/25/2012 | B12102349 | B12102349-013 |
| 14 | Soil | 50-SS-A Sieved | 10/25/2012 | B12102349 | B12102349-014 |
| 15 | Soil | 51-SS-A | 10/25/2012 | B12102349 | B12102349-015 |
| 16 | Soil | 51-SS-A Sieved | 10/25/2012 | B12102349 | B12102349-016 |
| 17 | Soil | 19-SS-A | 10/25/2012 | B12102349 | B12102349-017 |
| 18 | Soil | 19-SS-A Sieved | 10/25/2012 | B12102349 | B12102349-018 |
| 19 | Water-DI Blank | YOSD-1210-208 | 10/25/2012 | B12102368 | B12102368-001 |
| 20 | Water-Rinsate Blank | YOSD-1210-209 | 10/25/2012 | B12102368 | B12102368-002 |
| 21 | Water-Trip Blank | TB101612BTSSHP0259 | 10/25/2012 | B12102368 | B12102368-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12102349 and B12102368*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| VERIFICATION CRITERIA CHECK | |
|---|---|
| **Laboratory qualifiers used in this review:** | |
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |
| **Validation qualifiers used in this review:** | |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 arrived with a temperature of 1.5°C. Samples were intact. Cooler 2 arrived with a temperature of 0.8°C with the water blanks. No custody seals on coolers, however, they were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Chromium (Method SW6010B) and Selenium (Method SW6020) were detected in Method Blank MB-66818. A laboratory qualifier was not used. A validation qualifier is not used for associated raw samples because raw samples were >10x the reporting limit for Chromium and Selenium was not detected. Arsenic, Barium, Lead, and Selenium (Method E200.8) were detected in Method Blank MB-66595. No validation qualifier was used because raw water sample values were nondetect for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Lead (Method E200.8) was detected in Rinsate Blank YOSD-1210-209. A validation qualifier "U" was placed on this analyte. A validation qualifier was not necessary for associated raw soil samples because values for lead were >10x the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 61-SS-C the surrogate Nitrobenzene-d5 was above control limits and flagged with a laboratory qualifier "S". A validation qualifier was not necessary because two other surrogates were within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12102417-001AMS was flagged with laboratory qualifier "S" for spike recovery of the analyte Naphthalene (Method MA-VPH). Because the recovery was just below the low limit and the LCS was within control limits a validation qualifier was not used. Lab QC matrix spike B12102417-001AMS and matrix spike duplicate B12102417-001AMSD were flagged with laboratory qualifier "S" with the analytes n-Nonane, n-Decane being outside of control limits for spike recovery. Raw samples were not flagged with a validation qualifier because these analytes were not tested for individually. Lab QC matrix spike B12102349-003AMS and matrix spike duplicate B12102349-003AMSD were flagged with laboratory qualifier "S" with the analytes Benzo(a)pyrene, Dibenzo(ah)anthracene, and Indeno(1,2,3-cd)pyrene. (Method SW8270C) being outside of control limits. A validation qualifier is not used because another matrix spike and matrix spike duplicate was run in the batch, and those spike recoveries were within control limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind duplicates were collected. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

| Validator Qualified Analytical Results | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** |
| YOSD-1210-209 | Water | B12102368-002 | E200.8 | LEAD | 0.001 | mg/L | U |
| Validation Qualifer Definitions: | | | | | | | |
| U | Blank Exceedance | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/26/2012** |
| **Verified By/Date Verified: Angela Roddy 01/09/2013** | **Sample End Date: 10/31/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 31-SS-A | 10/26/2012 | B12102417 | B12102417-001 |
| 2 | Soil | 31-SS-A Sieved | 10/26/2012 | B12102417 | B12102417-002 |
| 3 | Soil | 31-SS-B | 10/26/2012 | B12102417 | B12102417-003 |
| 4 | Soil | 31-SS-B Sieved | 10/26/2012 | B12102417 | B12102417-004 |
| 5 | Soil | 31-SS-C | 10/26/2012 | B12102417 | B12102417-005 |
| 6 | Soil | 31-SS-C Sieved | 10/26/2012 | B12102417 | B12102417-006 |
| 7 | Soil | 46-SS-A | 10/26/2012 | B12102417 | B12102417-007 |
| 8 | Soil | 46-SS-A Sieved | 10/26/2012 | B12102417 | B12102417-008 |
| 9 | Soil | 46-SS-B | 10/26/2012 | B12102417 | B12102417-009 |
| 10 | Soil | 46-SS-B Sieved | 10/26/2012 | B12102417 | B12102417-010 |
| 11 | Soil | 46-SS-C | 10/26/2012 | B12102417 | B12102417-011 |
| 12 | Soil | 46-SS-C Sieved | 10/26/2012 | B12102417 | B12102417-012 |
| 13 | Water-DI Blank | YOSD-1210-210 | 10/31/2012 | B12102694 | B12102694-001 |
| 14 | Water-Rinsate Blank | YOSD-1210-211 | 10/31/2012 | B12102694 | B12102694-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatiles (VOC)-SW8260B Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12102417 and B12102694*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| VERIFICATION CRITERIA CHECK | |
|---|---|
| **Laboratory qualifiers used in this review:** | |
| * | MCL Exceedance |
| B | The analyte was detected in the method blank. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Diluted out |
| S | Spike recovery outside of advisory limits. |
| **Validation qualifiers used in this review:** | |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 with soil samples was received at 0.2°C. Cooler 2 with water samples was received at 1.4°C. Custody seals were not present, however the coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Lead (SW6010B) was detected in Method Blank MB-66934. A laboratory qualifier was not used. A validation qualifier was not used for associated raw samples because raw samples were >10x the reporting limit for Lead. Selenium (SW6020) was detected in Method Blank MB-66858. A laboratory qualifier was not used. A validation qualifier was not used because Selenium was nondetected in raw samples. Mercury (SW7471A) was detected in Method Blank MB-66713. A laboratory qualifier was not used. A validation qualifier was not used because Mercury is nondetected in raw samples. Barium, Chromium, Silver, Cadmium, and Lead (E200.8) were detected at low levels in Method Blank MB-66964. A laboratory qualifier was not used, and a validation qualifier was not used because these metals were nondetected in associated raw water samples. Naphthalene (SW8270C) was detected in Method Blank MB-67096-66806-66726. The laboratory flagged associated raw samples with the qualifier "B" for blank exceedance. A validation qualifier "U" was used for the associated raw sample YOSD-1210-210. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Methylene Chloride (SW8260B) and Naphthalene (SW8270C) were detected in DI Blank YOSD-1210-210. Methylene Chloride and Chloroform (SW8260B) were detected in YOSD-1210-211. Both blanks are flagged with a validation qualifier "U" for blank exceedance. Raw soil samples with values <5x the reporting limit were flagged with validation qualifier "U" for blank exceedance. Chloroform (Method SW8260B) was also detected in DI Blank YOSD-1210-210 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: For raw samples 31-SS-A and 46-SS-A the surrogate % recovery of Nitrobenzene-d5 (SW8270C for Tetraethyllead) was outside of control limits and flagged with a laboratory qualifier "S". A validation qualifier was not necessary because two other surrogates were within limits for this method. Sample 46-SS-C was flagged with laboratory qualifier "O" for the surrogate Nitrobenzene-d5 (SW8270C for Tetraethyllead) being diluted out. However, the associated target analytes were not detected for Tetraethyllead (SW8270C). A validation qualifier is not necessary because other surrogates were within limits for this method. For lab QC matrix spike B12102625-001HMS and matrix spike duplicate B12102625-001HMSD was flagged with a laboratory qualifier "S" for the surrogate % recovery of pBromofluorobenzene (SW8260B) being above control limits. No validation qualifier was used because this could be related to the QC sample only, as well as other surrogates were within limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS-66718 was flagged with laboratory qualifier "S" for the surrogate Nitrobenzene-d5 (SW8270C) being below control limits. No validation qualifier was used because the MS/MSD for this method was within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Lab QC matrix spike B12102417-001AMS was flagged with laboratory qualifier "S" for spike recovery of the analyte Naphthalene (Method MA-VPH). A validation qualifier was not used because the LCS was within control limits. Lab QC matrix spike B12102417-001AMS and matrix spike duplicate B12102417-001AMSD were flagged with laboratory qualifier "S" with the analytes n-Nonane, n-Decane (MA-EPH) being outside of control limits for spike recovery. A validation qualifier was not used because the LCS was within control limits. Lab QC matrix spike B12102349-003AMS and matrix spike duplicate B12102349-003AMSD were flagged with laboratory qualifier "S" with the analytes Benzo(a)pyrene, Dibenzo(ah)anthracene, Naphthalene, and Indeno(1,2,3-cd)pyrene. (Method SW8270C) being outside of control limits. A validation qualifier is not used because another matrix spike and matrix spike duplicate was run in the batch, and those spike recoveries were within control limits. Additionally, the LCS was within limits. Lab QC matrix spike B12110040-002AMS3 and matrix spike duplicate B12110040-002AMSD was flagged with laboratory qualifier "S" for spike recovery of the analyte Silver (SW6010B) being below control limits. However, a validation qualifier was not used because the post digestion spike was within control limits. Lab QC matrix spike B12110174-001AMS and matrix spike duplicate B12110174-001AMSD was flagged with laboratory qualifier "S" for spike recovery of the analyte Chloroethane (SW8260B) being below control limits. A validation qualifier was not used because the LCS was within control limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind duplicates were collected. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.
- In the event, a surrogate is added to the dilution and the surrogate is diluted out, a laboratory qualifier "O" is put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

**Validator Qualified Analytical Results**

| Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag |
|---|---|---|---|---|---|---|---|
| YOSD-1210-210 | Water | B12102694-001 | SW8270C | Naphthalene | 0.32 | ug/L | U |
| YOSD-1210-210 | Water | B12102694-001 | SW8260B | Methylene chloride | 0.75 | ug/L | U |
| YOSD-1210-211 | Water | B12102694-002 | SW8260B | Chloroform | 0.62 | ug/L | U |
| YOSD-1210-211 | Water | B12102694-002 | SW8260B | Methylene chloride | 1.0 | ug/L | U |
| 31-SS-B | Soil | B12102417-003 | SW8270C | Naphthalene | 0.013 | mg/kg | U |
| 46-SS-B | Soil | B12102417-009 | SW8270C | Naphthalene | 0.010 | mg/kg | U |

Validation Qualifer Definitions:

| | |
|---|---|
| U | Blank Exceedance |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/30/2012** |
| **Verified By/Date Verified: Angela Roddy 01/10/2013** | **Sample End Date: 10/31/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 8-SS-A | 10/30/2012 | B12102699 | B12102699-001 |
| 2 | Soil | 8-SS-A Sieved | 10/30/2012 | B12102699 | B12102699-002 |
| 3 | Soil | 7-SS-A | 10/30/2012 | B12102699 | B12102699-003 |
| 4 | Soil | 7-SS-A Sieved | 10/30/2012 | B12102699 | B12102699-004 |
| 5 | Soil | 6-SS-A | 10/30/2012 | B12102699 | B12102699-005 |
| 6 | Soil | 6-SS-A Sieved | 10/30/2012 | B12102699 | B12102699-006 |
| 7 | Soil | 5-SS-A | 10/30/2012 | B12102699 | B12102699-007 |
| 8 | Soil | 5-SS-A Sieved | 10/30/2012 | B12102699 | B12102699-008 |
| 9 | Soil | 4-SS-A | 10/30/2012 | B12102699 | B12102699-009 |
| 10 | Soil | 4-SS-A Sieved | 10/30/2012 | B12102699 | B12102699-010 |
| 11 | Soil | 11-SS-A | 10/30/2012 | B12102699 | B12102699-011 |
| 12 | Soil | 11-SS-A Sieved | 10/30/2012 | B12102699 | B12102699-012 |
| 13 | Soil | 11-SS-AD | 10/30/2012 | B12102699 | B12102699-013 |
| 14 | Soil | 11-SS-AD Sieved | 10/30/2012 | B12102699 | B12102699-014 |
| 15 | Soil | 12-SS-A | 10/30/2012 | B12102699 | B12102699-015 |
| 16 | Soil | 12-SS-A Sieved | 10/30/2012 | B12102699 | B12102699-016 |
| 17 | Soil | 12-SS-B | 10/30/2012 | B12102699 | B12102699-017 |
| 18 | Soil | 12-SS-B Sieved | 10/30/2012 | B12102699 | B12102699-018 |
| 19 | Soil | 12-SS-C | 10/30/2012 | B12102699 | B12102699-019 |
| 20 | Soil | 12-SS-C Sieved | 10/30/2012 | B12102699 | B12102699-020 |
| 21 | Water-DI Blank | YOSD-1210-210 | 10/31/2012 | B12102694 | B12102694-001 |
| 22 | Water-Rinsate Blank | YOSD-1210-211 | 10/31/2012 | B12102694 | B12102694-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatiles (VOC)-SW8260B Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12102699 and B12102694*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| VERIFICATION CRITERIA CHECK | |
|---|---|
| **Laboratory qualifiers used in this review:** | |
| * | MCL Exceedance |
| B | The analyte was detected in the method blank. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |
| **Validation qualifiers used in this review:** | |
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 with soil samples was received at 1.0°C. Cooler 2 with water samples was received at 1.4°C. Custody seals were not present, however the coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Lead (SW6010B) was detected in Method Blank MB-66934. A laboratory qualifier was not used. A validation qualifier is not used for associated raw samples because raw samples were >10x the reporting limit for Lead. Selenium (SW6020) was detected in Method Blank MB-66858. A laboratory qualifier was not used. A validation qualifier was not used because Selenium is nondetected in raw samples. Barium, Cadmium, Chromium, Lead, and Silver (Method E200.8) were detected in Method Blank MB-66694. No validation qualifier was used because raw water sample values for these analytes were nondetect. Mercury (Method E245.1) was detected in Method Blank MB-66715. No validation qualifier was used because raw water sample values were nondetect for Mercury. Naphthalene (SW8270C) was detected in Method Blank MB-67096-66806-66726. The laboratory flagged associated raw samples with the qualifier "B" for blank exceedance. A validation qualifier "U" was used for the associated DI Blank YOSD-1210-210. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Methylene Chloride (SW8260B) and Naphthalene (SW8270C) were detected in DI Blank YOSD-1210-210. Methylene Chloride and Chloroform (SW8260B) were detected in YOSD-1210-211. Both blanks are flagged with a validation qualifier "U" for blank exceedance. Raw soil samples with values <5x the reporting limit were flagged with validation qualifier "U" for blank exceedance. Chloroform (Method SW8260B) was also detected in DI Blank YOSD-1210-210 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: For raw samples 5-SS-A and 12-SS-B the surrogate % recovery of VPH Aliphatics was outside of control limits and flagged with a laboratory qualifier "S". However, the surrogate % recovery was outside of QC advisory limits due to positive sample matrix interference, as noted by the laboratory. No validation qualifier was used. For lab QC matrix spike B12102625-001HMS and matrix spike duplicate B12102625-001HMSD was flagged with a laboratory qualifier "S" for the surrogate % recovery of pBromofluorobenzene (SW8260B) being above control limits. No validation qualifier was used because this is related to the QC sample only. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS-66718 (SW8270C) was outside of control limits for the analyte Phenanthrene. It was flagged with the laboratory qualifier "S". However, the MS/MSD for the analyte Phenanthrene was within control limits. A validation qualifier was not used. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12102417-001AMS was flagged with laboratory qualifier "S" for spike recovery of the analyte Naphthalene (Method MA-VPH). A validation qualifier was not used because the LCS was within control limits. Lab QC matrix spike B12110174-001AMS and matrix spike duplicate B12110174-001AMSD was flagged with laboratory qualifier "S" for spike recovery of the analyte Chloroethane (SW8260B) being below control limits. A validation qualifier was not used because the LCS was within control limits. Lab QC matrix spike B12102625-001HMS and matrix spike duplicate B12102625-001HMSD were flagged with laboratory qualifier "S" for the analytes 1,1,2,2-Tetrachloroethane and 1,2,3-Trichloropropane (Method SW8260B) for being above control limits. No validation qualifier was used because the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| 17. Laboratory Duplicates | | | | | | |
|---|---|---|---|---|---|---|
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: For sample 11-SS-A and its duplicate 11-SS-AD the RPDs and PRDLs outside of control limits for the following analytes: Method MA-EPH; C9 to C18 Aliphatics (110% PRDL), C19 to C36 Aliphatics (63%), Total Extractable Hydrocarbons (72%), and C11 to C22 Aromatics (76%); Method SW8015M; Total Extractable Hydrocarbons-Screen, (63%). A validation qualifier "J" was placed on associated samples for these analytes except the TEH-Screen. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1210-210 | Water | B12102694-001 | SW8270C | Naphthalene | 0.32 | ug/L | U | |
| YOSD-1210-210 | Water | B12102694-001 | SW8260B | Methylene chloride | 0.75 | ug/L | U | |
| YOSD-1210-211 | Water | B12102694-002 | SW8260B | Chloroform | 0.62 | ug/L | U | |
| YOSD-1210-211 | Water | B12102694-002 | SW8260B | Methylene chloride | 1.0 | ug/L | U | |
| 8-SS-A | Soil | B12102699-001 | SW8270C | Naphthalene | 0.0098 | mg/kg | U | |
| 5-SS-A | Soil | B12102699-007 | SW8270C | Naphthalene | 1.6 | mg/kg | U | |
| 11-SS-A | Soil | B12102699-011 | MA-EPH | C11 to C22 Aromatics | 2620 | mg/kg | J | RPD |
| 11-SS-A | Soil | B12102699-011 | MA-EPH | C19 to C36 Aliphatics | 1680 | mg/kg | J | RPD |
| 11-SS-A | Soil | B12102699-011 | MA-EPH | C9 to C18 Aliphatics | 583 | mg/kg | J | PRDL |
| 11-SS-A | Soil | B12102699-011 | MA-EPH | Total Extractable Hydrocarbons | 6030 | mg/kg | J | RPD |
| 11-SS-AD | Soil | B12102699-013 | MA-EPH | C11 to C22 Aromatics | 1180 | mg/kg | J | RPD |
| 11-SS-AD | Soil | B12102699-013 | MA-EPH | C19 to C36 Aliphatics | 880 | mg/kg | J | RPD |
| 11-SS-AD | Soil | B12102699-013 | MA-EPH | C9 to C18 Aliphatics | 170 | mg/kg | J | PRDL |
| 11-SS-AD | Soil | B12102699-013 | MA-EPH | Total Extractable Hydrocarbons | 2850 | mg/kg | J | RPD |
| 12-SS-A | Soil | B12102699-015 | MA-EPH | C11 to C22 Aromatics | 186 | mg/kg | J | RPD |
| 12-SS-A | Soil | B12102699-015 | MA-EPH | C19 to C36 Aliphatics | 313 | mg/kg | J | RPD |
| 12-SS-A | Soil | B12102699-015 | MA-EPH | C9 to C18 Aliphatics | <126 | mg/kg | J | PRDL |
| 12-SS-A | Soil | B12102699-015 | MA-EPH | Total Extractable Hydrocarbons | 716 | mg/kg | J | RPD |
| 12-SS-B | Soil | B12102699-017 | MA-EPH | C11 to C22 Aromatics | 341 | mg/kg | J | RPD |
| 12-SS-B | Soil | B12102699-017 | MA-EPH | C19 to C36 Aliphatics | 381 | mg/kg | J | RPD |
| 12-SS-B | Soil | B12102699-017 | MA-EPH | C9 to C18 Aliphatics | <126 | mg/kg | J | PRDL |
| 12-SS-B | Soil | B12102699-017 | MA-EPH | Total Extractable Hydrocarbons | 1110 | mg/kg | J | RPD |
| 12-SS-C | Soil | B12102699-019 | MA-EPH | C11 to C22 Aromatics | 717 | mg/kg | J | RPD |
| 12-SS-C | Soil | B12102699-019 | MA-EPH | C19 to C36 Aliphatics | 700 | mg/kg | J | RPD |
| 12-SS-C | Soil | B12102699-019 | MA-EPH | C9 to C18 Aliphatics | 161 | mg/kg | J | PRDL |
| 12-SS-C | Soil | B12102699-019 | MA-EPH | Total Extractable Hydrocarbons | 2180 | mg/kg | J | RPD |
| 4-SS-A | Soil | B12102699-009 | MA-EPH | C11 to C22 Aromatics | 78 | mg/kg | J | RPD |
| 4-SS-A | Soil | B12102699-009 | MA-EPH | C19 to C36 Aliphatics | 88 | mg/kg | J | RPD |
| 4-SS-A | Soil | B12102699-009 | MA-EPH | C9 to C18 Aliphatics | <23 | mg/kg | J | PRDL |
| 4-SS-A | Soil | B12102699-009 | MA-EPH | Total Extractable Hydrocarbons | 244 | mg/kg | J | RPD |
| 5-SS-A | Soil | B12102699-007 | MA-EPH | C11 to C22 Aromatics | 565 | mg/kg | J | RPD |
| 5-SS-A | Soil | B12102699-007 | MA-EPH | C19 to C36 Aliphatics | 345 | mg/kg | J | RPD |
| 5-SS-A | Soil | B12102699-007 | MA-EPH | C9 to C18 Aliphatics | 1230 | mg/kg | J | PRDL |
| 5-SS-A | Soil | B12102699-007 | MA-EPH | Total Extractable Hydrocarbons | 2520 | mg/kg | J | RPD |
| 7-SS-A | Soil | B12102699-003 | MA-EPH | C11 to C22 Aromatics | 57 | mg/kg | J | RPD |
| 7-SS-A | Soil | B12102699-003 | MA-EPH | C19 to C36 Aliphatics | 120 | mg/kg | J | RPD |
| 7-SS-A | Soil | B12102699-003 | MA-EPH | C9 to C18 Aliphatics | <22 | mg/kg | J | PRDL |
| 7-SS-A | Soil | B12102699-003 | MA-EPH | Total Extractable Hydrocarbons | 245 | mg/kg | J | RPD |
| 8-SS-A | Soil | B12102699-001 | MA-EPH | C11 to C22 Aromatics | 95 | mg/kg | J | RPD |
| 8-SS-A | Soil | B12102699-001 | MA-EPH | C19 to C36 Aliphatics | 116 | mg/kg | J | RPD |
| 8-SS-A | Soil | B12102699-001 | MA-EPH | C9 to C18 Aliphatics | <22 | mg/kg | J | PRDL |
| 8-SS-A | Soil | B12102699-001 | MA-EPH | Total Extractable Hydrocarbons | 304 | mg/kg | J | RPD |

| Validation Qualifer Definitions: | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 10/31/2012** |
| **Verified By/Date Verified: Angela Roddy 01/10/2013** | **Sample End Date: 10/31/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 13-SS-A | 10/31/2012 | B12110079 | B12110079-001 |
| 2 | Soil | 13-SS-A Sieved | 10/31/2012 | B12110079 | B12110079-002 |
| 3 | Soil | 15-SS-A | 10/31/2012 | B12110079 | B12110079-003 |
| 4 | Soil | 15-SS-A Sieved | 10/31/2012 | B12110079 | B12110079-004 |
| 5 | Soil | 14-SS-A | 10/31/2012 | B12110079 | B12110079-005 |
| 6 | Soil | 14-SS-A Sieved | 10/31/2012 | B12110079 | B12110079-006 |
| 7 | Soil | 16-SS-A | 10/31/2012 | B12110079 | B12110079-007 |
| 8 | Soil | 16-SS-A Sieved | 10/31/2012 | B12110079 | B12110079-008 |
| 9 | Soil | 17-SS-A | 10/31/2012 | B12110079 | B12110079-009 |
| 10 | Soil | 17-SS-A Sieved | 10/31/2012 | B12110079 | B12110079-010 |
| 11 | Soil | 18-SS-A | 10/31/2012 | B12110079 | B12110079-011 |
| 12 | Soil | 18-SS-A Sieved | 10/31/2012 | B12110079 | B12110079-012 |
| 13 | Soil | 25-SS-A | 10/31/2012 | B12110079 | B12110079-013 |
| 14 | Soil | 25-SS-A Sieved | 10/31/2012 | B12110079 | B12110079-014 |
| 15 | Soil | 25-SS-B | 10/31/2012 | B12110079 | B12110079-015 |
| 16 | Soil | 25-SS-B Sieved | 10/31/2012 | B12110079 | B12110079-016 |
| 17 | Soil | 25-SS-C | 10/31/2012 | B12110079 | B12110079-017 |
| 18 | Soil | 25-SS-C Sieved | 10/31/2012 | B12110079 | B12110079-018 |
| 19 | Water-DI Blank | YOSD-1210-210 | 10/31/2012 | B12102694 | B12102694-001 |
| 20 | Water-Rinsate Blank | YOSD-1210-211 | 10/31/2012 | B12102694 | B12102694-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatiles (VOC)-SW8260B Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12110079 and B12102694*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| VERIFICATION CRITERIA CHECK | |
|---|---|
| **Laboratory qualifiers used in this review:** | |
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated. |
| B | The analyte was detected in the method blank. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |
| **Validation qualifiers used in this review:** | |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 with soil samples was received at 0.2°C. Cooler 2 with water samples was received at 1.4°C. Custody seals were not present, however the coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Mercury (Method SW7471A) was detected in Method Blank MB-66759. No validation qualifier was used because raw sample values were >10x the reporting limit for Mercury. Arsenic (SW6020) was detected in Method Blank MB-66889. A laboratory qualifier was not used. A validation qualifier was not used because the results found in the raw samples were >10x the reporting limit. Barium, Cadmium, Chromium, Lead, and Silver (Method E200.8) were detected in Method Blank MB-66694. No validation qualifier was used because raw water sample values were nondetect for these analytes. Mercury (Method E245.1) was detected in Method Blank MB-66715. No validation qualifier was used because raw water sample values were nondetect for Mercury. Naphthalene (SW8270C) was detected in Method Blank MB-67096-66806-66726. The laboratory flagged associated raw samples with the qualifier "B" for blank exceedance. A validation qualifier "U" was used for the associated raw sample YOSD-1210-210. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Methylene Chloride (SW8260B) and Naphthalene (SW8270C) were detected in DI Blank YOSD-1210-210. Methylene Chloride and Chloroform (SW8260B) were detected in YOSD-1210-211. Both blanks are flagged with a validation qualifier "U" for blank exceedance. Raw soil samples with values <5x the reporting limit were flagged with validation qualifier "U" for blank exceedance. Chloroform (Method SW8260B) was also detected in DI Blank YOSD-1210-210 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: For raw samples 14-SS-A and 18-SS-A the surrogate % recovery of Terphenyl-d14 was outside of control limits and flagged with a laboratory qualifier "S". A validation qualifier was not necessary because two other surrogates were within limits for this method. For lab QC matrix spike B12102625-001HMS and matrix spike duplicate B12102625-001HMSD was flagged with a laboratory qualifier "S" for the surrogate % recovery of pBromofluorobenzene (SW8260B) being above control limits. No validation qualifier was used. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS-66791 (SW8270C) was outside of control limits for the analytes 2-Methylnaphthalene, Acenaphthylene, Anthracene, Benzo(a)pyrene, Chrysene, Fluorene, Phenanthrene, and Pyrene. It was flagged with the laboratory qualifier "S". Per the QAPP, if the LCS is out of control limits, it should be re-analyzed. The laboratory did not re-analyze the LCS for SW8270C because per their protocol, if the MS/MSD for the all the analytes tested for are within control limits, then the LCS is considered null. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12110227-013AMS3 and matrix spike duplicate B12110227-013AMSD3 were flagged with the laboratory qualifier "S" for the analyte Barium being out of control limits. No validation qualifier was used because the post digestion spike was within control limits. Lab QC matrix spike B12110079-003AMS was flagged with laboratory qualifier "S" for spike recovery of the analyte Naphthalene (Method MA-VPH). No validation qualifier was used because the LCS was within limits. Lab QC matrix spike duplicate B12110079-003AMSD was flagged with laboratory qualifier "S" for spike recovery being over the control limits for the analyte C19 to C36 Aliphatics (MA-EPH). A validation qualifier was not used because sample matrix could be causing interference. Lab QC matrix spike B12110174-001AMS and matrix spike duplicate B12110174-001AMSD were flagged with laboratory qualifier "S" for spike recovery for the analyte Chloroethane being below control limits. No validation qualifier was used because the LCS was within control limits. Lab QC matrix spike B12110174-001AMS and matrix spike duplicate B12110174-001AMSD was flagged with laboratory qualifier "S" for spike recovery of the analyte Chloroethane (SW8260B) being below control limits. A validation qualifier was not used because the LCS was within control limits. Lab QC matrix spike B12102625-001HMS and matrix spike duplicate B12102625-001HMSD were flagged with laboratory qualifier "S" for the analytes 1,1,2,2-Tetrachloroethane and 1,2,3-Trichloropropane (Method SW8260B) for being above control limits. No validation qualifier was used because the LCS was within limits. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind field duplicates were collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** |
| YOSD-1210-210 | Water | B12102694-001 | SW8270C | Naphthalene | 0.32 | ug/L | U |
| YOSD-1210-210 | Water | B12102694-001 | SW8260B | Methylene chloride | 0.75 | ug/L | U |
| YOSD-1210-211 | Water | B12102694-002 | SW8260B | Chloroform | 0.62 | ug/L | U |
| YOSD-1210-211 | Water | B12102694-002 | SW8260B | Methylene chloride | 1.0 | ug/L | U |
| 18-SS-A | Soil | B12110079-011 | SW8270C | Naphthalene | 0.27 | mg/kg | U |
| U | Blank Exceedance | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 11/1/2012** |
| **Verified By/Date Verified: Angela Roddy 01/14/2013** | **Sample End Date: 11/2/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 30-SS-A | 11/1/2012 | B12110227 | B12110227-001 |
| 2 | Soil | 30-SS-A Sieved | 11/1/2012 | B12110227 | B12110227-002 |
| 3 | Soil | 29-SS-A | 11/1/2012 | B12110227 | B12110227-003 |
| 4 | Soil | 29-SS-A Sieved | 11/1/2012 | B12110227 | B12110227-004 |
| 5 | Soil | 29-SS-B | 11/1/2012 | B12110227 | B12110227-005 |
| 6 | Soil | 29-SS-B Sieved | 11/1/2012 | B12110227 | B12110227-006 |
| 7 | Soil | 29-SS-C | 11/1/2012 | B12110227 | B12110227-007 |
| 8 | Soil | 29-SS-C Sieved | 11/1/2012 | B12110227 | B12110227-008 |
| 9 | Soil | 45-SS-A | 11/1/2012 | B12110227 | B12110227-009 |
| 10 | Soil | 45-SS-A Sieved | 11/1/2012 | B12110227 | B12110227-010 |
| 11 | Soil | 45-SS-B | 11/1/2012 | B12110227 | B12110227-011 |
| 12 | Soil | 45-SS-B Sieved | 11/1/2012 | B12110227 | B12110227-012 |
| 13 | Soil | 45-SS-C | 11/1/2012 | B12110227 | B12110227-013 |
| 14 | Soil | 45-SS-C Sieved | 11/1/2012 | B12110227 | B12110227-014 |
| 15 | Water-Rinsate Blank | YOSD-1211-212 | 11/2/2012 | B12110363 | B12110363-001 |
| 16 | Water-DI Blank | YOSD-1211-213 | 11/2/2012 | B12110363 | B12110363-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12110227 and B12110363*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| VERIFICATION CRITERIA CHECK | |
|---|---|
| **Laboratory qualifiers used in this review:** | |
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % percent recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Diluted out. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |
| **Validation qualifiers used in this review:** | |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 with soil samples was received at 0.4°C. Cooler 2 with water samples was received at 0.3°C. Custody seals were not present, however the coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Arsenic was detected in Method Blank MB-66889 (SW6020). A laboratory qualifier was not used. A validation qualifier was not used because the results found in the raw samples were >10x the reporting limit. Chromium and Silver (Method E200.8) were detected in Method Blank MB-66863. No validation qualifier was used because raw water sample values were nondetect for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Chloroform (SW8260B) and Naphthalene (SW8270C) were detected in YOSD-1211-212 and YOSD-1211-213. A validation qualifier "U" was placed on both blanks for these analytes. A validation qualifier was placed on all associated raw samples with values <5x the reporting limit for these analytes. C5 to C8 Aliphatics (Method MA-EPH), Bromodichloromethane, and Chloromethane (Method SW8260B) were also detected in blanks YOSD-1211-212 and YOSD-1211-213 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because these are estimated values and are below the reporting limits. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: For raw sample 29-SS-B the surrogate % recovery of 2-Fluorobiphenyl and Nitrobenzene-d5 (SW8270C) were outside of control limits and flagged with a laboratory qualifier "S". However, the surrogate %recovery could be biased high due to positive matrix interference. Sample 45-SS-C was flagged with laboratory qualifier "O". This sample had a high level of organics present, and the sample extract was diluted out. No validation qualifier was used because all samples did not detect the associated target compounds. Method Blank MB-66808 (Method SW8270C) also had surrogate % recoveries of the same analytes outside of control limits, but a matrix spike and matrix spike duplicate were re-analyzed with results within control limits. No validation qualifier was used. MB-66808 was flagged with laboratory qualifier "S" for the surrogates 2-Fluorobiphenyl and Nitrobenzene-d5 being below control limits. Also, LCS-66808 (Method SW8270C) was flagged with laboratory qualifier "S" for the surrogate 2-Fluorobiphenyl being below control limits. No validation qualifier was used because all samples were nondetect for the associated target compound. Also, the MS/MSD for the same QC was within limits for these surrogates. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: This is explained in Section 14. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12110227-013AMS3 and matrix spike duplicate B12110227-013AMSD (Method SW6010B) were flagged with the laboratory qualifier "S" for the analyte Barium being out of control limits. No validation qualifier was used because the post digestion spike was within control limits. Lab QC matrix spike B12110227-001AMS was flagged with laboratory qualifier "S" for spike recovery of the analyte Phenanthrene (SW8270C) being below control limits. A validation qualifier was not used because the LCS was within limits. Lab QC matrix spike B12110255-003HMS and matrix spike duplicate B12110255-003HMSD were flagged with the laboratory qualifier "S" for the analyte Dichlorodifluoromethane (SW8260B) being outside of control limits. However, this analyte was nondetected in associated raw water samples; therefore, no validation qualifier was used. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| 17. Laboratory Duplicates | | | | | | |
|---|---|---|---|---|---|---|
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind field duplicates were collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** |
| YOSD-1211-212 | Water | B12110363-001 | SW8260B | Chloroform | 7 | ug/L | U |
| YOSD-1211-212 | Water | B12110363-001 | SW8270C | Naphthalene | 0.21 | ug/L | U |
| YOSD-1211-213 | Water | B12110363-002 | SW8260B | Chloroform | 6.9 | ug/L | U |
| YOSD-1211-213 | Water | B12110363-002 | SW8270C | Naphthalene | 0.23 | ug/L | U |
| 45-SS-B | Soil | B12110227-011 | SW8270C | Naphthalene | 0.36 | mg/kg | U |
| Validation Qualifer Definitions: | | | | | | | |
| U | Blank Exceedance | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 11/2/2012** |
| **Verified By/Date Verified: Angela Roddy 01/14/2013** | **Sample End Date: 11/2/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 44-SS-A | 11/2/2012 | B12110359 | B12110359-001 |
| 2 | Soil | 44-SS-A Sieved | 11/2/2012 | B12110359 | B12110359-002 |
| 3 | Soil | 44-SS-B | 11/2/2012 | B12110359 | B12110359-003 |
| 4 | Soil | 44-SS-B Sieved | 11/2/2012 | B12110359 | B12110359-004 |
| 5 | Soil | 44-SS-C | 11/2/2012 | B12110359 | B12110359-005 |
| 6 | Soil | 44-SS-C Sieved | 11/2/2012 | B12110359 | B12110359-006 |
| 7 | Soil | 44-SS-CD | 11/2/2012 | B12110359 | B12110359-007 |
| 8 | Soil | 44-SS-CD Sieved | 11/2/2012 | B12110359 | B12110359-008 |
| 9 | Water-Rinsate Blank | YOSD-1211-212 | 11/2/2012 | B12110363 | B12110363-001 |
| 10 | Water-DI Blank | YOSD-1211-213 | 11/2/2012 | B12110363 | B12110363-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatiles (VOC)-SW8260B. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12110359 and B12110363*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| VERIFICATION CRITERIA CHECK | |
|---|---|
| **Laboratory qualifiers used in this review:** | |
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Diluted out. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |
| **Validation qualifiers used in this review:** | |
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 with soil samples was received at 1.0°C. Cooler 2 with water samples was received at 0.3°C. Custody seals were not present, however the coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Barium, Chromium, and Lead (SW6010B) were detected in Method Blank MB-66890. A laboratory qualifier was not used. A validation qualifier was not used because the results found in the raw samples were >10x the reporting limit. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Chloroform (SW8260B) and Naphthalene (SW8270C) were detected in YOSD-1211-212 and YOSD-1211-213. A validation qualifier "U" was placed on both blanks for these analytes. A validation qualifier was placed on all associated raw samples with values <5x the reporting limit for these analytes. C5 to C8 Aliphatics (Method MA-EPH), Bromodichloromethane, and Chloromethane (Method SW8260B) were also detected in blanks YOSD-1211-212 and YOSD-1211-213 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because these are estimated values and are below the reporting limits. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 44-SS-A was flagged with laboratory qualifier "S" for the analytes VPH Aliphatics and VPH Aromatics (MA-VPH) being outside of control limits for surrogate recoveries. A note was made in the report that the low surrogate recovery for the samples is attributed to the organic matter in the sample matrix. The matrix spike and matrix spike duplicate of the same sample had similar surrogate recoveries. Sample 44-SS-C was flagged with laboratory qualifier "S" for the analytes 1-Chloro-octadecane (MA-EPH), Nitrobenzene-d5 (SW8270C), and laboratory qualifier "O" for o-Terphenyl (SW8015M). A note was made in the report that the surrogate recovery is outside QC advisory limits due to positive sample matrix interference. Sample 44-SS-CD was flagged wit laboratory qualifier "S" for the analytes VPH Aromatics (MA-VPH), 1-Chloro-octadecane (MA-EPH), o-Terphenyl (MA-EPH), and Nitrobenzene-d5 (SW8270C) being outside of control limits for surrogate recoveries. A note was made in the report that the surrogate recovery is outside QC advisory limits due to positive sample matrix interference. No validation qualifier was used due to sample matrix interference. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS-66913 was flagged with the laboratory qualifier "S" for the analyte Chloroethane (SW8260B) for being below control limits. The MS/MSD for this method also was outside of control limits. However, this analyte was nondetected in the raw samples. No validation qualifier was used. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12110569-015AMS3 and matrix spike duplicate B12110569-015AMSD were flagged with laboratory qualifier "S" for the analyte lead (SW6010B) being below control limits. No validation qualifier was used because the post digestion spike was within limits for lead. Lab QC matrix spike B12110359-001AMS and matrix spike duplicate B12110359-001AMSD were flagged with the laboratory qualifier "S" for the analytes Methyl tert-butyl ether (MTBE), Benzene, Toluene, Ethylbenzene, m+p-Xylenes, o-Xylene, Naphthalene, TPH (MA-VPH). No validation qualifier was used because of the sample matrix and the LCS being within control limits. A validation qualifier was not used because of matrix interference from high levels of organics being present. Lab QC matrix spike B12110569-021AMS, matrix spike duplicate B12110569-021AMSD, and LCS-66913 (SW8260B) were flagged with laboratory qualifier "S" for the analyte Chloroethane being below control limits. A validation qualifier was not necessary because raw samples were non-detect for this analyte. Lab QC matrix spike B12110255-003HMS and matrix spike duplicate B12110255-003HMSD were flagged with the laboratory qualifier "S" for the analyte Dichlorodifluoromethane (SW8260B) being outside of control limits. However, this analyte was nondetected in associated raw water samples; therefore, no validation qualifier was used. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Samples 44-SS-C and its duplicate 44-SS-CD had RPDs and PRDLs outside of control limits for the following analytes: m+p-xylenes, 75%; o-xylene, 55%; Xylenes-Total, 60%; C9 to C10 Aromatics, 72%; C9 to C12 Aliphatics, 74%; (Method VPH); 2-Methylnaphthalene, 76%; Fluorene, 81%-PRDL; Naphthalene, 75%; Phenanthrene, 95%-PRDL; and Pyrene, 82%-PRDL (SW8270C). A validation qualifier "J" was placed on all associated samples for these analytes. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| 44-SS-A | Soil | B12110359-001 | SW8270C | 2-METHYLNAPHTHALENE | < 0.28 | mg/kg | J | RPD |
| 44-SS-A | Soil | B12110359-001 | MA-VPH | C9-C10 AROMATICS | < 2.3 | mg/kg | J | RPD |
| 44-SS-A | Soil | B12110359-001 | MA-VPH | C9-C12 ALIPHATICS | < 2.3 | mg/kg | J | RPD |
| 44-SS-A | Soil | B12110359-001 | SW8270C | FLUORENE | < 0.28 | mg/kg | J | PRDL |
| 44-SS-A | Soil | B12110359-003 | MA-VPH | M-P XYLENE | < 0.057 | mg/kg | J | RPD |
| 44-SS-A | Soil | B12110359-003 | SW8270C | NAPHTHALENE | < 0.28 | mg/kg | J | RPD |
| 44-SS-A | Soil | B12110359-003 | MA-VPH | O-XYLENE | < 0.057 | mg/kg | J | RPD |
| 44-SS-A | Soil | B12110359-003 | SW8270C | PHENANTHRENE | < 0.28 | mg/kg | J | PRDL |
| 44-SS-A | Soil | B12110359-003 | SW8270C | PYRENE | < 0.28 | mg/kg | J | PRDL |
| 44-SS-A | Soil | B12110359-003 | MA-VPH | TOTAL XYLENE | < 0.057 | mg/kg | J | RPD |
| 44-SS-B | Soil | B12110359-003 | SW8270C | 2-METHYLNAPHTHALENE | 2.6 | mg/kg | J | RPD |
| 44-SS-B | Soil | B12110359-003 | MA-VPH | C9-C10 AROMATICS | 862 | mg/kg | J | RPD |
| 44-SS-B | Soil | B12110359-003 | MA-VPH | C9-C12 ALIPHATICS | 1060 | mg/kg | J | RPD |
| 44-SS-B | Soil | B12110359-003 | SW8260B | CHLOROETHANE | < 0.20 | mg/kg | J | RPD |
| 44-SS-B | Soil | B12110359-003 | SW8270C | FLUORENE | 0.35 | mg/kg | J | PRDL |
| 44-SS-B | Soil | B12110359-005 | MA-VPH | M-P XYLENE | 20 | mg/kg | J | RPD |
| 44-SS-B | Soil | B12110359-005 | SW8270C | NAPHTHALENE | 1.2 | mg/kg | J/U | RPD/BLANK |
| 44-SS-B | Soil | B12110359-005 | MA-VPH | O-XYLENE | 13 | mg/kg | J | RPD |
| 44-SS-B | Soil | B12110359-005 | SW8270C | PHENANTHRENE | 0.51 | mg/kg | J | PRDL |
| 44-SS-B | Soil | B12110359-005 | SW8270C | PYRENE | 0.36 | mg/kg | J | PRDL |
| 44-SS-B | Soil | B12110359-005 | MA-VPH | TOTAL XYLENE | 33 | mg/kg | J | RPD |
| 44-SS-C | Soil | B12110359-005 | SW8270C | 2-METHYLNAPHTHALENE | 4.2 | mg/kg | J | RPD |
| 44-SS-C | Soil | B12110359-005 | MA-VPH | C9-C10 AROMATICS | 1430 | mg/kg | J | RPD |
| 44-SS-C | Soil | B12110359-005 | MA-VPH | C9-C12 ALIPHATICS | 1940 | mg/kg | J | RPD |
| 44-SS-C | Soil | B12110359-005 | SW8270C | FLUORENE | 0.68 | mg/kg | J | PRDL |
| 44-SS-C | Soil | B12110359-007 | MA-VPH | M-P XYLENE | 15 | mg/kg | J | RPD |
| 44-SS-C | Soil | B12110359-007 | SW8270C | NAPHTHALENE | 1.5 | mg/kg | J | RPD |
| 44-SS-C | Soil | B12110359-007 | MA-VPH | O-XYLENE | 14 | mg/kg | J | RPD |
| 44-SS-C | Soil | B12110359-007 | SW8270C | PHENANTHRENE | 0.89 | mg/kg | J | PRDL |
| 44-SS-C | Soil | B12110359-007 | SW8270C | PYRENE | 0.46 | mg/kg | J | PRDL |
| 44-SS-C | Soil | B12110359-007 | MA-VPH | TOTAL XYLENE | 28 | mg/kg | J | RPD |
| 44-SS-CD | Soil | B12110359-007 | SW8270C | 2-METHYLNAPHTHALENE | 9.4 | mg/kg | J | RPD |
| 44-SS-CD | Soil | B12110359-007 | MA-VPH | C9-C10 AROMATICS | 670 | mg/kg | J | RPD |
| 44-SS-CD | Soil | B12110359-007 | MA-VPH | C9-C12 ALIPHATICS | 887 | mg/kg | J | RPD |
| 44-SS-CD | Soil | B12110359-007 | SW8270C | FLUORENE | 1.6 | mg/kg | J | PRDL |
| 44-SS-CD | Soil | B12110359-007 | MA-VPH | M-P XYLENE | 6.8 | mg/kg | J | RPD |
| 44-SS-CD | Soil | B12110359-007 | SW8270C | NAPHTHALENE | 3.3 | mg/kg | J | RPD |
| 44-SS-CD | Soil | B12110359-007 | MA-VPH | O-XYLENE | 8.0 | mg/kg | J | RPD |
| 44-SS-CD | Soil | B12110359-007 | SW8270C | PHENANTHRENE | 2.5 | mg/kg | J | PRDL |
| 44-SS-CD | Soil | B12110359-007 | SW8270C | PYRENE | 1.1 | mg/kg | J | PRDL |
| 44-SS-CD | Soil | B12110359-003 | MA-VPH | TOTAL XYLENE | 15 | mg/kg | U | |
| YOSD-1211-212 | Water | B12110363-001 | SW8260B | Chloroform | 7 | ug/L | U | |
| YOSD-1211-212 | Water | B12110363-001 | SW8270C | Naphthalene | 0.21 | ug/L | U | |
| YOSD-1211-213 | Water | B12110363-002 | SW8260B | Chloroform | 6.9 | ug/L | U | |
| YOSD-1211-213 | Water | B12110363-002 | SW8270C | Naphthalene | 0.23 | ug/L | U | |

| Validation Qualifer Definitions: | |
|---|---|
| U | Blank Exceedance |
| J | QC Exceedance |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 11/6/2012** |
| **Verified By/Date Verified: Angela Roddy 01/14/2013** | **Sample End Date: 11/7/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 21-SS-A | 11/6/2012 | B12110569 | B12110569-001 |
| 2 | Soil | 21-SS-A Sieved | 11/6/2012 | B12110569 | B12110569-002 |
| 3 | Soil | 21-SS-B | 11/6/2012 | B12110569 | B12110569-003 |
| 4 | Soil | 21-SS-B Sieved | 11/6/2012 | B12110569 | B12110569-004 |
| 5 | Soil | 21-SS-C | 11/6/2012 | B12110569 | B12110569-005 |
| 6 | Soil | 21-SS-C Sieved | 11/6/2012 | B12110569 | B12110569-006 |
| 7 | Soil | 20-SS-A | 11/6/2012 | B12110569 | B12110569-007 |
| 8 | Soil | 20-SS-A Sieved | 11/6/2012 | B12110569 | B12110569-008 |
| 9 | Soil | 20-SS-B | 11/6/2012 | B12110569 | B12110569-009 |
| 10 | Soil | 20-SS-B Sieved | 11/6/2012 | B12110569 | B12110569-010 |
| 11 | Soil | 20-SS-C | 11/6/2012 | B12110569 | B12110569-011 |
| 12 | Soil | 20-SS-C Sieved | 11/6/2012 | B12110569 | B12110569-012 |
| 13 | Soil | 22-SS-A | 11/6/2012 | B12110569 | B12110569-013 |
| 14 | Soil | 22-SS-A Sieved | 11/6/2012 | B12110569 | B12110569-014 |
| 15 | Soil | 22-SS-B | 11/6/2012 | B12110569 | B12110569-015 |
| 16 | Soil | 22-SS-B Sieved | 11/6/2012 | B12110569 | B12110569-016 |
| 17 | Soil | 22-SS-C | 11/6/2012 | B12110569 | B12110569-017 |
| 18 | Soil | 22-SS-C Sieved | 11/6/2012 | B12110569 | B12110569-018 |
| 19 | Soil | 36-SS-A | 11/6/2012 | B12110569 | B12110569-019 |
| 20 | Soil | 36-SS-A Sieved | 11/6/2012 | B12110569 | B12110569-020 |
| 21 | Soil | 36-SS-B | 11/6/2012 | B12110569 | B12110569-021 |
| 22 | Soil | 36-SS-B Sieved | 11/6/2012 | B12110569 | B12110569-022 |
| 23 | Soil | 36-SS-C | 11/6/2012 | B12110569 | B12110569-023 |
| 24 | Soil | 36-SS-C Sieved | 11/6/2012 | B12110569 | B12110569-024 |
| 25 | Water-Rinsate Blank | YOSD-1211-214 | 11/7/2012 | B12110741 | B12110741-001 |
| 26 | Water-DI Blank | YOSD-1211-215 | 11/7/2012 | B12110741 | B12110741-002 |
| 27 | Water-Trip Blank | TB102512BTSSSHP025 | 11/7/2012 | B12110741 | B12110741-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatiles (VOC)-SW8260B. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12110569 and B12110741*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Diluted out. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 and 2 with soil samples was received at 0.3 and 0.2°C. Cooler 3 with water samples was received at 0.4°C. Custody seals were not present, however the coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Barium and Cadmium (SW6010B) were detected in Method Blank MB-66985. A laboratory qualifier was not used. A validation qualifier was not used because the results found in the raw samples were >10x the reporting limit or nondetected. Cadmium and Chromium (Method SW6010B) were detected in Method Blank MB-66986. A validation qualifier was not used because the results found in the raw samples were either >10x the reporting limit or nondetected for these analytes. Naphthalene (SW8270C) was detected in Method Blank MB-67256-67209-67010. A validation qualifier was not used because the results found in the raw water samples were nondetected for this analyte. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Chloroform and Methylene Chloride (SW8260B) were detected in Samples YOSD-1211-214 and YOSD-1211-215. The Lab QC method blank did not detect Chloroform and Methylene Chloride. A validation qualifier "U" was placed on both blanks. A validation qualifier was not necessary for raw soil samples because they were non-detect for these analytes. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Samples 21-SS-B, 21-SS-C, 20-SS-B, and 36-SS-B were flagged with laboratory qualifier "S" for the surrogate Nitrobenzene-d5 (SW8270C) for being outside of control limits. A note was made in the report that the low surrogate recovery for the samples is attributed to the sample matrix interference. Samples 22-SS-A, 22-SS-B, and 36-SS-A were flagged with laboratory qualifier "S" for the surrogate 2-Fluorobiphenyl (SW8270C) being outside of control limits. A note was made in the report that the surrogate recovery is outside QC advisory limits due to positive sample matrix interference. Sample 22-SS-C was flagged with laboratory qualifier "S" for the surrogate Terphenyl-d14 (SW8270C) being outside of control limits. A note was made in the report that the surrogate recovery is outside QC advisory limits due to positive sample matrix interference. The Lab QC matrix spike and matrix spike duplicate of the same sample had similar surrogate recoveries. No validation qualifiers are used due to sample matrix interference. Sample 21-SS-C was flagged with laboratory qualifier "S" for the surrogate Dibromofluoromethane (SW8260B) being outside of control limits. Associated raw samples were nondetected for the associated target compounds. Samples 36-SS-A, 22-SS-A, 22-SS-B, 22-SS-C, 20-SS-A, and 21-SS-A were flagged with laboratory qualifier "O" for the surrogate Nitrobenzene-d5 being diluted out. No validation qualifier was used. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS-66913 was flagged with the laboratory qualifier "S" for the analyte Chloroethane (SW8260B) for being below control limits. The MS/MSD for this method also was below control limits. Although, this analyte was nondetected in the raw samples, associated samples are flagged with validation qualifier "J" for possible underestimated results. LCS-110912 was flagged with the laboratory qualifier "S" for the analytes Dichlorodifluoromethane and Bromomethane (SW8260B) for being outside of control limits. These analytes were tested for in the MS/MSD and were also outside of control limits. A validation qualifier was not used because the raw samples were nondetect for these analytes. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12110569-015AMS3 and matrix spike duplicate B12110359-001AMSD were flagged with the laboratory qualifier "S" for the analytes Barium, Chromium, and Lead (SW6010B) being outside of control limits. No validation qualifier was used because the post digestion spike was within limits suggesting sample matrix interference. Lab QC matrix spike B12110741-001CMS and matrix spike duplicate B12110741-001CMSD were flagged with the laboratory qualifier "S" for the analyte Dichlorodifluoromethane (SW8260B) being above control limits. A validation qualifier was not used because the raw samples were nondetect for these analytes. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: No blind field duplicates were collected with this batch. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1211-215 | Water | B12110741-002 | SW8260B | Chloroform | 3 | ug/L | U | |
| YOSD-1211-215 | Water | B12110741-002 | SW8260B | Methylene chloride | 5.4 | ug/L | U | |
| YOSD-2011-214 | Water | B12110741-001 | SW8260B | Methylene chloride | 3.7 | ug/L | U | |
| YOSD-2011-214 | Water | B12110741-001 | SW8260B | Chloroform | 2.1 | ug/L | U | |
| 21-SS-B | Soil | B12110569-003 | SW8260B | CHLOROETHANE | < 0.20 | ug/L | J | low bias |
| 21-SS-C | Soil | B12110569-005 | SW8260B | CHLOROETHANE | < 0.20 | ug/L | J | low bias |
| 20-SS-B | Soil | B12110569-009 | SW8260B | CHLOROETHANE | < 0.20 | ug/L | J | low bias |
| 20-SS-C | Soil | B12110569-011 | SW8260B | CHLOROETHANE | < 0.20 | ug/L | J | low bias |
| 36-SS-B | Soil | B12110569-021 | SW8260B | CHLOROETHANE | < 0.20 | ug/L | J | low bias |
| 36-SS-C | Soil | B12110569-023 | SW8260B | CHLOROETHANE | < 0.20 | ug/L | J | low bias |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |
| U | Blank Exceedance | | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 11/7/2012** |
| **Verified By/Date Verified: Angela Roddy 01/14/2013** | **Sample End Date: 11/7/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 23-SS-A | 11/7/2012 | B12110684 | B12110684-001 |
| 2 | Soil | 23-SS-A Sieved | 11/7/2012 | B12110684 | B12110684-002 |
| 3 | Soil | 37-SS-A | 11/7/2012 | B12110684 | B12110684-003 |
| 4 | Soil | 37-SS-A Sieved | 11/7/2012 | B12110684 | B12110684-004 |
| 5 | Soil | 38-SS-A | 11/7/2012 | B12110684 | B12110684-005 |
| 6 | Soil | 38-SS-A Sieved | 11/7/2012 | B12110684 | B12110684-006 |
| 7 | Soil | 38-SS-B | 11/7/2012 | B12110684 | B12110684-007 |
| 8 | Soil | 38-SS-B Sieved | 11/7/2012 | B12110684 | B12110684-008 |
| 9 | Soil | 38-SS-C | 11/7/2012 | B12110684 | B12110684-009 |
| 10 | Soil | 38-SS-C Sieved | 11/7/2012 | B12110684 | B12110684-010 |
| 11 | Soil | 9-SS-A | 11/7/2012 | B12110684 | B12110684-011 |
| 12 | Soil | 9-SS-A Sieved | 11/7/2012 | B12110684 | B12110684-012 |
| 13 | Soil | 9-SS-B | 11/7/2012 | B12110684 | B12110684-013 |
| 14 | Soil | 9-SS-B Sieved | 11/7/2012 | B12110684 | B12110684-014 |
| 15 | Soil | 9-SS-C | 11/7/2012 | B12110684 | B12110684-015 |
| 16 | Soil | 9-SS-C Sieved | 11/7/2012 | B12110684 | B12110684-016 |
| 17 | Soil | 39-SS-A | 11/7/2012 | B12110684 | B12110684-017 |
| 18 | Soil | 39-SS-A Sieved | 11/7/2012 | B12110684 | B12110684-018 |
| 19 | Soil | 39-SS-AD | 11/7/2012 | B12110684 | B12110684-019 |
| 20 | Soil | 39-SS-AD Sieved | 11/7/2012 | B12110684 | B12110684-020 |
| 21 | Soil | 2-SS-A | 11/7/2012 | B12110684 | B12110684-021 |
| 22 | Soil | 2-SS-A Sieved | 11/7/2012 | B12110684 | B12110684-022 |
| 23 | Soil | 2-SS-B | 11/7/2012 | B12110684 | B12110684-023 |
| 24 | Soil | 2-SS-B Sieved | 11/7/2012 | B12110684 | B12110684-024 |
| 25 | Soil | 2-SS-C | 11/7/2012 | B12110684 | B12110684-025 |
| 26 | Soil | 2-SS-C Sieved | 11/7/2012 | B12110684 | B12110684-026 |
| 27 | Soil | 1-SS-A | 11/7/2012 | B12110684 | B12110684-027 |
| 28 | Soil | 1-SS-A Sieved | 11/7/2012 | B12110684 | B12110684-028 |
| 29 | Soil | 3-SS-A | 11/7/2012 | B12110684 | B12110684-029 |
| 30 | Soil | 3-SS-A Sieved | 11/7/2012 | B12110684 | B12110684-030 |
| 31 | Water-Rinsate Blank | YOSD-1211-214 | 11/7/2012 | B12110741 | B12110741-001 |
| 32 | Water-DI Blank | YOSD-1211-215 | 11/7/2012 | B12110741 | B12110741-002 |
| 33 | Water-Trip Blank | TB102512BTSSSHP0259 | 11/7/2012 | B12110741 | B12110741-003 |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatiles (VOC)-SW8260B. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12110684 and B12110741*

| **PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT** | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| COMPLIANCE ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Diluted out. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |
| J | QC Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 and 2 with soil samples was received at 4.0 and 3.2°C. Cooler 3 with water samples was received at 0.4°C. Custody seals were not present, however the coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (SW8270C) was detected in Method Blank MB-67256-67209-67010. A validation qualifier was not used because the results found in the raw water samples were nondetected for this analyte. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Chloroform and Methylene Chloride (SW8260B) were detected in Samples YOSD-1211-214 and YOSD-1211-215. The Lab QC method blank did not detect Chloroform and Methylene Chloride. A validation qualifier "U" was placed on both blanks. A validation qualifier was not necessary for raw soil samples because there were non-detect for these analytes. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Samples 23-SS-A, 38-SS-A, and 38-SS-C were flagged with laboratory qualifier "S" for the surrogate Terphenyl-d14 (SW8270C-SVOCs) being outside of control limits. A validation qualifier was not necessary because two other surrogates were within limits for this method. 38-SS-B was flagged with laboratory qualifier "O" for the surrogate o-Terphenyl (SW8015M) being outside of control limits. No validation qualifier was used because this is a screening method. Samples 37-SS-A, 9-SS-C, 2-SS-A, 1-SS-A, 3-SS-A and MB-66973 were flagged with laboratory qualifier "S" for the surrogate 2-Fluorobiphenyl (SW8270C-Tetraethyllead) being outside of control limits. A note was made in the report that the surrogate recovery is outside QC advisory limits due to positive sample matrix interference. No validation qualifier was used because other surrogates were within limits. Samples 23-SS-A, 37-SS-A, 36-SS-A, 36-SS-B, 38-SS-C, 39-SS-A, 39-SS-AD, 2-SS-A, 2-SS-B, 2-SS-C, 1-SS-A, and 3-SS-A were flagged with laboratory qualifier "O" for the surrogate Nitrobenzene-d5 (SW8270C-Tetraethyllead) being diluted out. No validation qualifier was used. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS-66973 was flagged with the laboratory qualifier "S" for the analyte Tetraethyllead (SW8270C) being below control limits. However, this analyte was nondetected in the raw samples. No validation qualifier was used. LCS-110912 was flagged with the laboratory qualifier "S" for the analytes Dichlorodifluoromethane and Bromomethane (SW8260B) for being outside of control limits. No validation qualifier was used because these analytes are nondetected in associated water samples. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike duplicate B12111186-001AMSD was flagged with the laboratory qualifier "S" for the analyte Lead (SW6010B) being outside of control limits. No validation qualifier was used because the LFB and other QC factors were all within control limits. The low recovery could be related to matrix interference of that particular sample only. Lab QC matrix spike B12110684-011AMS and matrix spike duplicate B12110684-011AMSD were flagged with laboratory qualifier "S" for the analytes Dibenzo(a,h)anthracene and Benzo(a)pyrene (SW8270C) being outside of control limits. The lab reported the sample extract was diluted 5 times at analysis due to non-target compound sample matrix interference. No validation qualifier was used. Lab QC matrix spike B12110741-001CMS was flagged with the laboratory qualifier "S" for the analyte Dichlorodifluoromethane (SW8260B) being outside of control limits. Matrix spike duplicate B12110741-001CMSD was flagged with the laboratory qualifier "S" for the analytes Bromoethane and Dichlorodifluoromethane (SW8260B) being outside of control limits. However, these analyte were nondetected in associated raw water samples; therefore, no validation qualifier was used. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample 39-SS-A and its duplicate 39-SS-AD had an RPD outside of control limits for the analyte Chromium, 40% (SW6010B). A validation qualifier "J" was placed on all associated raw soil samples. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

**Validator Qualified Analytical Results**

| Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag | Comments |
|---|---|---|---|---|---|---|---|---|
| 23-SS-A | Soil | B12110684-001 | SW6010B | Chromium | 25 | mg/kg-dry | J | RPD |
| 37-SS-A | Soil | B12110684-003 | SW6010B | Chromium | 13 | mg/kg-dry | J | RPD |
| 38-SS-A | Soil | B12110684-005 | SW6010B | Chromium | 24 | mg/kg-dry | J | RPD |
| 38-SS-B | Soil | B12110684-007 | SW6010B | Chromium | 13 | mg/kg-dry | J | RPD |
| 38-SS-C | Soil | B12110684-009 | SW6010B | Chromium | 24 | mg/kg-dry | J | RPD |
| 9-SS-A | Soil | B12110684-011 | SW6010B | Chromium | 20 | mg/kg-dry | J | RPD |
| 9-SS-B | Soil | B12110684-013 | SW6010B | Chromium | 29 | mg/kg-dry | J | RPD |
| 9-SS-C | Soil | B12110684-015 | SW6010B | Chromium | 28 | mg/kg-dry | J | RPD |
| 39-SS-A | Soil | B12110684-017 | SW6010B | Chromium | 14 | mg/kg-dry | J | RPD |
| 39-SS-AD | Soil | B12110684-019 | SW6010B | Chromium | 21 | mg/kg-dry | J | RPD |
| 2-SS-A | Soil | B12110684-021 | SW6010B | Chromium | 21 | mg/kg-dry | J | RPD |
| 2-SS-B | Soil | B12110684-023 | SW6010B | Chromium | 22 | mg/kg-dry | J | RPD |
| 2-SS-C | Soil | B12110684-025 | SW6010B | Chromium | 22 | mg/kg-dry | J | RPD |
| 1-SS-A | Soil | B12110684-027 | SW6010B | Chromium | 16 | mg/kg-dry | J | RPD |
| 3-SS-A | Soil | B12110684-029 | SW6010B | Chromium | 21 | mg/kg-dry | J | RPD |
| YOSD-1211-215 | Water | B12110741-002 | SW8260B | Chloroform | 3 | ug/L | U | |
| YOSD-1211-215 | Water | B12110741-002 | SW8260B | Methylene chloride | 5.4 | ug/L | U | |
| YOSD-2011-214 | Water | B12110741-001 | SW8260B | Methylene chloride | 3.7 | ug/L | U | |
| YOSD-2011-214 | Water | B12110741-001 | SW8260B | Chloroform | 2.1 | ug/L | U | |

| Validation Qualifer Definitions: | |
|---|---|
| U | Blank Exceedance |
| J | QC Exceedance |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 11/7/2012** |
| **Verified By/Date Verified: Angela Roddy 01/14/2013** | **Sample End Date: 11/7/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 26-SS-A | 11/8/2012 | B12110915 | B12110915-001 |
| 2 | Soil | 26-SS-A Sieved | 11/8/2012 | B12110915 | B12110915-002 |
| 3 | Soil | 26-SS-B | 11/8/2012 | B12110915 | B12110915-003 |
| 4 | Soil | 26-SS-B Sieved | 11/8/2012 | B12110915 | B12110915-004 |
| 5 | Soil | 26-SS-C | 11/8/2012 | B12110915 | B12110915-005 |
| 6 | Soil | 26-SS-C Sieved | 11/8/2012 | B12110915 | B12110915-006 |
| 7 | Soil | 27-SS-A | 11/8/2012 | B12110915 | B12110915-007 |
| 8 | Soil | 27-SS-A Sieved | 11/8/2012 | B12110915 | B12110915-008 |
| 9 | Soil | 28-SS-A | 11/8/2012 | B12110915 | B12110915-009 |
| 10 | Soil | 28-SS-A Sieved | 11/8/2012 | B12110915 | B12110915-010 |
| 11 | Soil | 28-SS-B | 11/8/2012 | B12110915 | B12110915-011 |
| 12 | Soil | 28-SS-B Sieved | 11/8/2012 | B12110915 | B12110915-012 |
| 13 | Soil | 28-SS-C | 11/8/2012 | B12110915 | B12110915-013 |
| 14 | Soil | 28-SS-C Sieved | 11/8/2012 | B12110915 | B12110915-014 |
| 15 | Soil | 40-SS-A | 11/8/2012 | B12110915 | B12110915-015 |
| 16 | Soil | 40-SS-A Sieved | 11/8/2012 | B12110915 | B12110915-016 |
| 17 | Soil | 40-SS-B | 11/8/2012 | B12110915 | B12110915-017 |
| 18 | Soil | 40-SS-B-Sieved | 11/8/2012 | B12110915 | B12110915-018 |
| 19 | Soil | 40-SS-C | 11/8/2012 | B12110915 | B12110915-019 |
| 20 | Soil | 40-SS-C-Sieved | 11/8/2012 | B12110915 | B12110915-020 |
| 21 | Soil | 41-SS-A | 11/8/2012 | B12110915 | B12110915-021 |
| 22 | Soil | 41-SS-A-Sieved | 11/8/2012 | B12110915 | B12110915-022 |
| 23 | Soil | 42-SS-A | 11/8/2012 | B12110915 | B12110915-023 |
| 24 | Soil | 42-SS-A-Sieved | 11/8/2012 | B12110915 | B12110915-024 |
| 25 | Soil | 42-SS-B | 11/8/2012 | B12110915 | B12110915-025 |
| 26 | Soil | 42-SS-B-Sieved | 11/8/2012 | B12110915 | B12110915-026 |
| 27 | Soil | 42-SS-C | 11/8/2012 | B12110915 | B12110915-027 |
| 28 | Soil | 42-SS-C-Sieved | 11/8/2012 | B12110915 | B12110915-028 |
| 29 | Soil | 42-SS-CD | 11/8/2012 | B12110915 | B12110915-029 |
| 30 | Soil | 42-SS-CD-Sieved | 11/8/2012 | B12110915 | B12110915-030 |
| 31 | Soil | 43-SS-A | 11/8/2012 | B12110915 | B12110915-031 |
| 32 | Soil | 43-SS-A-Sieved | 11/8/2012 | B12110915 | B12110915-032 |
| 33 | Soil | 43-SS-B | 11/8/2012 | B12110915 | B12110915-033 |
| 34 | Soil | 43-SS-B-Sieved | 11/8/2012 | B12110915 | B12110915-034 |
| 35 | Soil | 43-SS-C | 11/8/2012 | B12110915 | B12110915-035 |
| 36 | Soil | 43-SS-C-Sieved | 11/8/2012 | B12110915 | B12110915-036 |
| 37 | Water-DI Blank | YOSD-1211-216 | 11/8/2012 | B12110910 | B12110910-001 |
| 38 | Water-Rinsate Blank | YOSD-1211-217 | 11/8/2012 | B12110910 | B12110910-002 |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatiles (VOC)-SW8260B. Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B12110915 and B12110910*

| **PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT** | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| COMPLIANCE ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Diluted out. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |
| J | QC Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. As a note, VOCs (Method SW8260B) were not ordered for 42-SS-CD. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Both Cooler 1 and 2 with soil samples was received at 0.2°C. Cooler 3 with water samples was received at 0.2°C. Custody seals were not present, however the coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory blank samples were free of target analyte contamination. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Chloroform and Methylene Chloride were detected in DI Blank YOSD-1211-216 and Rinsate Blank YOSD-1211-217. The Lab QC method blank was nondetect for Chloroform and Methylene Chloride. A validation qualifier "U" was placed on both blanks for Methylene Chloride. A validation qualifier "U" was placed on YOSD-1211-216 only for Chloroform. YOSD-1211-217 was flagged with laboratory qualifier "J" for Chloroform, as being estimated and below the reporting limit. A validation qualifier was not necessary for raw soil samples because they were non-detect for these two analytes. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Samples 26-SS-A, 26-SS-C, 27-SS-A, 28-SS-A, 28-SS-B, 40-SS-B, 40-SS-C, 41-SS-A, 42-SS-A, 42-SS-B and 43-SS-A were flagged with laboratory qualifier "S" for the surrogate % recovery for Terphenyl-d14 (Method SW8270C) being above control limits. A validation qualifier was not necessary because two other surrogates were within limits for this method. Surrogates for Tetraethyllead were above control limits or diluted out for most samples in this batch, flagged with laboratory qualifiers "S" and "O". A validation qualifier was not used because all raw samples had non-detect values for Tetraethyllead. Sample 41-SS-A was also flagged with laboratory qualifier "S" for the surrogate % recovery for 1-Chloro-octadecane (Method MA-EPH) and o-Terphenyl (Method SW8015M) for being below control limits. The laboratory notes there was a significant precipitate from the solvent extract during the solvent exchanged step. This could be sample matrix interference. No validation qualifier was used. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Lab QC matrix spike B12110915-035AMS3 was flagged with laboratory qualifier "S" for the analyte Barium (SW6010B) being outside of control limits. No validation qualifier was used because the post digestion spike was within limits for Barium. Lab QC matrix spike duplicate B12110915-035AMSD was flagged with the laboratory qualifier "S" for the analyte Lead (SW6010B) being outside of control limits. No validation qualifier was used because the post digestion spike was within control limits. Lab QC matrix spike B12110915-027AMS was flagged with laboratory qualifier "S" for % recovery for the analytes Chlorethane and m+p-Xylenes (SW8260B) being just below control limits. Lab QC matrix spike duplicate B12110915-027AMSD was flagged with laboratory qualifier "S" for % recovery for the analyte Chlorethane being just below control limits. No validation qualifier was used because the LCS was within limits. Lab QC matrix spike B12110915-035AMS and matrix spike duplicate B12110915-035AMSD were flagged with laboratory qualifier "S" for the analyte Naphthalene (Method MA-VPH) for being below control limits. The LCS was within limits. This could be related to positive matrix interference. No validation qualifier was used. Lab QC matrix spike B12110915-001AMS was flagged with the laboratory qualifier "S" for the analytes C19 to C36 Aliphatics (above control limits) and n-Nonane (below control limits). No validation qualifier was used because the duplicate and LCS came within limits for the analyte C19 to C36 Aliphatics. Lab QC matrix spike B12110915-015AMS was flagged with laboratory qualifier "S" for the analytes Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Chrysene, Dibenzo(a,h)anthracene, Fluroanthene, and Pyrene. Lab QC matrix spike duplicate B12110915-015AMSD was flagged with laboratory qualifier "S" for the analytes Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Chrysene, Dibenzo(a,h)anthracene, Fluroanthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene. No validation qualifier was used because the LCS was within limits for these analytes. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample 42-SS-C and its duplicate 42-SS-CD had an RPD of 45% for the analyte Lead-Sieved (SW6010B). A validation qualifier "J" was placed on all associated raw soil samples for this analyte. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | Result | **Units** | **Flag** | **Comments** |
| 26-SS-A-Sieved | Soil | B12110915-002 | SW6010B | Lead-Sieved | 1870 | mg/kg | J | RPD |
| 26-SS-B-Sieved | Soil | B12110915-004 | SW6010B | Lead-Sieved | 1870 | mg/kg | J | RPD |
| 26-SS-C-Sieved | Soil | B12110915-006 | SW6010B | Lead-Sieved | 3080 | mg/kg | J | RPD |
| 27-SS-A-Sieved | Soil | B12110915-008 | SW6010B | Lead-Sieved | 439 | mg/kg | J | RPD |
| 28-SS-A-Sieved | Soil | B12110915-010 | SW6010B | Lead-Sieved | 258 | mg/kg | J | RPD |
| 28-SS-B-Sieved | Soil | B12110915-012 | SW6010B | Lead-Sieved | 210 | mg/kg | J | RPD |
| 28-SS-C-Sieved | Soil | B12110915-014 | SW6010B | Lead-Sieved | 303 | mg/kg | J | RPD |
| 40-SS-A-Sieved | Soil | B12110915-016 | SW6010B | Lead-Sieved | 490 | mg/kg | J | RPD |
| 40-SS-B-Sieved | Soil | B12110915-018 | SW6010B | Lead-Sieved | 751 | mg/kg | J | RPD |
| 40-SS-C-Sieved | Soil | B12110915-020 | SW6010B | Lead-Sieved | 656 | mg/kg | J | RPD |
| 41-SS-A-Sieved | Soil | B12110915-022 | SW6010B | Lead-Sieved | 2590 | mg/kg | J | RPD |
| 42-SS-A-Sieved | Soil | B12110915-024 | SW6010B | Lead-Sieved | 5770 | mg/kg | J | RPD |
| 42-SS-B-Sieved | Soil | B12110915-026 | SW6010B | Lead-Sieved | 3930 | mg/kg | J | RPD |
| 43-SS-A-Sieved | Soil | B12110915-032 | SW6010B | Lead-Sieved | 465 | mg/kg | J | RPD |
| 43-SS-B-Sieved | Soil | B12110915-034 | SW6010B | Lead-Sieved | 805 | mg/kg | J | RPD |
| 43-SS-C-Sieved | Soil | B12110915-036 | SW6010B | Lead-Sieved | 290 | mg/kg | J | RPD |
| 42-SS-C Sieved | Soil | B12110915-028 | SW6010B | Lead-Sieved | 1280 | mg/kg | J | RPD |
| 42-SS-CD Sieved | Soil | B12110915-030 | SW6010B | Lead-Sieved | 2020 | mg/kg | J | RPD |
| YOSD-2011-216 | Water | B12110910-001 | SW8260B | Chloroform | 0.73 | ug/L | U | |
| YOSD-2011-216 | Water | B12110910-001 | SW8260B | Methylene chloride | 1.3 | ug/L | U | |
| YOSD-2011-217 | Water | B12110910-002 | SW8260B | Methylene Chloride | 0.74 | ug/L | U | |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |
| J | QC Exceedance | | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 11/27/2012** |
| **Verified By/Date Verified: Angela Roddy 01/15/2013** | **Sample End Date: 11/28/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | TEL4-SS-A | 11/27/2012 | B12112136 | B12112136-001 |
| 2 | Soil | TEL4-SS-A-Sieved | 11/27/2012 | B12112136 | B12112136-002 |
| 3 | Soil | TEL5-SS-A | 11/27/2012 | B12112136 | B12112136-003 |
| 4 | Soil | TEL5-SS-A-Sieved | 11/27/2012 | B12112136 | B12112136-004 |
| 5 | Soil | TEL9-SS-A | 11/27/2012 | B12112136 | B12112136-005 |
| 6 | Soil | TEL9-SS-A-Sieved | 11/27/2012 | B12112136 | B12112136-006 |
| 7 | Soil | TEL10-SS-A | 11/27/2012 | B12112136 | B12112136-007 |
| 8 | Soil | TEL10-SS-A-Sieved | 11/27/2012 | B12112136 | B12112136-008 |
| 9 | Soil | TEL10-SS-B | 11/27/2012 | B12112136 | B12112136-009 |
| 10 | Soil | TEL10-SS-B-Sieved | 11/27/2012 | B12112136 | B12112136-010 |
| 11 | Soil | TEL10-SS-BD | 11/27/2012 | B12112136 | B12112136-011 |
| 12 | Soil | TEL10-SS-BD-Sieved | 11/27/2012 | B12112136 | B12112136-012 |
| 13 | Soil | TEL10-SS-C | 11/27/2012 | B12112136 | B12112136-013 |
| 14 | Soil | TEL10-SS-C-Sieved | 11/27/2012 | B12112136 | B12112136-014 |
| 15 | Soil | TEL14-SS-A | 11/27/2012 | B12112136 | B12112136-015 |
| 16 | Soil | TEL14-SS-A-Sieved | 11/27/2012 | B12112136 | B12112136-016 |
| 17 | Soil | TEL15-SS-A | 11/27/2012 | B12112136 | B12112136-017 |
| 18 | Soil | TEL15-SS-A-Sieved | 11/27/2012 | B12112136 | B12112136-018 |
| 19 | Soil | TEL19-SS-A | 11/27/2012 | B12112136 | B12112136-019 |
| 20 | Soil | TEL19-SS-A-Sieved | 11/27/2012 | B12112136 | B12112136-020 |
| 21 | Soil | TEL20-SS-A | 11/27/2012 | B12112136 | B12112136-021 |
| 22 | Soil | TEL20-SS-A-Sieved | 11/27/2012 | B12112136 | B12112136-022 |
| 23 | Soil | TEL24-SS-A | 11/27/2012 | B12112136 | B12112136-023 |
| 24 | Soil | TEL24-SS-A-Sieved | 11/27/2012 | B12112136 | B12112136-024 |
| 25 | Soil | TEL25-SS-A | 11/27/2012 | B12112136 | B12112136-025 |
| 26 | Soil | TEL25-SS-A-Sieved | 11/27/2012 | B12112136 | B12112136-026 |
| 27 | Water-Rinsate Blank | YOSD-1211-301 | 11/28/2012 | B12112286 | B12112286-001 |
| 28 | Water-DI Blank | YOSD-1211-302 | 11/28/2012 | B12112286 | B12112286-002 |
| 29 | Water-Rinsate Blank | YOSD-1211-303 | 11/28/2012 | B12112286 | B12112286-003 |
| 30 | Water-DI Blank | YOSD-1211-304 | 11/28/2012 | B12112286 | B12112286-004 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; Total Metals-EPA SW846, SW6010B, SW6020, Semi-Volatile Organic Compounds-low conc-SW8270C; Water: Total Metals-E200.8.*

- *Laboratory Project Ids: B12112136 and B12112286*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| VERIFICATION CRITERIA CHECK | |
|---|---|
| **Laboratory qualifiers used in this review:** | |
| A | The analyte level was greater than four times the spike level. In accordance with the method % percent recovery is not calculated. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |
| **Validation qualifiers used in this review:** | |
| N/A | |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Cooler 1 with soil samples was received at 0.4°C. Cooler 2 with water samples was received at 0.1°C. Custody seals were not present, however the coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory blank samples were free of target analyte contamination. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were free of target analyte contamination. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Samples TEL9-SS-A and TEL10-SS-A were flagged with laboratory qualifier "S" for the surrogate % recovery for 2-Fluorobiphenyl (Method SW8270C) being just below control limits at 66%( 67-102%). No validation qualifier was used because the associated target compound Tetraethyllead was not detected in raw samples. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: LCS-67402 (SW8270C) was flagged with laboratory qualifier "S" for the surrogate 2-Fluorobiphenyl being just below control limits at 66% (67-102%). No validation qualifier was used because raw samples did not detect the associated target compound Tetraethyllead. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12112136-021AMS3 was flagged with the laboratory qualifier "S" for the analyte Lead (SW6020) being above control limits. No validation qualifier was used because the MS/MSD was rerun and within control limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Blind field duplicates were within control limits for RPDS. However, per the QAPP blind field duplicates should have different sample numbers. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.

- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)

- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 11/28/2012** |
| **Verified By/Date Verified: Angela Roddy 01/15/2013** | **Sample End Date: 11/28/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | TEL1-SS-A | 11/28/2012 | B12112287 | B12112287-001 |
| 2 | Soil | TEL1-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-002 |
| 3 | Soil | TEL2-SS-A | 11/28/2012 | B12112287 | B12112287-003 |
| 4 | Soil | TEL2-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-004 |
| 5 | Soil | TEL-SSS-A | 11/28/2012 | B12112287 | B12112287-005 |
| 6 | Soil | TEL3-SSS-A-Sieved | 11/28/2012 | B12112287 | B12112287-006 |
| 7 | Soil | TEL6-SS-A | 11/28/2012 | B12112287 | B12112287-007 |
| 8 | Soil | TEL6-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-008 |
| 9 | Soil | TEL6-SS-B | 11/28/2012 | B12112287 | B12112287-009 |
| 10 | Soil | TEL6-SS-B-Sieved | 11/28/2012 | B12112287 | B12112287-010 |
| 11 | Soil | TEL6-SS-C | 11/28/2012 | B12112287 | B12112287-011 |
| 12 | Soil | TEL6-SS-C-Sieved | 11/28/2012 | B12112287 | B12112287-012 |
| 13 | Soil | TEL6-SS-CD | 11/28/2012 | B12112287 | B12112287-013 |
| 14 | Soil | TEL6-SS-CD-Sieved | 11/28/2012 | B12112287 | B12112287-014 |
| 15 | Soil | TEL7-SS-A | 11/28/2012 | B12112287 | B12112287-015 |
| 16 | Soil | TEL7-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-016 |
| 17 | Soil | TEL8-SS-A | 11/28/2012 | B12112287 | B12112287-017 |
| 18 | Soil | TEL8-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-018 |
| 19 | Soil | TEL11-SS-A | 11/28/2012 | B12112287 | B12112287-019 |
| 20 | Soil | TEL11-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-020 |
| 21 | Soil | TEL12-SS-A | 11/28/2012 | B12112287 | B12112287-021 |
| 22 | Soil | TEL12-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-022 |
| 23 | Soil | TEL13-SS-A | 11/28/2012 | B12112287 | B12112287-023 |
| 24 | Soil | TEL13-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-024 |
| 25 | Soil | TEL17-SS-A | 11/28/2012 | B12112287 | B12112287-025 |
| 26 | Soil | TEL17-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-026 |
| 27 | Soil | TEL16-SS-A | 11/28/2012 | B12112287 | B12112287-027 |
| 28 | Soil | TEL16-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-028 |
| 29 | Soil | TEL18-SS-A | 11/28/2012 | B12112287 | B12112287-029 |
| 30 | Soil | TEL18-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-030 |
| 31 | Soil | TEL21-SS-A | 11/28/2012 | B12112287 | B12112287-031 |

| | | | | | |
|---|---|---|---|---|---|
| 32 | Soil | TEL21-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-032 |
| 33 | Soil | TEL22-SS-A | 11/28/2012 | B12112287 | B12112287-033 |
| 34 | Soil | TEL22-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-034 |
| 35 | Soil | TEL22-SS-B | 11/28/2012 | B12112287 | B12112287-035 |
| 36 | Soil | TEL22-SS-B-Sieved | 11/28/2012 | B12112287 | B12112287-036 |
| 37 | Soil | TEL22-SS-C | 11/28/2012 | B12112287 | B12112287-037 |
| 38 | Soil | TEL22-SS-C-Sieved | 11/28/2012 | B12112287 | B12112287-038 |
| 39 | Soil | TEL23-SS-A | 11/28/2012 | B12112287 | B12112287-039 |
| 40 | Soil | TEL23-SS-A-Sieved | 11/28/2012 | B12112287 | B12112287-040 |
| 41 | Water-Rinsate Blank | YOSD-1211-301 | 11/28/2012 | B12112286 | B12112286-001 |
| 42 | Water-DI Blank | YOSD-1211-302 | 11/28/2012 | B12112286 | B12112286-002 |
| 43 | Water-Rinsate Blank | YOSD-1211-303 | 11/28/2012 | B12112286 | B12112286-003 |
| 44 | Water-DI Blank | YOSD-1211-304 | 11/28/2012 | B12112286 | B12112286-004 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; Total Metals-EPA SW846, SW6010B, SW6020, Semi-Volatile Organic Compounds-low conc-SW8270C; Water: Total Metals-E200.8.*

- *Laboratory Project Ids: B12112287 and B12112286*

**PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT**

| | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

N The analyte concentration was not sufficiently high to calculate an RPD.

S Spike recovery outside of advisory limits.

**Validation qualifiers used in this review:**

N/A

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Make note that TEL3-SSS-A was typed as shown, which is different than field notes. Also, make note YOSD-1211-301 and YOSD-1211-302 are written YOSD-1211-310 and YOSD-1211-311 in field notes. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Coolers 1 and 2 with soil samples were received at 0.3°C and 0.2°C respectively. Cooler 3 with water samples was received at 0.1°C. Custody seals were not present, however the coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory blank samples were free of target analyte contamination. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were free of target analyte contamination. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: Surrogate recoveries were within control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12120076-009AMS3 and matrix spike duplicate B12120076-009AMSD were flagged with the laboratory qualifier "S" for the analyte Lead (SW6010B) being below control limits. No validation qualifier was used because the MS/MSDs were repeated multiple times for this batch and were within control limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Blind field duplicates were within control limits for RPDS. However, per the QAPP blind field duplicates should have different sample numbers. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 11/29/2012** |
| **Verified By/Date Verified: Angela Roddy 01/15/2013** | **Sample End Date: 11/30/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | PS2-SS-A | 11/29/2012 | B12112403 | B12112403-001 |
| 2 | Soil | PS2-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-002 |
| 3 | Soil | PS2-SS-B | 11/29/2012 | B12112403 | B12112403-003 |
| 4 | Soil | PS2-SS-B Sieved | 11/29/2012 | B12112403 | B12112403-004 |
| 5 | Soil | PS2-SS-C | 11/29/2012 | B12112403 | B12112403-005 |
| 6 | Soil | PS2-SS-C Sieved | 11/29/2012 | B12112403 | B12112403-006 |
| 7 | Soil | PS3-SS-A | 11/29/2012 | B12112403 | B12112403-007 |
| 8 | Soil | PS3-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-008 |
| 9 | Soil | PS4-SS-A | 11/29/2012 | B12112403 | B12112403-009 |
| 10 | Soil | PS4-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-010 |
| 11 | Soil | PS6-SS-A | 11/29/2012 | B12112403 | B12112403-011 |
| 12 | Soil | PS6-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-012 |
| 13 | Soil | PS7-SS-A | 11/29/2012 | B12112403 | B12112403-013 |
| 14 | Soil | PS7-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-014 |
| 15 | Soil | PS8-SS-A | 11/29/2012 | B12112403 | B12112403-015 |
| 16 | Soil | PS8-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-016 |
| 17 | Soil | PS9-SS-A | 11/29/2012 | B12112403 | B12112403-017 |
| 18 | Soil | PS9-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-018 |
| 19 | Soil | PS10-SS-A | 11/29/2012 | B12112403 | B12112403-019 |
| 20 | Soil | PS10-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-020 |
| 21 | Soil | PS11-SS-A | 11/29/2012 | B12112403 | B12112403-021 |
| 22 | Soil | PS11-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-022 |
| 23 | Soil | PS11-SS-B | 11/29/2012 | B12112403 | B12112403-023 |
| 24 | Soil | PS11-SS-B Sieved | 11/29/2012 | B12112403 | B12112403-024 |
| 25 | Soil | PS11-SS-C | 11/29/2012 | B12112403 | B12112403-025 |
| 26 | Soil | PS11-SS-C Sieved | 11/29/2012 | B12112403 | B12112403-026 |
| 27 | Soil | PS11-SS-CD | 11/29/2012 | B12112403 | B12112403-027 |
| 28 | Soil | PS11-SS-CD Sieved | 11/29/2012 | B12112403 | B12112403-028 |
| 29 | Soil | PS1-SS-A | 11/29/2012 | B12112403 | B12112403-029 |
| 30 | Soil | PS1-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-030 |
| 31 | Soil | PS5-SS-A | 11/29/2012 | B12112403 | B12112403-031 |
| 32 | Soil | PS5-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-032 |
| 33 | Soil | PS12-SS-A | 11/29/2012 | B12112403 | B12112403-033 |
| 34 | Soil | PS12-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-034 |
| 35 | Soil | PS13-SS-A | 11/29/2012 | B12112403 | B12112403-035 |

| | | | | | |
|---|---|---|---|---|---|
| 36 | Soil | PS13-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-036 |
| 37 | Soil | PS14-SS-A | 11/29/2012 | B12112403 | B12112403-037 |
| 38 | Soil | PS14-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-038 |
| 39 | Soil | PS15-SS-A | 11/29/2012 | B12112403 | B12112403-039 |
| 40 | Soil | PS15-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-040 |
| 41 | Soil | PS16-SS-A | 11/29/2012 | B12112403 | B12112403-041 |
| 42 | Soil | PS16-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-042 |
| 43 | Soil | PS17-SS-A | 11/29/2012 | B12112403 | B12112403-043 |
| 44 | Soil | PS17-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-044 |
| 45 | Soil | PS18-SS-A | 11/29/2012 | B12112403 | B12112403-045 |
| 46 | Soil | PS18-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-046 |
| 47 | Soil | PS19-SS-A | 11/29/2012 | B12112403 | B12112403-047 |
| 48 | Soil | PS19-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-048 |
| 49 | Soil | PS20-SS-A | 11/29/2012 | B12112403 | B12112403-049 |
| 50 | Soil | PS20-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-050 |
| 51 | Soil | PS21-SS-A | 11/29/2012 | B12112403 | B12112403-051 |
| 52 | Soil | PS21-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-052 |
| 53 | Soil | PS22-SS-A | 11/29/2012 | B12112403 | B12112403-053 |
| 54 | Soil | PS22-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-054 |
| 55 | Soil | PS22-SS-B | 11/29/2012 | B12112403 | B12112403-055 |
| 56 | Soil | PS22-SS-B Sieved | 11/29/2012 | B12112403 | B12112403-056 |
| 57 | Soil | PS22-SS-C | 11/29/2012 | B12112403 | B12112403-057 |
| 58 | Soil | PS22-SS-C Sieved | 11/29/2012 | B12112403 | B12112403-058 |
| 59 | Soil | PS23-SS-A | 11/29/2012 | B12112403 | B12112403-059 |
| 60 | Soil | PS23-SS-A Sieved | 11/29/2012 | B12112403 | B12112403-060 |
| 61 | Water-Rinsate Blank | YOSD-1211-401 | 11/29/2012 | B12112410 | B12112410-001 |
| 62 | Water-DI Blank | YOSD-1211-402 | 11/29/2012 | B12112410 | B12112410-002 |
| 63 | Water-Rinsate Blank | YOSD-1211-403 | 11/30/2012 | B12112410 | B12112410-003 |
| 64 | Water-DI Blank | YOSD-1211-404 | 11/30/2012 | B12112410 | B12112410-004 |
| 65 | Water-DI Blank | YOSD-1211-405 | 11/30/2012 | B12112410 | B12112410-005 |
| 66 | Water-Rinsate Blank | YOSD-1211-406 | 11/30/2012 | B12112410 | B12112410-006 |
| 67 | Water-Trip Blank | TB102512TSSHP0259A | 11/29/2012 | B12112410 | B12112410-007 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; Total Metals-EPA SW846, SW6010B, SW6020, Volatiles (VOC)-SW8260B. Water: Total Metals-E200.8, E747.1A*

- *Laboratory Project Ids: B12112403 and B12112410*

**PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT**

| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
|---|---|---|---|---|---|---|

Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

A The analyte level was greater than four times the spike level. In accordance with the method % percent recovery is not calculated.

J Estimated value. The analyte was present but less than the reporting limit.

N The analyte concentration was not sufficiently high to calculate an RPD.

S Spike recovery outside of advisory limits.

**Validation qualifiers used in this review:**

J QC Exceedance

U Blank Exceedance

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Coolers 1 and 2 with soil samples were received at 0.4 and 0.6°C respectively. Cooler 3 with water samples was received at 1.0°C. Custody seals were not present, however the coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Barium and Silver (SW6010B/SW6020) were detected in Method Blanks MB-67544 and MB-67569. No validation qualifier was used because Barium results in raw samples were >10x the reporting limit and raw samples were nondetect for Silver. Chromium (SW6020) was detected in Method Blank MB-6758. No validation qualifier was used because sample results were >10x the reporting limit for Chromium. Arsenic and Selenium (SW6020) were detected in Method Blank MB-67544. No validation qualifier was used because sample results were >10x the reporting limit for Arsenic and samples were nondetect for Selenium. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Chloroform (SW8260B) was detected in blanks YOSD-211-401 and YOSD-211-402. A validation qualifier "U" is placed on the both blanks for this analyte. A validation qualifier was not necessary for raw soil samples because they were non-detect for this analyte. Bromodichloromethane and Chloromethane were detected in blanks YOSD-211-401 and YOSD-211-402 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because these are estimated values and are below the reporting limits. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Samples PS2-SS-C and PS3-SS-A were flagged with laboratory qualifier "S" for surrogates Dibromofluoromethane and Tolune-d8 (SW8260B) being above control limits. No validation qualifier was used because other surrogates were within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike B12112403-053AMS3 was flagged with laboratory qualifier "S" for the analyte Silver being below control limits. No validation qualifier was used because the post digestion spike was within limits. Lab QC matrix spike duplicate B12120248-001AMSD was flagged with laboratory qualifier "S" for the analyte Barium being outside of control limits. No validation qualifier was used because the post digestion spike was within limits. Lab QC matrix spike B12112403-053AMS3 and matrix spike duplicate B12112403-053AMSD were flagged with laboratory qualifier "S" for the analyte Barium being above control limits. No validation qualifier was used because the post digestion spike was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample PS11-SS-C and its PS11-SS-D were outside of control limits for RPDs for the analytes Moisture (SW3550A) (129%) and Lead (SW6010B-Sieved) (74%). A validation qualifier "J" was placed on all associated raw soil sample for these analytes. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| PS10-SS-A-Sieved | Soil | B12112403-020 | SW6010B | Lead-Sieved | 854 | mg/kg | J | RPD |
| PS11-SS-A-Sieved | Soil | B12112403-022 | SW6010B | Lead-Sieved | 94 | mg/kg | J | RPD |
| PS11-SS-B-Sieved | Soil | B12112403-024 | SW6010B | Lead-Sieved | 140 | mg/kg | J | RPD |
| PS11-SS-CD-Sieved | Soil | B12112403-028 | SW6010B | Lead-Sieved | 72 | mg/kg | J | RPD |
| PS11-SS-C-Sieved | Soil | B12112403-026 | SW6010B | Lead-Sieved | 33 | mg/kg | J | RPD |
| PS12-SS-A-Sieved | Soil | B12112403-034 | SW6010B | Lead-Sieved | 112 | mg/kg | J | RPD |
| PS13-SS-A-Sieved | Soil | B12112403-036 | SW6010B | Lead-Sieved | 227 | mg/kg | J | RPD |
| PS14-SS-A-Sieved | Soil | B12112403-038 | SW6010B | Lead-Sieved | 885 | mg/kg | J | RPD |
| PS15-SS-A-Sieved | Soil | B12112403-040 | SW6010B | Lead-Sieved | 4070 | mg/kg | J | RPD |
| PS16-SS-A-Sieved | Soil | B12112403-042 | SW6010B | Lead-Sieved | 88 | mg/kg | J | RPD |
| PS17-SS-A-Sieved | Soil | B12112403-044 | SW6010B | Lead-Sieved | 45 | mg/kg | J | RPD |
| PS18-SS-A-Sieved | Soil | B12112403-046 | SW6010B | Lead-Sieved | 1320 | mg/kg | J | RPD |
| PS19-SS-A-Sieved | Soil | B12112403-048 | SW6010B | Lead-Sieved | 1280 | mg/kg | J | RPD |
| PS1-SS-A-Sieved | Soil | B12112403-030 | SW6010B | Lead-Sieved | 62 | mg/kg | J | RPD |
| PS20-SS-A-Sieved | Soil | B12112403-050 | SW6010B | Lead-Sieved | 519 | mg/kg | J | RPD |
| PS21-SS-A-Sieved | Soil | B12112403-052 | SW6010B | Lead-Sieved | 228 | mg/kg | J | RPD |
| PS22-SS-A-Sieved | Soil | B12112403-054 | SW6010B | Lead-Sieved | 78 | mg/kg | J | RPD |
| PS22-SS-B-Sieved | Soil | B12112403-056 | SW6010B | Lead-Sieved | 92 | mg/kg | J | RPD |
| PS22-SS-C-Sieved | Soil | B12112403-058 | SW6010B | Lead-Sieved | 21 | mg/kg | J | RPD |
| PS23-SS-A-Sieved | Soil | B12112403-060 | SW6010B | Lead-Sieved | 491 | mg/kg | J | RPD |
| PS2-SS-A-Sieved | Soil | B12112403-002 | SW6010B | Lead-Sieved | 434 | mg/kg | J | RPD |
| PS2-SS-B-Sieved | Soil | B12112403-004 | SW6010B | Lead-Sieved | 61 | mg/kg | J | RPD |
| PS2-SS-C-Sieved | Soil | B12112403-006 | SW6010B | Lead-Sieved | 24 | mg/kg | J | RPD |
| PS3-SS-A-Sieved | Soil | B12112403-008 | SW6010B | Lead-Sieved | 112 | mg/kg | J | RPD |
| PS4-SS-A-Sieved | Soil | B12112403-010 | SW6010B | Lead-Sieved | 66 | mg/kg | J | RPD |
| PS5-SS-A-Sieved | Soil | B12112403-032 | SW6010B | Lead-Sieved | 113 | mg/kg | J | RPD |
| PS6-SS-A-Sieved | Soil | B12112403-012 | SW6010B | Lead-Sieved | 195 | mg/kg | J | RPD |
| PS7-SS-A-Sieved | Soil | B12112403-014 | SW6010B | Lead-Sieved | 135 | mg/kg | J | RPD |
| PS8-SS-A-Sieved | Soil | B12112403-016 | SW6010B | Lead-Sieved | 312 | mg/kg | J | RPD |
| PS9-SS-A-Sieved | Soil | B12112403-018 | SW6010B | Lead-Sieved | 298 | mg/kg | J | RPD |
| PS10-SS-A | Soil | B12112403-019 | SW3550A | Moisture by wt % | 7.6 | % | J | RPD |
| PS11-SS-A | Soil | B12112403-021 | SW3550A | Moisture by wt % | 5.6 | % | J | RPD |
| PS11-SS-B | Soil | B12112403-023 | SW3550A | Moisture by wt % | 3.7 | % | J | RPD |
| PS11-SS-C | Soil | B12112403-025 | SW3550A | Moisture by wt % | 2.8 | % | J | RPD |
| PS11-SS-CD | Soil | B12112403-027 | SW3550A | Moisture by wt % | 13 | % | J | RPD |
| PS12-SS-A | Soil | B12112403-033 | SW3550A | Moisture by wt % | 13 | % | J | RPD |
| PS13-SS-A | Soil | B12112403-035 | SW3550A | Moisture by wt % | 7.8 | % | J | RPD |
| PS14-SS-A | Soil | B12112403-037 | SW3550A | Moisture by wt % | 3.9 | % | J | RPD |
| PS15-SS-A | Soil | B12112403-039 | SW3550A | Moisture by wt % | 3.6 | % | J | RPD |
| PS16-SS-A | Soil | B12112403-041 | SW3550A | Moisture by wt % | 4.6 | % | J | RPD |
| PS17-SS-A | Soil | B12112403-043 | SW3550A | Moisture by wt % | 8.5 | % | J | RPD |
| PS18-SS-A | Soil | B12112403-045 | SW3550A | Moisture by wt % | 10 | % | J | RPD |
| PS19-SS-A | Soil | B12112403-047 | SW3550A | Moisture by wt % | 14 | % | J | RPD |
| PS1-SS-A | Soil | B12112403-029 | SW3550A | Moisture by wt % | 4.5 | % | J | RPD |
| PS20-SS-A | Soil | B12112403-049 | SW3550A | Moisture by wt % | 8 | % | J | RPD |
| PS21-SS-A | Soil | B12112403-051 | SW3550A | Moisture by wt % | 8.1 | % | J | RPD |
| PS22-SS-A | Soil | B12112403-053 | SW3550A | Moisture by wt % | 5.6 | % | J | RPD |
| PS22-SS-B | Soil | B12112403-055 | SW3550A | Moisture by wt % | 13 | % | J | RPD |
| PS22-SS-C | Soil | B12112403-057 | SW3550A | Moisture by wt % | 14 | % | J | RPD |
| PS23-SS-A | Soil | B12112403-059 | SW3550A | Moisture by wt % | 10 | % | J | RPD |
| PS2-SS-A | Soil | B12112403-001 | SW3550A | Moisture by wt % | 8.5 | % | J | RPD |
| PS2-SS-B | Soil | B12112403-003 | SW3550A | Moisture by wt % | 13 | % | J | RPD |
| PS2-SS-C | Soil | B12112403-005 | SW3550A | Moisture by wt % | 13 | % | J | RPD |
| PS3-SS-A | Soil | B12112403-007 | SW3550A | Moisture by wt % | 5.2 | % | J | RPD |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PS4-SS-A | Soil | B12112403-009 | SW3550A | Moisture by wt % | 5.4 | % | J | RPD |
| PS5-SS-A | Soil | B12112403-031 | SW3550A | Moisture by wt % | 8.5 | % | J | RPD |
| PS6-SS-A | Soil | B12112403-011 | SW3550A | Moisture by wt % | 11 | % | J | RPD |
| PS7-SS-A | Soil | B12112403-013 | SW3550A | Moisture by wt % | 6.3 | % | J | RPD |
| PS8-SS-A | Soil | B12112403-015 | SW3550A | Moisture by wt % | 7.1 | % | J | RPD |
| PS9-SS-A | Soil | B12112403-017 | SW3550A | Moisture by wt % | 11 | % | J | RPD |
| YOSD-1211-402 | Water-DI Blank | B12112410-002 | SW8260B | Chloroform | 6.8 | ug/L | U | |
| YOSD-1211-401 | Water-Rinsate Blank | B12112410-001 | SW8260B | Chloroform | 6.3 | ug/L | U | |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |
| J | QC Exceedance | | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 11/29/2012** |
| **Verified By/Date Verified: Angela Roddy 01/15/2013** | **Sample End Date: 11/30/2012** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | PS24-SS-A | 11/30/2012 | B12112415 | B12112415-001 |
| 2 | Soil | PS24-SS-A-Sieved | 11/30/2012 | B12112415 | B12112415-002 |
| 3 | Soil | PS25-SS-A | 11/30/2012 | B12112415 | B12112415-003 |
| 4 | Soil | PS25-SS-A-Sieved | 11/30/2012 | B12112415 | B12112415-004 |
| 5 | Soil | PS26-SS-A | 11/30/2012 | B12112415 | B12112415-005 |
| 6 | Soil | PS26-SS-A-Sieved | 11/30/2012 | B12112415 | B12112415-006 |
| 7 | Soil | PS27-SS-A | 11/30/2012 | B12112415 | B12112415-007 |
| 8 | Soil | PS27-SS-A-Sieved | 11/30/2012 | B12112415 | B12112415-008 |
| 9 | Soil | PS28-SS-A | 11/30/2012 | B12112415 | B12112415-009 |
| 10 | Soil | PS28-SS-A-Sieved | 11/30/2012 | B12112415 | B12112415-010 |
| 11 | Soil | PS29-SS-A | 11/30/2012 | B12112415 | B12112415-011 |
| 12 | Soil | PS29-SS-A-Sieved | 11/30/2012 | B12112415 | B12112415-012 |
| 13 | Soil | PS29-SS-B | 11/30/2012 | B12112415 | B12112415-013 |
| 14 | Soil | PS29-SS-B-Sieved | 11/30/2012 | B12112415 | B12112415-014 |
| 15 | Soil | PS29-SS-C | 11/30/2012 | B12112415 | B12112415-015 |
| 16 | Soil | PS29-SS-C-Sieved | 11/30/2012 | B12112415 | B12112415-016 |
| 17 | Soil | PS29-SS-CD | 11/30/2012 | B12112415 | B12112415-017 |
| 18 | Soil | PS29-SS-CD-Sieved | 11/30/2012 | B12112415 | B12112415-018 |
| 19 | Soil | PS30-SS-A | 11/30/2012 | B12112415 | B12112415-019 |
| 20 | Soil | PS30-SS-A-Sieved | 11/30/2012 | B12112415 | B12112415-020 |
| 21 | Soil | PS31-SS-A | 11/30/2012 | B12112415 | B12112415-021 |
| 22 | Soil | PS31-SS-A-Sieved | 11/30/2012 | B12112415 | B12112415-022 |
| 23 | Soil | PS32-SS-A | 11/30/2012 | B12112415 | B12112415-023 |
| 24 | Soil | PS32-SS-A-Sieved | 11/30/2012 | B12112415 | B12112415-024 |
| 25 | Soil | PS33-SS-A | 11/30/2012 | B12112415 | B12112415-025 |
| 26 | Soil | PS33-SS-A-Sieved | 11/30/2012 | B12112415 | B12112415-026 |
| 27 | Soil | PS34-SS-A | 11/30/2012 | B12112415 | B12112415-027 |

| | | | | | |
|---|---|---|---|---|---|
| 28 | Soil | PS34-SS-A-Sieved | 11/30/2012 | B12112415 | B12112415-028 |
| 29 | Soil | PS35-SS-A | 11/30/2012 | B12112415 | B12112415-029 |
| 30 | Soil | PS35-SS-A-Sieved | 11/30/2012 | B12112415 | B12112415-030 |
| 31 | Soil | PS35-SS-AD | 11/30/2012 | B12112415 | B12112415-031 |
| 32 | Soil | PS35-SS-AD-Sieved | 11/30/2012 | B12112415 | B12112415-032 |
| 33 | Water-Rinsate Blank | YOSD-1211-401 | 11/29/2012 | B12112410 | B12112410-001 |
| 34 | Water-DI Blank | YOSD-1211-402 | 11/29/2012 | B12112410 | B12112410-002 |
| 35 | Water-Rinsate Blank | YOSD-1211-403 | 11/30/2012 | B12112410 | B12112410-003 |
| 36 | Water-DI Blank | YOSD-1211-404 | 11/30/2012 | B12112410 | B12112410-004 |
| 37 | Water-DI Blank | YOSD-1211-405 | 11/30/2012 | B12112410 | B12112410-005 |
| 38 | Water-Rinsate Blank | YOSD-1211-406 | 11/30/2012 | B12112410 | B12112410-006 |
| 39 | Water-Trip Blank | TB102512TSSHP0259A | 11/29/2012 | B12112410 | B12112410-007 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; Total Metals-EPA SW846, SW6010B, SW6020, Semi-Volatile Organic Compounds-low conc-SW8270C; Volatiles (VOC)-SW8260B. Water: Total Metals-E200.8, E747.1A*

- *Laboratory Project Ids: B12112415 and B12112410*

**PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT**

| | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |

Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18.

| | | | | | | |
|---|---|---|---|---|---|---|
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |

Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16.

| | | | | | | |
|---|---|---|---|---|---|---|
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |

Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures.

| | | | | | | |
|---|---|---|---|---|---|---|
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |

Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

A The analyte level was greater than four times the spike level. In accordance with the method % percent recovery is not calculated.

J Estimated value. The analyte was present but less than the reporting limit.

N The analyte concentration was not sufficiently high to calculate an RPD.

S Spike recovery outside of advisory limits

**Validation qualifiers used in this review:**

J QC Exceedance

U Blank Exceedance

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Samples were received intact and in good condition. Coolers 1 and 2 with soil samples were received at 0.3°C. Cooler 3 with water samples was received at 1.0°C. Custody seals were not present, however the coolers were hand delivered. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records, or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Barium (SW6010B) was detected in Method Blank MB-67641. No validation qualifier was used because Barium results in raw samples were >10x the reporting limit (0.02 mg-kg-dry). | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Chloroform (SW8260B) was detected in samples YOSD-1211-401 and YOSD-1211-402. A validation qualifier "U" is placed on both blanks only for this analyte. A validation qualifier was not necessary for raw soil samples because they were non-detect for this analyte. Bromodichloromethane and Chloromethane (SW8260B) were detected in blanks YOSD-1211-401 and YOSD-1211-402 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because these are estimated values and are below the reporting limits. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: Surrogate recoveries were within control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC matrix spike duplicate B12112432-001AMSD was flagged with the laboratory qualifier "S" for the analyte Mercury (SW7471A) being above control limits. This could be related to this QC sample and its matrix interference. No validation qualifier was used because the matrix spike and LFB were within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample PS35-SS-A and its duplicate PS35-SS-AD were outside of control limits for RPDs for the analytes Arsenic (66%), Barium (56%), and Chromium (69%) using methods SW6010B/SW6020. A validation qualifier "J" was placed on all associated raw soil samples. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of "A" was put on the data; in accordance with the method, % recovery is not calculated.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| PS24-SS-A | Soil | B12112415-001 | SW6010B | Arsenic | 33 | mg/kg | J | RPD |
| PS25-SS-A | Soil | B12112415-003 | SW6010B | Arsenic | 59 | mg/kg | J | RPD |
| PS26-SS-A | Soil | B12112415-005 | SW6010B | Arsenic | 86 | mg/kg | J | RPD |
| PS27-SS-A | Soil | B12112415-007 | SW6010B | Arsenic | 55 | mg/kg | J | RPD |
| PS28-SS-A | Soil | B12112415-009 | SW6010B | Arsenic | 13 | mg/kg | J | RPD |
| PS29-SS-A | Soil | B12112415-011 | SW6020 | Arsenic | 8 | mg/kg | J | RPD |
| PS29-SS-B | Soil | B12112415-013 | SW6020 | Arsenic | 10 | mg/kg | J | RPD |
| PS29-SS-C | Soil | B12112415-015 | SW6020 | Arsenic | 9 | mg/kg | J | RPD |
| PS29-SS-CD | Soil | B12112415-017 | SW6020 | Arsenic | 10 | mg/kg | J | RPD |
| PS30-SS-A | Soil | B12112415-019 | SW6010B | Arsenic | 37 | mg/kg | J | RPD |
| PS31-SS-A | Soil | B12112415-021 | SW6010B | Arsenic | 46 | mg/kg | J | RPD |
| PS32-SS-A | Soil | B12112415-023 | SW6010B | Arsenic | 21 | mg/kg | J | RPD |
| PS33-SS-A | Soil | B12112415-025 | SW6010B | Arsenic | 90 | mg/kg | J | RPD |
| PS34-SS-A | Soil | B12112415-027 | SW6010B | Arsenic | 27 | mg/kg | J | RPD |
| PS35-SS-A | Soil | B12112415-029 | SW6010B | Arsenic | 22 | mg/kg | J | RPD |
| PS35-SS-AD | Soil | B12112415-031 | SW6010B | Arsenic | 11 | mg/kg | J | RPD |
| PS24-SS-A | Soil | B12112415-001 | SW6010B | Barium | 500 | mg/kg | J | RPD |
| PS25-SS-A | Soil | B12112415-003 | SW6010B | Barium | 597 | mg/kg | J | RPD |
| PS26-SS-A | Soil | B12112415-005 | SW6010B | Barium | 324 | mg/kg | J | RPD |
| PS27-SS-A | Soil | B12112415-007 | SW6010B | Barium | 289 | mg/kg | J | RPD |
| PS28-SS-A | Soil | B12112415-009 | SW6010B | Barium | 374 | mg/kg | J | RPD |
| PS29-SS-A | Soil | B12112415-011 | SW6010B | Barium | 380 | mg/kg | J | RPD |
| PS29-SS-B | Soil | B12112415-013 | SW6010B | Barium | 277 | mg/kg | J | RPD |
| PS29-SS-C | Soil | B12112415-015 | SW6010B | Barium | 194 | mg/kg | J | RPD |
| PS29-SS-CD | Soil | B12112415-017 | SW6010B | Barium | 201 | mg/kg | J | RPD |
| PS30-SS-A | Soil | B12112415-019 | SW6010B | Barium | 376 | mg/kg | J | RPD |
| PS31-SS-A | Soil | B12112415-021 | SW6010B | Barium | 613 | mg/kg | J | RPD |
| PS32-SS-A | Soil | B12112415-023 | SW6010B | Barium | 308 | mg/kg | J | RPD |
| PS33-SS-A | Soil | B12112415-025 | SW6010B | Barium | 588 | mg/kg | J | RPD |
| PS34-SS-A | Soil | B12112415-027 | SW6010B | Barium | 503 | mg/kg | J | RPD |
| PS35-SS-A | Soil | B12112415-029 | SW6010B | Barium | 1220 | mg/kg | J | RPD |
| PS35-SS-AD | Soil | B12112415-031 | SW6010B | Barium | 684 | mg/kg | J | RPD |
| PS24-SS-A | Soil | B12112415-001 | SW6010B | Chromium | 37 | mg/kg | J | RPD |
| PS25-SS-A | Soil | B12112415-003 | SW6010B | Chromium | 39 | mg/kg | J | RPD |
| PS26-SS-A | Soil | B12112415-005 | SW6010B | Chromium | 23 | mg/kg | J | RPD |
| PS27-SS-A | Soil | B12112415-007 | SW6010B | Chromium | 23 | mg/kg | J | RPD |
| PS28-SS-A | Soil | B12112415-009 | SW6010B | Chromium | 31 | mg/kg | J | RPD |
| PS29-SS-A | Soil | B12112415-011 | SW6010B | Chromium | 31 | mg/kg | J | RPD |
| PS29-SS-B | Soil | B12112415-013 | SW6010B | Chromium | 26 | mg/kg | J | RPD |
| PS29-SS-C | Soil | B12112415-015 | SW6010B | Chromium | 31 | mg/kg | J | RPD |
| PS29-SS-CD | Soil | B12112415-017 | SW6010B | Chromium | 29 | mg/kg | J | RPD |
| PS30-SS-A | Soil | B12112415-019 | SW6010B | Chromium | 25 | mg/kg | J | RPD |
| PS31-SS-A | Soil | B12112415-021 | SW6010B | Chromium | 36 | mg/kg | J | RPD |
| PS32-SS-A | Soil | B12112415-023 | SW6010B | Chromium | 20 | mg/kg | J | RPD |
| PS33-SS-A | Soil | B12112415-025 | SW6010B | Chromium | 21 | mg/kg | J | RPD |
| PS34-SS-A | Soil | B12112415-027 | SW6010B | Chromium | 26 | mg/kg | J | RPD |
| PS35-SS-A | Soil | B12112415-029 | SW6010B | Chromium | 66 | mg/kg | J | RPD |
| PS35-SS-AD | Soil | B12112415-031 | SW6010B | Chromium | 32 | mg/kg | J | RPD |
| YOSD-1211-402 | Water-DI Blank | B12112410-002 | SW8260B | Chloroform | 6.8 | ug/L | U | |
| YOSD-1211-401 | Water-Rinsate Blank | B12112410-001 | SW8260B | Chloroform | 6.3 | ug/L | U | |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |
| J | QC Exceedance | | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 04/09/2013** |
| **Verified By/Date Verified: Angela Roddy 05/03/2013** | **Sample End Date: 04/11/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Water | YMW-14-SS-A | 4/9/2013 | B13041046 | B13041046-001 |
| 2 | Soil | YMW-14-SS-A-Sieved | 4/9/2013 | B13041046 | B13041046-002 |
| 3 | Soil | YMW-14-SS-B | 4/9/2013 | B13041046 | B13041046-003 |
| 4 | Soil | YMW-14-SS-B-Sieved | 4/9/2013 | B13041046 | B13041046-004 |
| 5 | Soil | YMW-14-SS-C | 4/9/2013 | B13041046 | B13041046-005 |
| 6 | Soil | YMW-14-SS-C-Sieved | 4/9/2013 | B13041046 | B13041046-006 |
| 7 | Soil | YMW-14-SB-A | 4/9/2013 | B13041046 | B13041046-007 |
| 8 | Soil | YMW-13-SS-A | 4/10/2013 | B13041046 | B13041046-008 |
| 9 | Soil | YMW-13-SS-A-Sieved | 4/10/2013 | B13041046 | B13041046-009 |
| 10 | Soil | YMW-13-SS-B | 4/10/2013 | B13041046 | B13041046-010 |
| 11 | Soil | YMW-13-SS-B-Sieved | 4/10/2013 | B13041046 | B13041046-011 |
| 12 | Soil | YMW-13-SS-C | 4/10/2013 | B13041046 | B13041046-012 |
| 13 | Soil | YMW-13-SS-C-Sieved | 4/10/2013 | B13041046 | B13041046-013 |
| 14 | Soil | YMW-13-SB-A[1] | 4/10/2013 | B13041046 | B13041046-014 |
| 15 | Soil | YMW-11-SS-A | 4/11/2013 | B13041046 | B13041046-015 |
| 16 | Soil | YMW-11-SS-A-Sieved | 4/11/2013 | B13041046 | B13041046-016 |
| 17 | Soil | YMW-11-SS-B | 4/11/2013 | B13041046 | B13041046-017 |
| 18 | Soil | YMW-11-SS-B-Sieved | 4/11/2013 | B13041046 | B13041046-018 |
| 19 | Soil | YMW-11-SS-C | 4/11/2013 | B13041046 | B13041046-019 |
| 20 | Soil | YMW-11-SS-C-Sieved | 4/11/2013 | B13041046 | B13041046-020 |
| 21 | Soil | YMW-11-SB-A | 4/11/2013 | B13041046 | B13041046-021 |
| 22 | Soil | YMW-11-SB-B | 4/11/2013 | B13041046 | B13041046-022 |
| 23 | Soil | YMW-12-SS-A | 4/11/2013 | B13041046 | B13041046-023 |
| 24 | Soil | YMW-12-SS-A-Sieved | 4/11/2013 | B13041046 | B13041046-024 |
| 25 | Soil | YMW-12-SS-B | 4/11/2013 | B13041046 | B13041046-025 |
| 26 | Soil | YMW-12-SS-B-Sieved | 4/11/2013 | B13041046 | B13041046-026 |
| 27 | Soil | YMW-12-SS-C | 4/11/2013 | B13041046 | B13041046-027 |
| 28 | Soil | YMW-12-SS-C-Sieved | 4/11/2013 | B13041046 | B13041046-028 |
| 29 | Soil | YMW-12-SB-A | 4/11/2013 | B13041046 | B13041046-029 |
| 30 | Soil | YMW-12-SB-AD | 4/11/2013 | B13041046 | B13041046-030 |
| 31 | Soil | YMW-16-SS-A | 4/11/2013 | B13041046 | B13041046-031 |
| 32 | Soil | YMW-16-SS-A-Sieved | 4/11/2013 | B13041046 | B13041046-032 |
| 33 | Soil | YMW-16-SS-B | 4/11/2013 | B13041046 | B13041046-033 |
| 34 | Soil | YMW-16-SS-B-Sieved | 4/11/2013 | B13041046 | B13041046-034 |
| 35 | Soil | YMW-16-SS-C | 4/11/2013 | B13041046 | B13041046-035 |
| 36 | Soil | YMW-16-SS-C-Sieved | 4/11/2013 | B13041046 | B13041046-036 |
| 37 | Soil | YMW-16-SB-A | 4/11/2013 | B13041046 | B13041046-037 |
| 38 | Water-Rinsate Blank | YOSD-1304-100 | 4/11/2013 | B13041064 | B13041064-001 |
| | [1] YMW-13-SB-A was resampled on 4/26/2013 and renamed YMW-13-SB-D | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*
- *Laboratory Project Ids: B13041046 and B13041064*

| **PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT** | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification, except those values flagged with validation qualifier "R" listed in the table below. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % percent recovery is not calculated. |
| B | The analyte was detected in the method blank. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| R | Rejected |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. Sample YMW-13-SS-C was rerun for Lead (Method SW6010B) due to its nonconformance per Kris Adler. Both results are reported; however the first value has been given validation qualifier "R" for rejected. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Cooler 1 arrived with a temperature of 0.9°C. Cooler 2 arrived with a temperature of 0.7°C. Cooler 3 arrived with a temperature of 1.6°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B) was detected in Method Blanks MB-70540, MB-70541, and MB-70562. The associated soil samples do not require a qualification because Barium detections were >10x the method blank reporting limit. Cadmium and Silver (Method SW6010B) and Selenium (SW6020) were detected in Method Blank MB-70562. The associated soil samples do not require a qualification because these analyte detections were either non-detected or were >10x the method blank reporting limit. Water: Chromium (Method E200.8) was detected in Method Blank MB-70489. The associated water sample does not require a qualification because Chromium was non-detected. 2-Methylnaphthalene, Acenaphthylene, and Naphthalene (Method SW8270C) were detected in Method Blank MB-70685-70603-70528. The laboratory flagged these analytes with a "B" for the associated water sample. A laboratory qualifier "U" was placed on these analytes for the water Rinsate blank YOSD-1304-100. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: 2-Methylnaphthalene, Acenaphthylene, and Naphthalene (Method SW8270C) were detected in water Rinsate blank YOSD-1304-100. They were flagged with a laboratory qualifier of "B" due to these analytes being detected in the Method Blank. A validation qualifier "U" was placed on raw soil samples that had detections <5x reporting limit for these analytes, as well as the Rinsate blank itself. Chloroform (Method SW8260B) was also detected in Rinsate Blank YOSD-1304-100. A validation qualifier was not necessary on raw samples because Chloroform was non-detect in raw soil samples. However, a validation qualifier "U" was placed on the Rinsate Blank. Chloromethane (SW8260B) was also detected in Rinsate Blank YOSD-1304-100. A validation qualifier was not necessary on the blank itself or raw samples because if a blank was flagged with a laboratory qualifier "J", the result was below the reporting limit and therefore estimated. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Samples YMW-14-SS-A, YMW-12-SS-A, and YMW-12-SS-B were flagged with laboratory qualifier "S" for the % recovery of VPH Aromatics Surrogate and VPH Aliphatics Surrogate (Method MA-VPH) being above control limits. The detected associated VPH analytes were flagged with validation qualifier "J", indicating high bias. Samples YMW-14-SS-A, YMW-14-SB-A, YMW-11-SS-B, YMW-12-SS-A, YMW-12-SS-C, YMW-16-SS-A and YMW-16-SS-B were flagged with laboratory qualifier "S" for the % recovery of the SVOC surrogate Terphenyl-d14 (Method SW8270C) being above control limits. A validation qualifier was not necessary because two of the three surrogates were within control limits. Sample YMW-12-SB-A and sample duplicate YMW-12-SB-AD were flagged with laboratory qualifier "S" for the % recovery of the SVOC surrogate Nitrobenzene-d5 (Method SW8270C) being outside of control limits. A validation was not necessary because other surrogates were within limits. Sample YMW-16-SB-A was flagged with laboratory qualifier "S" for the % recovery of the EPH surrogate o-Terphenyl (Method MA-EPH) being above control limits, as well as for the % recovery of the VPH Aromatics and VPH Aliphatics Surrogates (Method MA-VPH). A validation qualifier "J" was placed on all detected VPH analytes, indicating high bias. A validation qualifier was not necessary for the Method MA-EPH because other surrogates were within limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS-70525 was flagged with laboratory qualifier "S" for analytes 2-Chlorotoluene and Tetrachloroethane (Method SW8260B) for the % recovery being outside of control limits. No validation qualifier was necessary because the MS/MSD were within limits and the raw samples were nondetect for these analytes. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: QC matrix spike B13041046-033AMS3 and matrix spike duplicate B13041046-033AMSD were flagged with laboratory qualifier "S" for the % recovery of the analyte Chromium (Method SW6010B) being above control limits. No validation qualifier was necessary because the post digestion spike was within limits for Chromium. QC matrix spike B13041046-037AMS3 and matrix spike duplicate B13041046-037AMSD were flagged with laboratory qualifier "S" for the % recovery of the analyte Barium (Method SW6010B) being above control limits. No validation qualifier was necessary because the post digestion spike was within limits for Barium. QC matrix spike B13041046-007AMS was flagged with laboratory qualifier "S" for the % recovery of the analytes Acenaphthene, Chrysene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Pyrene and the surrogate Nitrobenzene-d5 (Method SW8270C). A validation qualifier was not necessary because the matrix spike was rerun with all analytes and surrogates within control limits. QC matrix spike duplicate B13041046-035AMSD was flagged with laboratory qualifiers "S" and "R" for the % recovery of the analytes Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Fluoranthene, Indeno(1,2,3-cd)pyrene, and Pyrene (Method SW8270C) being outside of control limits. A validation qualifier was not necessary because the LCS was within control limits. Water: QC matrix spike B13041064-001DMS was flagged with laboratory qualifier "S" for the % recovery of the analytes 2-Chlorethyl vinyl ether, 2-Chlorotoluene, 4-Chlorotoluene, Dichlorodifluoromethane, Ethylbenzene, Tetrachloroethene, Toluene, and m+p-Xylenes, (Method SW8260B) being outside of control limits. No validation qualifier was necessary because the LCS was within limits for those analytes. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits as required by the QAAP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample YMW-12-SB-A and its duplicate YMW-12-SB-AD had an RPD of 50% for the analyte Lead (Method SW6010B). A validation qualifier "J" was placed on these analytes for the respective raw samples. Also, the analyte Total Extractable Hydrocarbons had an RPD of 157%, and sample duplicate YMW-12-SB-AD was given a validation qualifier "R" for rejected, as the ratio to the other analytes in this method was incorrect | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data report.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1304-100 | Water | B13041064-001 | SW8270C | 2-Methylnaphthalene | 0.35 | ug/L | U | |
| YOSD-1304-100 | Water | B13041064-001 | SW8270C | Acenaphthylene | 0.22 | ug/L | U | |
| YOSD-1304-100 | Water | B13041064-001 | SW8270C | Napthalene | 0.40 | ug/L | U | |
| YOSD-1304-100 | Water | B13041064-001 | SW8260B | Chloroform | 5.6 | ug/L | U | |
| YMW-16-SS-B | Soil | B13041046-033 | SW8270C | 2-Methylnaphthalene | 0.076 | mg/kg | U | |
| YMW-16-SS-C | Soil | B13041046-035 | SW8270C | 2-Methylnaphthalene | 0.022 | mg/kg | U | |
| YMW-11-SB-B | Soil | B13041046-022 | SW8270C | Acenaphthylene | 0.0059 | mg/kg | U | |
| YMW-12-SS-C | Soil | B13041046-027 | SW8270C | Napthalene | 0.62 | mg/kg | U | |
| YMW-14-SS-C | Soil | B13041046-005 | SW8270C | Napthalene | 0.60 | mg/kg | U | |
| YMW-14-SS-C | Soil | B13041046-005 | SW8270C | 2-Methylnaphthalene | 1.4 | mg/kg | U | |
| YMW-14-SS-A | Soil | B13041046-001 | MA-VPH | Benzene | 0.21 | mg/kg | J | High Bias |
| YMW-14-SS-A | Soil | B13041046-001 | MA-VPH | m+p-Xylenes | 0.14 | mg/kg | J | High Bias |
| YMW-14-SS-A | Soil | B13041046-001 | MA-VPH | o-Xylene | 0.068 | mg/kg | J | High Bias |
| YMW-14-SS-A | Soil | B13041046-001 | MA-VPH | Xylenes, Total | 0.21 | mg/kg | J | High Bias |
| YMW-14-SS-A | Soil | B13041046-001 | MA-VPH | C9 to C10 Aromatics | 10 | mg/kg | J | High Bias |
| YMW-14-SS-A | Soil | B13041046-001 | MA-VPH | C5-C8 Aliphatics | 47 | mg/kg | J | High Bias |
| YMW-14-SS-A | Soil | B13041046-001 | MA-VPH | C9- to C12 Aliphatics | 7.5 | mg/kg | J | High Bias |
| YMW-14-SS-A | Soil | B13041046-001 | MA-VPH | Total Purgeable Hydrocarbons | 61 | mg/kg | J | High Bias |
| YMW-12-SS-A | Soil | B13041046-023 | MA-VPH | C9 to C10 Aromatics | 18 | mg/kg | J | High Bias |
| YMW-12-SS-A | Soil | B13041046-023 | MA-VPH | C5-C8 Aliphatics | 51 | mg/kg | J | High Bias |
| YMW-12-SS-A | Soil | B13041046-023 | MA-VPH | C9- to C12 Aliphatics | 45 | mg/kg | J | High Bias |
| YMW-12-SS-A | Soil | B13041046-023 | MA-VPH | Total Purgeable Hydrocarbons | 84 | mg/kg | J | High Bias |
| YMW-12-SS-B | Soil | B13041046-025 | MA-VPH | C9 to C10 Aromatics | 38 | mg/kg | J | High Bias |
| YMW-12-SS-B | Soil | B13041046-025 | MA-VPH | C5-C8 Aliphatics | 89 | mg/kg | J | High Bias |
| YMW-12-SS-B | Soil | B13041046-025 | MA-VPH | C9 TO C12 Aliphatics | 85 | mg/kg | J | High Bias |
| YMW-12-SS-B | Soil | B13041046-025 | MA-VPH | Total Purgeable Hydrocarbons | 158 | mg/kg | J | High Bias |
| YMW-16-SB-A | Soil | B13041046-037 | MA-VPH | m+p-Xylenes | 58 | mg/kg | J | High Bias |
| YMW-16-SB-A | Soil | B13041046-037 | MA-VPH | o-Xylene | 28 | mg/kg | J | High Bias |
| YMW-16-SB-A | Soil | B13041046-037 | MA-VPH | Xylenes, Total | 86 | mg/kg | J | High Bias |
| YMW-16-SB-A | Soil | B13041046-037 | MA-VPH | C9 to C10 Aromatics | 2660 | mg/kg | J | High Bias |
| YMW-16-SB-A | Soil | B13041046-037 | MA-VPH | C5-C8 Aliphatics | 1700 | mg/kg | J | High Bias |
| YMW-16-SB-A | Soil | B13041046-037 | MA-VPH | C9 to C12 Aliphatics | 3480 | mg/kg | J | High Bias |
| YMW-16-SB-A | Soil | B13041046-037 | MA-VPH | Total Purgeable Hydrocarbons | 8970 | mg/kg | J | High Bias |
| YMW-11-SB-A | Soil | B13041046-021 | SW6010B | Lead | 17 | mg/kg | J | RPD |
| YMW-11-SB-B | Soil | B13041046-022 | SW6020 | Lead | 8 | mg/kg | J | RPD |
| YMW-11-SS-A | Soil | B13041046-015 | SW6010B | Lead | 600 | mg/kg | J | RPD |
| YMW-11-SS-B | Soil | B13041046-017 | SW6010B | Lead | 125 | mg/kg | J | RPD |
| YMW-11-SS-C | Soil | B13041046-019 | SW6010B | Lead | 46 | mg/kg | J | RPD |
| YMW-12-SB-A | Soil | B13041046-029 | SW6010B | Lead | 12 | mg/kg | J | RPD |
| YMW-12-SB-AD | Soil | B13041046-030 | SW6010B | Lead | 20 | mg/kg | J | RPD |
| YMW-12-SS-A | Soil | B13041046-023 | SW6010B | Lead | 269 | mg/kg | J | RPD |
| YMW-12-SS-B | Soil | B13041046-025 | SW6010B | Lead | 151 | mg/kg | J | RPD |
| YMW-12-SS-C | Soil | B13041046-027 | SW6010B | Lead | 104 | mg/kg | J | RPD |
| YMW-13-SS-A | Soil | B13041046-008 | SW6010B | Lead | 31 | mg/kg | J | RPD |
| YMW-13-SS-B | Soil | B13041046-010 | SW6010B | Lead | 181 | mg/kg | J | RPD |
| YMW-13-SS-C | Soil | B13041046-012 | SW6010B | Lead | 37400 | mg/kg | R | Rejected |
| YMW-13-SS-C | Soil | B13041046-012 | SW6010B | Lead | 589 | mg/kg | J | RPD |
| YMW-14-SB-A | Soil | B13041046-007 | SW6010B | Lead | 36 | mg/kg | J | RPD |
| YMW-14-SS-A | Soil | B13041046-001 | SW6010B | Lead | 842 | mg/kg | J | RPD |
| YMW-14-SS-B | Soil | B13041046-003 | SW6010B | Lead | 335 | mg/kg | J | RPD |
| YMW-14-SS-C | Soil | B13041046-005 | SW6010B | Lead | 85 | mg/kg | J | RPD |
| YMW-16-SB-A | Soil | B13041046-037 | SW6010B | Lead | 31 | mg/kg | J | RPD |
| YMW-16-SS-A | Soil | B13041046-031 | SW6010B | Lead | 402 | mg/kg | J | RPD |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| YMW-16-SS-B | Soil | B13041046-033 | SW6010B | Lead | 431 | mg/kg | J | RPD |
| YMW-16-SS-C | Soil | B13041046-035 | SW6010B | Lead | 303 | mg/kg | J | RPD |
| YMW-12-SB-AD | Soil | B13041046-030 | MA-EPH | Total Extractable Hydrocarbons | 16300 | mg/kg | R | Rejected |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |
| R | Rejected | | | | | | | |
| U | Blank Exceedance | | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 04/15/2013** |
| **Verified By/Date Verified: Angela Roddy 05/03/2013** | **Sample End Date: 04/19/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | YMW-17-SS-A | 4/15/2013 | B13041473 | B13041473-001 |
| 2 | Soil | YMW-17-SS-A-Sieved | 4/15/2013 | B13041473 | B13041473-002 |
| 3 | Soil | YMW-17-SS-B | 4/15/2013 | B13041473 | B13041473-003 |
| 4 | Soil | YMW-17-SS-B-Sieved | 4/15/2013 | B13041473 | B13041473-004 |
| 5 | Soil | YMW-17-SS-C | 4/15/2013 | B13041473 | B13041473-005 |
| 6 | Soil | YMW-17-SS-C-Sieved | 4/15/2013 | B13041473 | B13041473-006 |
| 7 | Soil | YMW-17-SB-A | 4/15/2013 | B13041473 | B13041473-007 |
| 8 | Soil | YMW-17-SB-B | 4/15/2013 | B13041473 | B13041473-008 |
| 9 | Soil | YMW-22-SS-A | 4/17/2013 | B13041474 | B13041473-009 |
| 10 | Soil | YMW-22-SS-A-Sieved | 4/17/2013 | B13041473 | B13041473-010 |
| 11 | Soil | YMW-22-SS-B | 4/17/2013 | B13041473 | B13041473-011 |
| 12 | Soil | YMW-22-SS-B-Sieved | 4/17/2013 | B13041473 | B13041473-012 |
| 13 | Soil | YMW-22-SS-C | 4/17/2013 | B13041473 | B13041473-013 |
| 14 | Soil | YMW-22-SS-C-Sieved | 4/17/2013 | B13041473 | B13041473-014 |
| 15 | Soil | YMW-22-SB-A | 4/17/2013 | B13041473 | B13041473-015 |
| 16 | Soil | YMW-23-SS-A | 4/17/2013 | B13041473 | B13041473-016 |
| 17 | Soil | YMW-23-SS-A-Sieved | 4/17/2013 | B13041473 | B13041473-017 |
| 18 | Soil | YMW-23-SS-B | 4/17/2013 | B13041473 | B13041473-018 |
| 19 | Soil | YMW-23-SS-B-Sieved | 4/17/2013 | B13041473 | B13041473-019 |
| 20 | Soil | YMW-23-SS-C | 4/17/2013 | B13041473 | B13041473-020 |
| 21 | Soil | YMW-23-SS-C-Sieved | 4/17/2013 | B13041473 | B13041473-021 |
| 22 | Soil | YMW-23-SB-A | 4/17/2013 | B13041473 | B13041473-022 |
| 23 | Water-Rinsate Blank | YOSD-1304-102 | 4/19/2013 | B13041579 | B13041579-001 |
| 24 | Water-Trip Blank | TB032813BTSSHP0262 | 4/19/2013 | B13041579 | B13041579-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C(to include Tetraethyllead); Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13041473 and B13041579*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| B | The analyte was detected in the method blank. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Diluted out |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Cooler 1 arrived with a temperature of 0.6°C. Cooler 2 arrived with a temperature of 1.6°C. Cooler 3 arrived with a temperature of 3.4 °C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: Fractionations and PAHs were added to the samples YMW-22-SB-A, YMW-23-SS-B, YMW-23-SS-C, and YMW-23-SB-A per phone call with Kris Adler on 4/23/2013. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Chromium (Method SW6010B) was detected in Method Blank MB-70740. The associated soil samples do not require a qualification because Chromium detections were >10x the method blank reporting limit. Water: Arsenic, Cadmium, Chromium, and Lead (Method E200.8) were detected in Method Blank MB-70702. The associated water sample does not require a qualification because the analytes were non-detected. 2-Methylnaphthalene, Acenaphthylene, and Naphthalene (Method SW8270C) were detected in Method Blank MB-70949-70792-70657. The laboratory flagged these analytes with a "B" for the associated water sample. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnaphthalene, Acenaphthylene, and Naphthalene (Method SW8270C) were detected in water Rinsate blank YOSD-1304-102. It was flagged with a laboratory qualifier of "B". A validation qualifier "U" was placed on these analytes for the associated raw samples that detections <5x the reporting limits, as well as the Rinsate blank itself. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Sample YMW-17-SB-A was flagged with laboratory qualifier "O" for the % recovery of the EPH surrogates 1-Chloro-octadecane and o-Terphenyl (Method MA-EPH) being diluted out. No validation qualifier was necessary because the surrogates in the LCS were within limits for this same method. Samples YMW-22-SS-B and YMW-22-SS-C were flagged with laboratory qualifier "S" for the % recovery of the VOC surrogate p-Bromofluorobenzene (Method SW8260B) was below control limits. Also, sample YMW-22-SS-C was flagged with laboratory qualifier "S" for the % recovery of VOC surrogate Toluene-d8 (Method SW8260B) being below control limits. No validation qualifier was necessary because three of the four surrogates for this method were within limits. Sample YMW-22-SB-A was flagged with laboratory qualifier "O" for the % recovery of the surrogates VPH Aromatics and VPH Aliphatics (Method MA-VPH) being diluted out. No validation qualifier was necessary because the surrogates in the LCS were within limits for this same method. Also, sample YMW-22-SB-A was flagged with laboratory qualifier "S" for the % recovery of the EPH surrogate o-Terphenyl (Method SW8015M) being above control limits. A validation qualifier was not necessary because this method is a screen. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: Water: LCS_042313 was flagged with laboratory qualifier "S" for analyte 1,1,2,2-Tetrachloroethane (Method SW8260B) for the % recovery being outside of control limits. No validation qualifier was necessary because the raw samples were nondetect for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC matrix spike B13041473-005AMS was flagged with laboratory qualifier "S" for the % recovery of the analyte Total Extractable Hydrocarbons (Method SW8015M). A validation qualifier was not necessary because the LCS was within limits for this analyte. Water: QC matrix spike B13041579-001D_MS and matrix spike duplicate B13041579-001D_MSD were flagged with laboratory qualifier "S" for the % recovery of the analytes 2-Chlorethyl vinyl ether and 1,1,2,2-Tetrachlorethane (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw water samples were nondetect for these analytes. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits as required by the QAAP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not submitted with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.
- In the event a surrogate is diluted out, a laboratory qualifier “O” is placed on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1304-102 | Water | B13041579-001 | SW8270C | 2-Methylnaphthalene | 0.36 | ug/L | U | |
| YOSD-1304-102 | Water | B13041579-001 | SW8270C | Acenaphthylene | 0.21 | ug/L | U | |
| YOSD-1304-102 | Water | B13041579-001 | SW8270C | Napthalene | 0.50 | ug/L | U | |
| YMW-17-SS-A | Soil | B13041473-001 | SW8270C | 2-Methylnaphthalene | 0.0099 | mg/kg | U | |
| YMW-17-SS-C | Soil | B13041473-005 | SW8270C | 2-Methylnaphthalene | 0.021 | mg/kg | U | |
| YMW-23-SB-A | Soil | B13041473-022 | SW8270C | 2-Methylnaphthalene | 0.011 | mg/kg | U | |
| YMW-23-SS-C | Soil | B13041473-020 | SW8270C | 2-Methylnaphthalene | 0.0099 | mg/kg | U | |
| YMW-17-SS-A | Soil | B13041473-001 | SW8270C | Acenaphthylene | 0.014 | mg/kg | U | |
| YMW-17-SS-C | Soil | B13041473-005 | SW8270C | Napthalene | 0.017 | mg/kg | U | |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 04/18/2013** |
| **Verified By/Date Verified: Angela Roddy 06/07/2013** | **Sample End Date: 04/19/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | YMW-10-SS-A | 4/18/2013 | B13041580 | B13041580-001 |
| 2 | Soil | YMW-10-SS-A-Sieved | 4/18/2013 | B13041580 | B13041580-002 |
| 3 | Soil | YMW-10-SS-B | 4/18/2013 | B13041580 | B13041580-003 |
| 4 | Soil | YMW-10-SS-B-Sieved | 4/18/2013 | B13041580 | B13041580-004 |
| 5 | Soil | YMW-10-SS-C | 4/18/2013 | B13041580 | B13041580-005 |
| 6 | Soil | YMW-10-SS-C-Sieved | 4/18/2013 | B13041580 | B13041580-006 |
| 7 | Soil | YMW-10-SB-A | 4/18/2013 | B13041580 | B13041580-007 |
| 8 | Soil | YMW-15-SS-A | 4/18/2013 | B13041580 | B13041580-008 |
| 9 | Soil | YMW-15-SS-A-Sieved | 4/18/2013 | B13041580 | B13041580-009 |
| 10 | Soil | YMW-15-SS-B | 4/18/2013 | B13041580 | B13041580-010 |
| 11 | Soil | YMW-15-SS-B-Sieved | 4/18/2013 | B13041580 | B13041580-011 |
| 12 | Soil | YMW-15-SS-C | 4/18/2013 | B13041580 | B13041580-012 |
| 13 | Soil | YMW-15-SS-C-Sieved | 4/18/2013 | B13041580 | B13041580-013 |
| 14 | Soil | YMW-15-SB-A | 4/18/2013 | B13041580 | B13041580-014 |
| 15 | Soil | YMW-20-SS-A | 4/18/2013 | B13041580 | B13041580-015 |
| 16 | Soil | YMW-20-SS-A-Sieved | 4/18/2013 | B13041580 | B13041580-016 |
| 17 | Soil | YMW-20-SS-B | 4/18/2013 | B13041580 | B13041580-017 |
| 18 | Soil | YMW-20-SS-B-Sieved | 4/18/2013 | B13041580 | B13041580-018 |
| 19 | Soil | YMW-20-SS-C | 4/18/2013 | B13041580 | B13041580-019 |
| 20 | Soil | YMW-20-SS-C-Sieved | 4/18/2013 | B13041580 | B13041580-020 |
| 21 | Soil | YMW-20-SS-CD | 4/18/2013 | B13041580 | B13041580-021 |
| 22 | Soil | YMW-20-SS-CD-Sieved | 4/18/2013 | B13041580 | B13041580-022 |
| 23 | Soil | YMW-20-SB-A | 4/19/2013 | B13041580 | B13041580-023 |
| 24 | Soil | YMW-20-SB-B | 4/19/2013 | B13041580 | B13041580-024 |
| 25 | Soil | YMW-21-SS-A | 4/19/2013 | B13041580 | B13041580-025 |
| 26 | Soil | YMW-21-SS-A-Sieved | 4/19/2013 | B13041580 | B13041580-026 |
| 27 | Soil | YMW-21-SS-B | 4/19/2013 | B13041580 | B13041580-027 |
| 28 | Soil | YMW-21-SS-B-Sieved | 4/19/2013 | B13041580 | B13041580-028 |
| 29 | Soil | YMW-21-SS-C | 4/19/2013 | B13041580 | B13041580-029 |
| 30 | Soil | YMW-21-SS-C-Sieved | 4/19/2013 | B13041580 | B13041580-030 |
| 31 | Soil | YMW-21-SB-A | 4/19/2013 | B13041580 | B13041580-031 |
| 32 | Water-Rinsate Blank | YOSD-1304-102 | 4/19/2013 | B13041579 | B13041579-001 |
| 33 | Water-Trip Blank | TB032813BTSSHP0262 | 4/19/2013 | B13041579 | B13041579-002 |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C(to include Tetraethyllead); Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13041580 and B13041579*

| **PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT** | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| COMPLIANCE ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated. |
| B | The analyte was detected in the method blank. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Cooler 1 arrived with a temperature of 2.0°C. Cooler 2 arrived with a temperature of 1.2°C. Cooler 3 arrived with a temperature of 3.4 °C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: Fractionations and PAHs were added to the samples YMW-20-SS-C and YMW-20-SS-CD per instructions from the client. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B) was detected in Method Blanks MB-70858 and MB-70859. The associated soil samples do not require a qualification because Barium detections were >10x the method blank reporting limit. 2-Methylnapthalene (SW8270C) was detected in Method Blank MB-70788 and the associated raw samples were flagged with laboratory qualifier "B". The same samples are flagged with validation qualifier "U" for Blank exceedance. Water: Arsenic, Cadmium, Chromium, and Lead (Method E200.8) were detected in Method Blank MB-70702. The associated water sample does not require a qualification because the analytes were non-detected. 2-Methylnaphthalene, Acenaphthylene, and Naphthalene (Method SW8270C) were detected in Method Blank MB-70949-70792-70657. The laboratory flagged these analytes with a "B" for the associated water sample. A laboratory qualifier "U" was placed on these analytes for the water Rinsate blank YOSD-1304-102. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnaphthalene, Acenaphthylene, and Naphthalene (Method SW8270C) were detected in water Rinsate blank YOSD-1304-102. It was flagged with a laboratory qualifier of "B". A validation qualifier "U" was placed on these analytes with values <5x the reporting limit, as well as the Rinsate Blank. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Samples YMW-15-SB-A, YMW-21-SB-A, and YMW-20-SB-A were flagged with laboratory qualifier "S" for the surrogates VPH Aliphatics and VPH Aromatics (Method MA-VPH) % percent recovery being above control limits. Samples YMW-15-SB-A and YMW-21-SB-A were flagged with laboratory qualifier "J" for detected VPH analytes, indicating high bias. Sample YMW-20-SB-A was not flagged with a validation qualifier because the % recoveries were just below control limits. Sample YMW-15-SS-C was also flagged with laboratory qualifier "S" for the surrogate VPH Aliphatics, however was not flagged with a validation qualifier because two other surrogates were within limits. Samples YMW-21-SS-B and YMW-21-SB-A were flagged with laboratory qualifier "S" for the surrogate o-Terphenyl (Methods SW8270C and MA-EPH) being below control limits. No validation qualifier was necessary because other surrogates were within limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: Water: LCS_042313 was flagged with laboratory qualifier "S" for analyte 1,1,2,2-Tetrachloroethane (Method SW8260B) for the % recovery being outside of control limits. No validation qualifier was necessary because the raw samples were nondetect for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Soil: Lab QC Matrix spike B1304158-012AMS3 was flagged with laboratory qualifier "S" for the analytes Barium, Arsenic, and Selenium (Method SW6010B/SW6020) % recovery being outside of control limits. As well, the Matrix spike duplicate B1304158-012AMSD was flagged with laboratory qualifier "S" for the analytes Barium, Lead, Arsenic, and Selenium (Method SW6010B/SW6020) % recovery being outside of control limits. No validation qualifier was necessary because the post distillation MS/MSD was within control limits for all analytes. Water: QC matrix spike B13041579-001D_MS and matrix spike duplicate B13041579-001D_MSD were flagged with laboratory qualifier "S" for the % recovery of the analytes 2-Chlorethyl vinyl ether and 1,1,2,2-Tetrachlorethane (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw water samples were nondetect for these analytes. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits as required by the QAAP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample YMW-20-SS-C and its duplicate YMW-20-SS-CD were flagged with validation qualifier "J" for RPDs being outside of control limits for the following analytes: Phenanthrene (59%) (Method SW8270C); Barium (53%) and Lead (67%) (Method SW6010B); and Moisture (45%) (Method SW3550A). For all raw samples these analytes are flagged with a validation qualifier "J" for QC exceedance. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1304-102 | Water | B13041579-001 | SW8270C | 2-Methylnaphthalene | 0.36 | ug/L | U | |
| YOSD-1304-102 | Water | B13041579-001 | SW8270C | Acenaphthylene | 0.21 | ug/L | U | |
| YOSD-1304-102 | Water | B13041579-001 | SW8270C | Napthalene | 0.50 | ug/L | U | |
| YMW-10-SB-A | Soil | B13041580-007 | SW6010B | Lead | 43 | mg/kg | J | RPD |
| YMW-10-SS-A | Soil | B13041580-001 | SW6010B | Lead | 78 | mg/kg | J | RPD |
| YMW-10-SS-B | Soil | B13041580-003 | SW6010B | Lead | 74 | mg/kg | J | RPD |
| YMW-10-SS-C | Soil | B13041580-005 | SW6010B | Lead | 65 | mg/kg | J | RPD |
| YMW-15-SB-A | Soil | B13041580-014 | SW6010B | Lead | 20 | mg/kg | J | RPD |
| YMW-15-SS-A | Soil | B13041580-008 | SW6010B | Lead | 11 | mg/kg | J | RPD |
| YMW-15-SS-B | Soil | B13041580-010 | SW6010B | Lead | 80 | mg/kg | J | RPD |
| YMW-15-SS-C | Soil | B13041580-012 | SW6010B | Lead | 68 | mg/kg | J | RPD |
| YMW-20-SB-A | Soil | B13041580-023 | SW6010B | Lead | 81 | mg/kg | J | RPD |
| YMW-20-SB-B | Soil | B13041580-024 | SW6010B | Lead | 22 | mg/kg | J | RPD |
| YMW-20-SS-A | Soil | B13041580-015 | SW6010B | Lead | 15 | mg/kg | J | RPD |
| YMW-20-SS-B | Soil | B13041580-017 | SW6010B | Lead | 18 | mg/kg | J | RPD |
| YMW-20-SS-C | Soil | B13041580-019 | SW6010B | Lead | 143 | mg/kg | J | RPD |
| YMW-20-SS-CD | Soil | B13041580-021 | SW6010B | Lead | 289 | mg/kg | J | RPD |
| YMW-21-SB-A | Soil | B13041580-031 | SW6010B | Lead | 19300 | mg/kg | J | RPD |
| YMW-21-SS-A | Soil | B13041580-025 | SW6010B | Lead | 26700 | mg/kg | J | RPD |
| YMW-21-SS-B | Soil | B13041580-027 | SW6010B | Lead | 23600 | mg/kg | J | RPD |
| YMW-21-SS-C | Soil | B13041580-029 | SW6010B | Lead | 13000 | mg/kg | J | RPD |
| YMW-10-SB-A | Soil | B13041580-007 | SW6010B | Barium | 178 | mg/kg | J | RPD |
| YMW-10-SS-A | Soil | B13041580-001 | SW6010B | Barium | 235 | mg/kg | J | RPD |
| YMW-10-SS-B | Soil | B13041580-003 | SW6010B | Barium | 269 | mg/kg | J | RPD |
| YMW-10-SS-C | Soil | B13041580-005 | SW6010B | Barium | 201 | mg/kg | J | RPD |
| YMW-15-SB-A | Soil | B13041580-014 | SW6010B | Barium | 155 | mg/kg | J | RPD |
| YMW-15-SS-A | Soil | B13041580-008 | SW6010B | Barium | 148 | mg/kg | J | RPD |
| YMW-15-SS-B | Soil | B13041580-010 | SW6010B | Barium | 127 | mg/kg | J | RPD |
| YMW-15-SS-C | Soil | B13041580-012 | SW6010B | Barium | 154 | mg/kg | J | RPD |
| YMW-20-SB-A | Soil | B13041580-023 | SW6010B | Barium | 158 | mg/kg | J | RPD |
| YMW-20-SB-B | Soil | B13041580-024 | SW6010B | Barium | 127 | mg/kg | J | RPD |
| YMW-20-SS-A | Soil | B13041580-015 | SW6010B | Barium | 168 | mg/kg | J | RPD |
| YMW-20-SS-B | Soil | B13041580-017 | SW6010B | Barium | 159 | mg/kg | J | RPD |
| YMW-20-SS-C | Soil | B13041580-019 | SW6010B | Barium | 220 | mg/kg | J | RPD |
| YMW-20-SS-CD | Soil | B13041580-021 | SW6010B | Barium | 379 | mg/kg | J | RPD |
| YMW-21-SB-A | Soil | B13041580-031 | SW6010B | Barium | 165 | mg/kg | J | RPD |
| YMW-21-SS-A | Soil | B13041580-025 | SW6010B | Barium | 246 | mg/kg | J | RPD |
| YMW-21-SS-B | Soil | B13041580-027 | SW6010B | Barium | 219 | mg/kg | J | RPD |
| YMW-21-SS-C | Soil | B13041580-029 | SW6010B | Barium | 198 | mg/kg | J | RPD |
| YMW-10-SB-A | Soil | B13041580-007 | SW3550A | MOISTURE % BY WT. | 5.2 | % | J | RPD |
| YMW-10-SS-A | Soil | B13041580-001 | SW3550A | MOISTURE % BY WT. | 6.3 | % | J | RPD |
| YMW-10-SS-B | Soil | B13041580-003 | SW3550A | MOISTURE % BY WT. | 20 | % | J | RPD |
| YMW-10-SS-C | Soil | B13041580-005 | SW3550A | MOISTURE % BY WT. | 6.8 | % | J | RPD |
| YMW-15-SB-A | Soil | B13041580-014 | SW3550A | MOISTURE % BY WT. | 20 | % | J | RPD |
| YMW-15-SS-A | Soil | B13041580-008 | SW3550A | MOISTURE % BY WT. | 17 | % | J | RPD |
| YMW-15-SS-B | Soil | B13041580-010 | SW3550A | MOISTURE % BY WT. | 9.6 | % | J | RPD |
| YMW-15-SS-C | Soil | B13041580-012 | SW3550A | MOISTURE % BY WT. | 17 | % | J | RPD |
| YMW-20-SB-A | Soil | B13041580-023 | SW3550A | MOISTURE % BY WT. | 25 | % | J | RPD |
| YMW-20-SB-B | Soil | B13041580-024 | SW3550A | MOISTURE % BY WT. | 22 | % | J | RPD |
| YMW-20-SS-A | Soil | B13041580-015 | SW3550A | MOISTURE % BY WT. | 15 | % | J | RPD |
| YMW-20-SS-B | Soil | B13041580-017 | SW3550A | MOISTURE % BY WT. | 17 | % | J | RPD |
| YMW-20-SS-C | Soil | B13041580-019 | SW3550A | MOISTURE % BY WT. | 30 | % | J | RPD |
| YMW-20-SS-CD | Soil | B13041580-021 | SW3550A | MOISTURE % BY WT. | 19 | % | J | RPD |
| YMW-21-SB-A | Soil | B13041580-031 | SW3550A | MOISTURE % BY WT. | 33 | % | J | RPD |
| YMW-21-SS-A | Soil | B13041580-025 | SW3550A | MOISTURE % BY WT. | 26 | % | J | RPD |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| YMW-21-SS-B | Soil | B13041580-027 | SW3550A | MOISTURE % BY WT. | 13 | % | J | RPD |
| YMW-21-SS-C | Soil | B13041580-029 | SW3550A | MOISTURE % BY WT. | 13 | % | J | RPD |
| YMW-10-SB-A | Soil | B13041580-007 | SW8270C | Phenanthrene | <0.0035 | mg/kg | J | RPD |
| YMW-10-SS-A | Soil | B13041580-001 | SW8270C | Phenanthrene | 0.0078 | mg/kg | J | RPD |
| YMW-10-SS-B | Soil | B13041580-003 | SW8270C | Phenanthrene | <0.0042 | mg/kg | J | RPD |
| YMW-10-SS-C | Soil | B13041580-005 | SW8270C | Phenanthrene | 0.011 | mg/kg | J | RPD |
| YMW-15-SB-A | Soil | B13041580-014 | SW8270C | Phenanthrene | 0.099 | mg/kg | J | RPD |
| YMW-15-SS-A | Soil | B13041580-008 | SW8270C | Phenanthrene | <0.0040 | mg/kg | J | RPD |
| YMW-15-SS-B | Soil | B13041580-010 | SW8270C | Phenanthrene | <0.0037 | mg/kg | J | RPD |
| YMW-15-SS-C | Soil | B13041580-012 | SW8270C | Phenanthrene | 0.0058 | mg/kg | J | RPD |
| YMW-20-SS-C | Soil | B13041580-019 | SW8270C | Phenanthrene | 0.12 | mg/kg | J | RPD |
| YMW-20-SS-CD | Soil | B13041580-021 | SW8270C | Phenanthrene | 0.22 | mg/kg | J | RPD |
| YMW-21-SB-A | Soil | B13041580-031 | SW8270C | Phenanthrene | 9.7 | mg/kg | J | RPD |
| YMW-21-SS-A | Soil | B13041580-025 | SW8270C | Phenanthrene | <0.018 | mg/kg | J | RPD |
| YMW-21-SS-B | Soil | B13041580-027 | SW8270C | Phenanthrene | <0.015 | mg/kg | J | RPD |
| YMW-21-SS-C | Soil | B13041580-029 | SW8270C | Phenanthrene | <0.023 | mg/kg | J | RPD |
| YMW-15-SB-A | Soil | B13041580-014 | MA-VPH | Benzene | 23 | mg/kg | J | High Bias |
| YMW-15-SB-A | Soil | B13041580-014 | MA-VPH | Ethylbenzene | 205 | mg/kg | J | High Bias |
| YMW-15-SB-A | Soil | B13041580-014 | MA-VPH | m+p-Xylenes | 406 | mg/kg | J | High Bias |
| YMW-15-SB-A | Soil | B13041580-014 | MA-VPH | Xylenes, Total | 406 | mg/kg | J | High Bias |
| YMW-15-SB-A | Soil | B13041580-014 | MA-VPH | C9 to C10 Aromatics | 4350 | mg/kg | J | High Bias |
| YMW-15-SB-A | Soil | B13041580-014 | MA-VPH | C5 to C8 Aliphatics | 8110 | mg/kg | J | High Bias |
| YMW-15-SB-A | Soil | B13041580-014 | MA-VPH | C9 to C12 Aliphatics | 8370 | mg/kg | J | High Bias |
| YMW-15-SB-A | Soil | B13041580-014 | MA-VPH | Total Purgeable Hydrocarbons | 18500 | mg/kg | J | High Bias |
| YMW-21-SB-A | Soil | B13041580-031 | MA-VPH | m+p-Xylenes | 67 | mg/kg | J | High Bias |
| YMW-21-SB-A | Soil | B13041580-031 | MA-VPH | o-Xylene | 27 | mg/kg | J | High Bias |
| YMW-21-SB-A | Soil | B13041580-031 | MA-VPH | Xylenes, Total | 94 | mg/kg | J | High Bias |
| YMW-21-SB-A | Soil | B13041580-031 | MA-VPH | C9 to C10 Aromatics | 4480 | mg/kg | J | High Bias |
| YMW-21-SB-A | Soil | B13041580-031 | MA-VPH | C5 to C8 Aliphatics | 3850 | mg/kg | J | High Bias |
| YMW-21-SB-A | Soil | B13041580-031 | MA-VPH | C9 to C12 Aliphatics | 7250 | mg/kg | J | High Bias |
| YMW-21-SB-A | Soil | B13041580-031 | MA-VPH | Total Purgeable Hydrocarbons | 17400 | mg/kg | J | High Bias |
| YMW-15-SS-C | Soil | B13041580-012 | SW8270C | 2-Methylnaphthalene | 0.047 | mg/kg | U | |
| YMW-15-SS-C | Soil | B13041580-012 | SW8270C | Naphthalene | 0.032 | mg/kg | U | |

| Validation Qualifer Definitions: | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 04/23/2013** |
| **Verified By/Date Verified: Angela Roddy 06/10/2013** | **Sample End Date: 04/24/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | YMW-18-SS-A | 4/23/2013 | B13041825 | B13041825-001 |
| 2 | Soil | YMW-18-SS-A-Sieved | 4/23/2013 | B13041825 | B13041825-002 |
| 3 | Soil | YMW-18-SS-B | 4/23/2013 | B13041825 | B13041825-003 |
| 4 | Soil | YMW-18-SS-B-Sieved | 4/23/2013 | B13041825 | B13041825-004 |
| 5 | Soil | YMW-18-SS-C | 4/23/2013 | B13041825 | B13041825-005 |
| 6 | Soil | YMW-18-SS-C-Sieved | 4/23/2013 | B13041825 | B13041825-006 |
| 7 | Soil | YMW-18-SB-A | 4/23/2013 | B13041825 | B13041825-007 |
| 8 | Soil | YMW-18-SB-B | 4/23/2013 | B13041825 | B13041825-008 |
| 9 | Soil | YMW-19-SS-A | 4/23/2013 | B13041825 | B13041825-009 |
| 10 | Soil | YMW-19-SS-A-Sieved | 4/23/2013 | B13041825 | B13041825-010 |
| 11 | Soil | YMW-19-SS-B | 4/23/2013 | B13041825 | B13041825-011 |
| 12 | Soil | YMW-19-SS-B-Sieved | 4/23/2013 | B13041825 | B13041825-012 |
| 13 | Soil | YMW-19-SS-C | 4/23/2013 | B13041825 | B13041825-013 |
| 14 | Soil | YMW-19-SS-C-Sieved | 4/23/2013 | B13041825 | B13041825-014 |
| 15 | Soil | YMW-19-SB-A | 4/23/2013 | B13041825 | B13041825-015 |
| 16 | Soil | YMW-19-SB-AD | 4/23/2013 | B13041825 | B13041825-016 |
| 17 | Soil | YMW-10-SB-B | 4/23/2013 | B13041825 | B13041825-017 |
| 18 | Soil | YMW-10-SB-C | 4/23/2013 | B13041825 | B13041825-018 |
| 19 | Soil | YMW-11-SB-C | 4/24/2013 | B13041825 | B13041825-019 |
| 20 | Water-Rinsate Blank | YOSD-1304-103 | 4/23/2013 | B13041822 | B13041822-001 |
| 21 | Water-Potable | YOSD-1304-POT | 4/24/2013 | B13041822 | B13041822-002 |
| 22 | Water-Trip Blank | TB031913BTSSHP0262 | 4/23/2013 | B13041822 | B13041822-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13041825 and B13041822*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Cooler 1 arrived with a temperature of 0.2°C. Cooler 2 arrived with a temperature of 1.0°C. Cooler 3 arrived with a temperature of 0.5°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium, Cadmium, and Lead (Method SW6010B) were detected in Method Blank MB-70893. Also, Mercury (Method SW7471A) was detected in Method Blank MB-70931. The associated soil samples do not require a qualification because these analyte detections were either >10x the method blank reporting limit or non-detect. Water: Cadmium, Chromium, and Lead (Method E200.8) were detected in Method Blank MB-70772. The associated water samples do not require a qualification because the analytes were non-detected. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C) was detected in water Rinsate blank YOSD-1304-103. A validation qualifier "U" was placed on this analyte. No validation qualifier was necessary for raw soil samples because the samples that were positive for Naphthalene had levels that were >5x the reporting limit for this analyte. Toluene (SW8260B) was detected in Trip Blank #031913 B-TS SHP0262 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Samples YMW-18-SS-C, YMW-18-SB-A, and YMW-18-SB-B were flagged with laboratory qualifier "S" for the surrogate Nitrobenzene-d5 (Method SW8270C) % percent recovery being above control limits. A validation qualifier was not necessary because two other surrogates were within limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: Water: LCS_042613 was flagged with laboratory qualifier "S" for analyte Bromomethane (Method SW8260B) for the % recovery being outside of control limits. No validation qualifier was necessary because the LCS was rerun, and this analyte was within limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Lab QC Matrix spike B13042064-001AMS3 and Matrix Spike duplicate B13042064-001AMSD were flagged with laboratory qualifier "S" for the analyte Selenium (Method SW6010B/SW6020) % recovery being outside of control limits. Lab QC Matrix Spike B13042003-002AMS3 and Matrix Spike Duplicate B13042003-002AMSD3 were flagged with laboratory qualifier "S" for the analyte Mercury (Method SW7471A) % recovery being outside of control limits. No validation qualifier was necessary because the post distillation MS/MSD was within control limits for both analytes. Water: QC matrix spike B13041739-001A_MS and matrix spike duplicate B13041739-001A_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chloroethyl vinyl ether and Bromomethane (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw water samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits as required by the QAAP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: The blind field duplicate RPD results were all within control limits. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1304-103 | Water | B13041822-001 | SW8270C | Napthalene | 0.22 | ug/L | U | |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 04/24/2013** |
| **Verified By/Date Verified: Angela Roddy 06/11/2013** | **Sample End Date: 05/01/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 10-SB-A | 4/24/2013 | B13042041 | B13042041-001 |
| 2 | Soil | 20-SB-A | 4/24/2013 | B13042041 | B13042041-002 |
| 3 | Soil | 20-SB-B | 4/24/2013 | B13042041 | B13042041-003 |
| 4 | Soil | 51-SB-A | 4/24/2013 | B13042041 | B13042041-004 |
| 5 | Soil | 48-SB-A | 4/25/2013 | B13042041 | B13042041-005 |
| 6 | Soil | 48-SB-B | 4/25/2013 | B13042041 | B13042041-006 |
| 7 | Soil | 48-SB-C | 4/25/2013 | B13042041 | B13042041-007 |
| 8 | Soil | 48-SB-CD | 4/25/2013 | B13042041 | B13042041-008 |
| 9 | Soil | 49-SB-A | 4/25/2013 | B13042041 | B13042041-009 |
| 10 | Soil | 50-SB-A | 4/25/2013 | B13042041 | B13042041-010 |
| 11 | Water-Rinsate Blank | YOSD-1304-104 | 4/29/2013 | B13050107 | B13050107-001 |
| 12 | Water-Rinsate Blank | YOSD-1305-101 | 5/1/2013 | B13050107 | B13050107-002 |
| 13 | Water-Trip Blank | TB032813BTSSHP0262 | 4/29/2013 | B13050107 | B13050107-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13042041 and B13050107*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Cooler 1 arrived with a temperature of 5.4°C. Cooler 2 arrived with a temperature of 3.2°C. Cooler 3 arrived with a temperature of 0.4°C. Cooler 4 arrived with a temperature of 0.6°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B) was detected in Method Blank MB-70960. Also, Selenium (Method SW6020) was detected in Method Blank MB-70960. The associated soil samples do not require a qualification because these analyte detections were either >10x the method blank reporting limit or non-detect. Water: Chromium (Method E200.8) was detected in Method Blank MB-70946. The associated raw samples do not require a qualification because the analytes were non-detect for Chromium. Mercury (Method E245.1) was detected in Method Blank MB-70943. The associated raw samples do not require a qualification because the analytes were non-detect for Mercury. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnaphthalene and Naphthalene (Method SW8270C) were detected in water Rinsate blank YOSD-1305-101 and YOSD-1304-104. A validation qualifier "U" was placed on raw samples with values <5x the reporting limit, as well as the Rinsate Blank. 2-Methylnaphthalene and Naphthalene (Method SW8270C), Lead (Method E200.8), and Chloroform (SW8260B) were detected in Rinsate Blank YOSD-1304-104. A validation qualifier "U" was on raw soil with values <5x the reporting limit for organics and <10x the reporting limit for inorganics, as well as the Rinsate Blank. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 49-SB-A was flagged with laboratory qualifier "S" for the surrogates Nitrobenzene-d5 and 2-Fluorobiphenyl (Method SW8270C) % percent recovery being above control limits. A validation qualifier "J" was placed on all analytes detected for this method, indicating high bias. As well for this sample, o-Terphenyl (Methods SW8015M and MA-EPH) was flagged for % recovery being outside of control limits. A validation qualifier was not necessary because two other surrogates were within limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS_70850 was flagged with laboratory qualifier "S" for analyte n-Pentane (Method MA-VPH) for the % recovery being outside of control limits. No validation qualifier was necessary because this analyte was not requested for testing on raw samples. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC Matrix spike duplicate B13050085-001AMSD was flagged with laboratory qualifier "S" for the analyte Cadmium (Method SW6010B) % recovery being outside of control limits. No validation qualifier was necessary because the post distillation spike was within limits for this analyte. Lab QC Matrix Spike B13050255-002AMS and Matrix Spike Duplicate B13050255-002AMSD were flagged with laboratory qualifier "S" for the majority of analytes for the Method SW8270C % recovery being outside of control limits. No validation qualifier was necessary because the MS/MSD were rerun and were within control limits. Also, a note from the analyst stated normal QC limits may not be achievable at this dilution level 10 times. Water: QC matrix spike B13050107-001D_MS and matrix spike duplicate B13050107-001D_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits as required by the QAAP. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: The blind field duplicate RPD results were all within control limits. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1304-104 | Water | B13050107-001 | SW8270C | 2-Methylnaphthalene | 0.32 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | SW8260B | Chloroform | 3.2 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | SW8270C | Naphthalene | 1.2 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | E200.8 | Lead | 0.001 | mg/L | U | |
| YOSD-1305-101 | Water | B13050107-002 | SW8270C | Naphthalene | 1.3 | ug/L | U | |
| YOSD-1305-101 | Water | B13050107-002 | SW8270C | 2-Methylnaphthalene | 0.33 | ug/L | U | |
| 10-SB-A | Soil | B13042041-001 | SW8270C | 2-Methylnaphthalene | 0.013 | mg/kg | U | |
| 10-SB-A | Soil | B13042041-001 | SW6010B | Lead | 7 | mg/kg | U | |
| 48-SB-B | Soil | B13042041-006 | SW6010B | Lead | 7 | mg/kg | U | |
| 48-SB-C | Soil | B13042041-007 | SW6010B | Lead | 8 | mg/kg | U | |
| 48-SB-CD | Soil | B13042041-008 | SW6010B | Lead | 9 | mg/kg | U | |
| 49-SB-A | Soil | B13042041-009 | SW8270C | 2-Methylnaphthalene | 16 | mg/kg | J | High Bias |
| 49-SB-A | Soil | B13042041-009 | SW8270C | Acenaphthene | 0.59 | mg/kg | J | High Bias |
| 49-SB-A | Soil | B13042041-009 | SW8270C | Anthracene | 0.69 | mg/kg | J | High Bias |
| 49-SB-A | Soil | B13042041-009 | SW8270C | Benzo(a)anthracene | 0.27 | mg/kg | J | High Bias |
| 49-SB-A | Soil | B13042041-009 | SW8270C | Chrysene | 0.72 | mg/kg | J | High Bias |
| 49-SB-A | Soil | B13042041-009 | SW8270C | Fluorene | 2.4 | mg/kg | J | High Bias |
| 49-SB-A | Soil | B13042041-009 | SW8270C | Naphthalene | 4.1 | mg/kg | J | High Bias |
| 49-SB-A | Soil | B13042041-009 | SW8270C | Phenanthrene | 5.4 | mg/kg | J | High Bias |
| 49-SB-A | Soil | B13042041-009 | SW8270C | Pyrene | 1.1 | mg/kg | J | High Bias |
| ation Qualifer Definitions: | | | | | | | | |
| J | Exceedance | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 04/25/2013** |
| **Verified By/Date Verified: Angela Roddy 06/12/2013** | **Sample End Date: 05/01/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | YMW-23-SB-B | 4/25/2013 | B13042042 | B13042042-001 |
| 2 | Soil | YMW-23-SB-C | 4/25/2013 | B13042042 | B13042042-002 |
| 3 | Soil | YMW-22-SB-B | 4/25/2013 | B13042042 | B13042042-003 |
| 4 | Soil | YMW-22-SB-C | 4/25/2013 | B13042042 | B13042042-004 |
| 5 | Soil | YMW-20-SB-C | 4/25/2013 | B13042042 | B13042042-005 |
| 6 | Soil | YMW-20-SB-CD | 4/25/2013 | B13042042 | B13042042-006 |
| 7 | Soil | YMW-19-SB-B | 4/26/2013 | B13042042 | B13042042-007 |
| 8 | Soil | YMW-19-SB-C | 4/26/2013 | B13042042 | B13042042-008 |
| 9 | Soil | YMW-13-SB-D | 4/26/2013 | B13042042 | B13042042-009 |
| 10 | Soil | YMW-13-SB-B | 4/26/2013 | B13042042 | B13042042-010 |
| 11 | Soil | YMW-13-SB-C | 4/26/2013 | B13042042 | B13042042-011 |
| 12 | Water-Rinsate Blank | YOSD-1304-104 | 4/29/2013 | B13050107 | B13050107-001 |
| 13 | Water-Rinsate Blank | YOSD-1305-101 | 5/1/2013 | B13050107 | B13050107-002 |
| 14 | Water-Trip Blank | TB032813BTSSHP0262 | 4/29/2013 | B13050107 | B13050107-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13042042 and B13050107*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD exceeds advisory limit. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Cooler 1 arrived with a temperature of 4.6°C. Cooler 2 arrived with a temperature of 0.6°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium, Chromium, and Selenium (Method SW6010B/SW6020) were detected in Method Blank MB-71012. Barium, Lead, and Selenium (Method SW6020) were detected in Method Blank MB-71011. The associated soil samples do not require a qualification because these analyte detections were either >10x the method blank reporting limit or non-detect. Water: Chromium (Method E200.8) was detected in Method Blank MB-70946. The associated raw samples do not require a qualification because the analytes were non-detect for Chromium. Mercury (Method E245.1) was detected in Method Blank MB-70943. The associated raw samples do not require a qualification because the analytes were non-detect for Mercury. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnaphthalene and Naphthalene (Method SW8270C) were detected in water Rinsate blank YOSD-1305-101 and YOSD-1304-104. For the raw samples a validation qualifier was not necessary because values >5x the reporting limit. A validation qualifier "U" was placed in the Rinsate Blank for these analytes. 2-Methylnaphthalene and Naphthalene (Method SW8270C), Lead (Method E200.8), and Chloroform (SW8260B) were detected in Rinsate Blank YOSD-1304-104. A validation qualifier "U" was on raw soil with values <5x the reporting limit for organics and <10x the reporting limit for inorganics, as well as the Rinsate Blank. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Samples YMW-13-SB-D, YMW-13-SB-B, and YMW-13-SB-C were flagged with laboratory qualifier "S" for the surrogates Nitrobenzene-d5 (Method SW8270C) and o-Terphenyl (Method MA-EPH) % percent recovery being above control limits. A validation qualifier was not necessary because each method had two other surrogates that were within control limits. Sample YMW-13-SB-C was also flagged with laboratory qualifier "S" for surrogates Toluene-d8 (Method SW8260B) and VPH Aliphatics, VPH Aromatics (Method MA-VPH) for % recovery being outside of control limits. A validation qualifier was not necessary for the surrogate Toluene-d8 because three other surrogates were within limits. However, a validation qualifier "J" was placed on the detected analytes for Method MA-VPH. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS_70850 was flagged with laboratory qualifier "S" for analyte n-Pentane (Method MA-VPH) for the % recovery being outside of control limits. No validation qualifier was necessary because this analyte was not requested for testing on raw samples. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Lab QC Matrix spike duplicate B13042042-008AMSD was flagged with laboratory qualifier "S" for the analyte Lead (Method SW6020) % recovery being outside of control limits. No validation qualifier was necessary because the post distillation spike was within limits for this analyte. Water: QC matrix spike B13050107-001D_MS and matrix spike duplicate B13050107-001D_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits as required by the QAAP. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: All blind field duplicates were within RPD control limits per the QAPP. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of "A" was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

**Validator Qualified Analytical Results**

| Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag | Comments |
|---|---|---|---|---|---|---|---|---|
| YOSD-1304-104 | Water | B13050107-001 | SW8270C | 2-Methylnaphthalene | 0.32 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | SW8260B | Chloroform | 3.2 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | SW8270C | Naphthalene | 1.2 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | E200.8 | Lead | 0.001 | mg/L | U | |
| YOSD-1305-101 | Water | B13050107-002 | SW8270C | Naphthalene | 1.3 | ug/L | U | |
| YOSD-1305-101 | Water | B13050107-002 | SW8270C | 2-Methylnaphthalene | 0.33 | ug/L | U | |
| YMW-13-SB-B | Soil | B13042042-010 | SW6010B | Lead | 4 | mg/kg | U | |
| YMW-13-SB-C | Soil | B13042042-011 | SW6010B | Lead | 2 | mg/kg | U | |
| YMW-13-SB-D | Soil | B13042042-009 | SW6010B | Lead | 6 | mg/kg | U | |
| YMW-19-SB-B | Soil | B13042042-007 | SW6020 | Lead | 6 | mg/kg | U | |
| YMW-19-SB-C | Soil | B13042042-008 | SW6020 | Lead | 6 | mg/kg | U | |
| YMW-20-SB-C | Soil | B13042042-005 | SW6020 | Lead | 6 | mg/kg | U | |
| YMW-20-SB-CD | Soil | B13042042-006 | SW6020 | Lead | 6 | mg/kg | U | |
| YMW-22-SB-C | Soil | B13042042-004 | SW6020 | Lead | 6 | mg/kg | U | |
| YMW-23-SB-B | Soil | B13042042-001 | SW6020 | Lead | 5 | mg/kg | U | |
| YMW-23-SB-C | Soil | B13042042-002 | SW6010B | Lead | 5 | mg/kg | U | |
| YMW-13-SB-C | Soil | B13042042-011 | MA-VPH | Benzene | 2.5 | mg/kg | J | High Bias |
| YMW-13-SB-C | Soil | B13042042-011 | MA-VPH | C9 to C10 Aromatics | 1120 | mg/kg | J | High Bias |
| YMW-13-SB-C | Soil | B13042042-011 | MA-VPH | C5-C8 Aliphatics | 1260 | mg/kg | J | High Bias |
| YMW-13-SB-C | Soil | B13042042-011 | MA-VPH | C9 to C12 Aliphatics | 3030 | mg/kg | J | High Bias |
| YMW-13-SB-C | Soil | B13042042-011 | MA-VPH | Total Purgeable Hydrocarbons | 4820 | mg/kg | J | High Bias |

| Validation Qualifer Definitions: | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 04/26/2013** |
| **Verified By/Date Verified: Angela Roddy 06/13/2013** | **Sample End Date: 05/01/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | YMW-106-SB-A | 4/26/2013 | B13042075 | B13042075-001 |
| 2 | Soil | YMW-106-SB-B | 4/26/2013 | B13042075 | B13042075-002 |
| 3 | Soil | YMW-106-SB-C | 4/26/2013 | B13042075 | B13042075-003 |
| 4 | Soil | YMW-107-SB-A | 4/26/2013 | B13042075 | B13042075-004 |
| 5 | Soil | YMW-107-SB-B | 4/26/2013 | B13042075 | B13042075-005 |
| 6 | Soil | YMW-107-SB-C | 4/26/2013 | B13042075 | B13042075-006 |
| 7 | Soil | YMW-39-SB-A | 4/26/2013 | B13042075 | B13042075-007 |
| 8 | Water-Rinsate Blank | YOSD-1304-104 | 4/29/2013 | B13050107 | B13050107-001 |
| 9 | Water-Rinsate Blank | YOSD-1305-101 | 5/1/2013 | B13050107 | B13050107-002 |
| 10 | Water-Trip Blank | TB032813BTSSHP0262 | 4/29/2013 | B13050107 | B13050107-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13042075 and B13050107*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Diluted out. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Cooler 1 arrived with a temperature of 0.4°C. Cooler 2 arrived with a temperature of 0.6°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium and Chromium (Method SW6010B) were detected in Method Blank MB-71012. The associated soil samples do not require a qualification because these analyte detections were either >10x the method blank reporting limit or non-detect. Water: Chromium (Method E200.8) was detected in Method Blank MB-70946. The associated raw samples do not require a qualification because the analytes were non-detect for Chromium. Mercury (Method E245.1) was detected in Method Blank MB-70943. The associated raw samples do not require a qualification because the analytes were non-detect for Mercury. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnaphthalene and Naphthalene (Method SW8270C) were detected in water Rinsate blank YOSD-1305-101 and YOSD-1304-104. A validation qualifier "U" was placed on raw samples with values <5x the reporting limit, as well as the Rinsate Blank for these analytes. 2-Methylnaphthalene and Naphthalene (Method SW8270C), Lead (Method E200.8), and Chloroform (SW8260B) were detected in Rinsate Blank YOSD-1304-104. A validation qualifier "U" was on raw soil with values <5x the reporting limit for organics and <10x the reporting limit for inorganics, as well as the Rinsate Blank. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 107-SB-A was flagged with laboratory qualifier "S" for the surrogate Terphenyl-d14 (Method SW8270C) % percent recovery being above control limits. A validation qualifier was not necessary because this sample had two other surrogates that were within control limits. Sample 39-SB-A was flagged with laboratory qualifier "S" for the surrogate 2-Fluorobiphenyl (Method SW8270C) % recovery being above control limits, as well as a laboratory qualifier "O" for the surrogate Nitrobenzene-d5. A validation qualifier "J" was placed on the detected analytes for Method SW8270C, indicating high bias. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS_70894 was flagged with laboratory qualifier "S" for analyte n-Pentane (Method MA-VPH) for the % recovery being outside of control limits. No validation qualifier was necessary because this analyte was not requested for testing on raw samples. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Water: QC matrix spike B13050107-001D_MS and matrix spike duplicate B13050107-001D_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits as required by the QAAP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1304-104 | Water | B13050107-001 | SW8270C | 2-Methylnaphthalene | 0.32 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | SW8260B | Chloroform | 3.2 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | SW8270C | Naphthalene | 1.2 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | E200.8 | Lead | 0.001 | mg/L | U | |
| YOSD-1305-101 | Water | B13050107-002 | SW8270C | Naphthalene | 1.3 | ug/L | U | |
| YOSD-1305-101 | Water | B13050107-002 | SW8270C | 2-Methylnaphthalene | 0.33 | ug/L | U | |
| 107-SB-C | Soil | B13042075-006 | SW8270C | 2-Methylnaphthalene | 0.0052 | mg/kg | U | |
| 39-SB-A | Soil | B13042075-007 | SW8270C | 2-Methylnapthalene | 32 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Acenaphthene | 2.3 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Anthracene | 1.7 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Benzo(a)anthracene | 2.5 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Benzo(a)pyrene | 2.4 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Benzo(b)fluoranthene | 2.5 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Benzo(g,h,i)perylene | 0.8 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Benzo(k)fluoranthene | 0.91 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Chrysene | 2.5 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Fluoranthene | 5.6 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Fluorene | 5 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Indeno(1,2,3-cd)pyrene | 1.4 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Naphthalene | 10 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Phenanthrene | 11 | mg/kg | J | High Bias |
| 39-SB-A | Soil | B13042075-007 | SW8270C | Pyrene | 4.7 | mg/kg | J | High Bias |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 04/29/2013** |
| **Verified By/Date Verified: Angela Roddy 07/09/2013** | **Sample End Date: 05/01/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 14-SB-A | 4/29/2013 | B13050108 | B130050108-001 |
| 2 | Soil | 40-SB-A | 4/29/2013 | B13050108 | B130050108-002 |
| 3 | Soil | 25-SB-A | 4/29/2013 | B13050108 | B130050108-003 |
| 4 | Soil | 25-SB-AD | 4/29/2013 | B13050108 | B130050108-004 |
| 5 | Soil | 43-SB-A | 4/30/2013 | B13050108 | B130050108-005 |
| 6 | Soil | 26-SB-A | 4/30/2013 | B13050108 | B130050108-006 |
| 7 | Soil | 42-SB-A | 4/30/2013 | B13050108 | B130050108-007 |
| 8 | Soil | 27-SB-A | 4/30/2013 | B13050108 | B130050108-008 |
| 9 | Soil | 41-SB-A | 4/30/2013 | B13050108 | B130050108-009 |
| 10 | Soil | 28-SB-A | 4/30/2013 | B13050108 | B130050108-010 |
| 11 | Water-Rinsate Blank | YOSD-1304-104 | 4/29/2013 | B13050107 | B13050107-001 |
| 12 | Water-Rinsate Blank | YOSD-1305-101 | 5/1/2013 | B13050107 | B13050107-002 |
| 13 | Water-Trip Blank | TB032813BTSSHP0262 | 4/29/2013 | B13050107 | B13050107-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C (to include Tetraethyllead); Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13050108 and B13050107*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Diluted out. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Cooler 1 arrived with a temperature of 0.4°C. Cooler 2 arrived with a temperature of 0.6°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Selenium (Method SW6020) was detected in Method Blank MB-71093. The associated soil samples do not require a qualification because these analyte detections were non-detect. Water: Chromium (Method E200.8) was detected in Method Blank MB-70946. The associated raw samples do not require a qualification because the analytes were non-detect for Chromium. Mercury (Method E245.1) was detected in Method Blank MB-70943. The associated raw samples do not require a qualification because the analytes were non-detect for Mercury. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnaphthalene and Naphthalene (Method SW8270C) were detected in water Rinsate blank YOSD-1305-101 and YOSD-1304-104. A validation qualifier "U" was placed on the Rinsate Blank only for these analytes, as raw samples had values >5x the reporting limit. 2-Methylnaphthalene and Naphthalene (Method SW8270C), Lead (Method E200.8), and Chloroform (SW8260B) were detected in Rinsate Blank YOSD-1304-104. A validation qualifier "U" was placed on the Rinsate Blank only, as raw samples had values >5x the reporting limit for organics and >10x the reporting limit for inorganics. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 14-SB-A was flagged with laboratory qualifier "S" for the % recovery of o-Terphenyl (Method SW8270C) being outside of control limits. No validation qualifier was necessary because two other surrogates were within limits. 40-SB-A was flagged with laboratory qualifiers "J, S, and O" for the following surrogate % recovery being above control limits: 2-Fluorobiphenyl, Nitrobenzene-d5, and Terphenyl-d14 (Method SW8270C). A validation qualifier "J" was placed on all detected analytes for the Method SW8270C, indicating high bias. Samples 25-SB-A and 25-SB-AD were flagged with laboratory qualifier "S" for the surrogate recovery of Nitrobenzene-d5 (Method SW8270C) being outside of control limits. No validation qualifier was necessary because two other surrogates were within control limits. Sample 43-SB-A was flagged with laboratory qualifier "S" for the VPH Aliphatics (Method MA-VPH) surrogate recovery outside of control limits. No validation qualifier was necessary because it was one percentage point outside and the other surrogate was within limits. Also, for this same sample the surrogates 2-Fluorobiphenyl, Nitrobenzene-d5, and Terphenyl-d14 (Method SW8270C) were flagged with laboratory qualifiers "J and O", but no validation qualifier was necessary because these qualifiers do not reflect in the values of the related analytes for this method. Sample 26-SB-A was flagged with laboratory qualifier "S" for the % recovery of o-Terphenyl (Method MA-EPH) being outside of control limits. No validation qualifier was necessary because two other surrogates were within limits for this method. 26-SB-A was also flagged with laboratory qualifier "S" for the surrogates 2-Fluorobiphenyl and Nitrobenzene-d5 (Method SW8270C) % recovery being above control limits. All detected analytes for this method are flagged with validation qualifier "J", indicating high bias. Sample 42-SB-A was flagged with laboratory qualifier "S" for surrogate recovery of 2-Fluorobiphenol (Method SW8270C) being outside of control limits. No validation qualifier was necessary because two other surrogates were within limits for this method. Sample 27-SB-A was flagged with laboratory qualifier "O" for the surrogate recovery of VPH Aromatic and VPH Aliphatic surrogates (Method MA-VPH) being diluted out; also flagged with laboratory qualifier "S" for the following surrogates being above control limits: o-Terphenyl (Method MA-EPH), Nitrobenzene-d5 and 2-Fluorobiphenyl (Method SW8270C). A validation qualifier "J" is placed on all detected analytes for the Method SW8270C, indicating high bias. Sample 41-SB-A was flagged with laboratory qualifier "S" for the surrogate recovery of VPH Aliphatic surrogate (Method MA-VPH) and 2-Fluorobiphenyl and Nitrobenzene-d5 (Method SW8270C) being outside of control limits. A validation qualifier "J" was placed on all detected analytes for these two methods, indicating high bias. Sample 41-SB-A was also flagged with laboratory qualifier "S" for the surrogate recovery of o-Terphenyl (MA-EPH) being outside of control limits, however, two other surrogates were within limits for this method. Sample 28-SB-A was flagged with laboratory qualifier "S" for the surrogate recovery of VPH Aliphatic surrogate (Method MA-VPH) being outside of control limits. A validation qualifier "J" was placed on all detected analytes for this method, indicating high bias. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS-70980 was flagged with laboratory qualifier "S" for analytes 2-Methylnapthalene, Benzo(a)pyrene, Benzo(b)fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and surrogates Nitrobenzene-d5, Terphenyl-d14 (Method SW8270C) for the % recovery being outside of control limits. No validation qualifier was necessary because matrix spike and matrix spike duplicate, as well as the closing LCS were within limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Lab QC b13042183-001ams was flagged with laboratory qualifier "S" for the % recovery of the analytes Chlorobenzene, m+p xylenes, and o-xylene (Method SW8260B) being outside of control limits. No validation qualifier was necessary because the LCS was within control limits for these analytes. Also, for this same QC sample, a laboratory qualifier "S" was placed on the surrogate Dibromofluoroethane for the % recovery being outside of control limits. No validation qualifier was necessary because three other surrogates were within limits for the Method SW8260B. QC sample B13050249-003AMSD was flagged with laboratory qualifier "S" for the analyte n-nonane (MA-EPH) % recovery being outside of control limits. No validation qualifier was necessary because the LCS was within control limits for this analyte. Lab QC Matrix spike B13050255-002AMS was flagged with laboratory qualifier "S" for the following analyte recoveries being outside of control limits: Acenapthene, Anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Fluroanthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene. Also, the associated Matrix spike duplicate B13050255-002AMSD was flagged with laboratory qualifier "S" for the following analyte recoveries being outside of control limits: Acenapthene, Anthracene, Fluroanthene Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene (Method SW8270C). No validation qualifier was necessary because the LCS was within limits for these analytes. Also, the analyst indicated the sample was diluted over 10x, and normal QC limits may not be achievable at this dilution level. Water: QC matrix spike B13050107-001D_MS and matrix spike duplicate B13050107-001D_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits as required by the QAAP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample 25-SB-A and its duplicate 25-SB-AD were collected, and had RPDs outside of control limits for Barium (Method SW6010B) at 36%. The associated soil samples are flagged with validation qualifier "J" for Barium. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | X | Yes | | NA | AR | Initials |
|---|---|---|---|---|---|---|
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | | | | | | |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.
- In the event a surrogate concentration was diluted out, a laboratory qualifier “O” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1304-104 | Water | B13050107-001 | SW8270C | 2-Methylnaphthalene | 0.32 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | SW8260B | Chloroform | 3.2 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | SW8270C | Naphthalene | 1.2 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | E200.8 | Lead | 0.001 | mg/L | U | |
| YOSD-1305-101 | Water | B13050107-002 | SW8270C | Naphthalene | 1.3 | ug/L | U | |
| YOSD-1305-101 | Water | B13050107-002 | SW8270C | 2-Methylnaphthalene | 0.33 | ug/L | U | |
| 14-SB-A | Soil | B13050108-001 | SW6010B | Barium | 107 | mg/kg | J | RPD |
| 25-SB-A | Soil | B13050108-003 | SW6010B | Barium | 152 | mg/kg | J | RPD |
| 25-SB-AD | Soil | B13050108-004 | SW6010B | Barium | 219 | mg/kg | J | RPD |
| 26-SB-A | Soil | B13050108-006 | SW6010B | Barium | 168 | mg/kg | J | RPD |
| 27-SB-A | Soil | B13050108-008 | SW6010B | Barium | 125 | mg/kg | J | RPD |
| 28-SB-A | Soil | B13050108-010 | SW6010B | Barium | 101 | mg/kg | J | RPD |
| 41-SB-A | Soil | B13050108-009 | SW6010B | Barium | 183 | mg/kg | J | RPD |
| 42-SB-A | Soil | B13050108-007 | SW6010B | Barium | 189 | mg/kg | J | RPD |
| 43-SB-A | Soil | B13050108-005 | SW6010B | Barium | 331 | mg/kg | J | RPD |
| 40-SB-A | Soil | B13050108-002 | SW6010B | Barium | 149 | mg/kg | J | RPD |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Dibenzo(a,h)anthracene | 0.093 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Chrysene | 2.3 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.23 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Fluorene | 5.2 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Fluoranthene | 3.3 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Naphthalene | 4.8 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Benzo(k)fluoranthene | 0.37 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Benzo(g,h,i)perylene | 0.23 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Benzo(b)fluoranthene | 1.0 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | 2-Methylnaphthalene | 7.5 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Benzo(a)pyrene | 0.71 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Benzo(a)anthracene | 1.2 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Acenaphthene | 2.9 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Anthracene | 4.5 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Phenanthrene | 9.3 | mg/kg | J | High Bias |
| 40-SB-A | Soil | B13050108-002 | SW8270C | Pyrene | 4.2 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Benzo(b)fluoranthene | 0.14 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Benzo(a)pyrene | 0.11 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Fluoranthene | 0.39 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Chrysene | 0.25 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Naphthalene | 19 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Benzo(k)fluoranthene | 0.059 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Anthracene | 0.25 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Benzo(a)anthracene | 0.20 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | 2-Methylnaphthalene | 35 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Phenanthrene | 4.6 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Pyrene | 0.49 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Acenaphthene | 1.2 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Fluorene | 3.1 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.11 | mg/kg | J | High Bias |
| 26-SB-A | Soil | B13050108-006 | SW8270C | Benzo(g,h,i)perylene | 0.046 | mg/kg | J | High Bias |
| 27-SB-A | Soil | B13050108-008 | SW8270C | Chrysene | 0.45 | mg/kg | J | High Bias |
| 27-SB-A | Soil | B13050108-008 | SW8270C | Phenanthrene | 14 | mg/kg | J | High Bias |
| 27-SB-A | Soil | B13050108-008 | SW8270C | Pyrene | 0.98 | mg/kg | J | High Bias |
| 27-SB-A | Soil | B13050108-008 | SW8270C | Benzo(a)pyrene | 0.16 | mg/kg | J | High Bias |
| 27-SB-A | Soil | B13050108-008 | SW8270C | 2-Methylnaphthalene | 59 | mg/kg | J | High Bias |
| 27-SB-A | Soil | B13050108-008 | SW8270C | Fluoranthene | 0.56 | mg/kg | J | High Bias |
| 27-SB-A | Soil | B13050108-008 | SW8270C | Benzo(a)anthracene | 0.20 | mg/kg | J | High Bias |
| 27-SB-A | Soil | B13050108-008 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.15 | mg/kg | J | High Bias |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 27-SB-A | Soil | B13050108-008 | SW8270C | Fluorene | 5.8 | mg/kg-dry | J | High Bias |
| 27-SB-A | Soil | B13050108-008 | SW8270C | Acenaphthene | 2.7 | mg/kg-dry | J | High Bias |
| 27-SB-A | Soil | B13050108-008 | SW8270C | Benzo(k)fluoranthene | 0.072 | mg/kg-dry | J | High Bias |
| 27-SB-A | Soil | B13050108-008 | SW8270C | Anthracene | 0.97 | mg/kg-dry | J | High Bias |
| 27-SB-A | Soil | B13050108-008 | SW8270C | Benzo(b)fluoranthene | 0.20 | mg/kg-dry | J | High Bias |
| 27-SB-A | Soil | B13050108-008 | SW8270C | Naphthalene | 23 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | MA-VPH | C9-C10 AROMATICS | 2820 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | MA-VPH | Ethylbenzene | 65 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | MA-VPH | M-P XYLENE | 17 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | MA-VPH | C9-C12 ALIPHATICS | 7280 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | MA-VPH | TOTAL XYLENE | 29 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | MA-VPH | Naphthalene | 65 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | MA-VPH | BENZENE | 2.7 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | MA-VPH | TOT PURGEABLE HYDROCARBONS | 10900 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | MA-VPH | C5-C8 ALIPHATICS | 1250 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | MA-VPH | o-Xylene | 12 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Fluoranthene | 1.0 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | 2-Methylnaphthalene | 69 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Benzo(g,h,i)perylene | 0.14 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Benzo(a)pyrene | 0.34 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Fluorene | 5.2 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Benzo(b)fluoranthene | 0.41 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Phenanthrene | 7.7 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Pyrene | 1.3 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Naphthalene | 29 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Acenaphthene | 2.8 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Benzo(k)fluoranthene | 0.30 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Anthracene | 1.4 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Benzo(a)anthracene | 0.93 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.27 | mg/kg-dry | J | High Bias |
| 41-SB-A | Soil | B13050108-009 | SW8270C | Chrysene | 2.3 | mg/kg-dry | J | High Bias |
| 28-SB-A | Soil | B13050108-010 | MA-VPH | C9-C12 ALIPHATICS | 1780 | mg/kg-dry | J | High Bias |
| 28-SB-A | Soil | B13050108-010 | MA-VPH | C9-C10 AROMATICS | 750 | mg/kg-dry | J | High Bias |
| 28-SB-A | Soil | B13050108-010 | MA-VPH | TOT PURGEABLE HYDROCARBONS | 2820 | mg/kg-dry | J | High Bias |
| 28-SB-A | Soil | B13050108-010 | MA-VPH | BENZENE | 2.5 | mg/kg-dry | J | High Bias |
| 28-SB-A | Soil | B13050108-010 | MA-VPH | C5-C8 ALIPHATICS | 663 | mg/kg-dry | J | High Bias |
| 28-SB-A | Soil | B13050108-010 | MA-VPH | o-Xylene | 4.7 | mg/kg-dry | J | High Bias |
| 28-SB-A | Soil | B13050108-010 | MA-VPH | Ethylbenzene | 24 | mg/kg-dry | J | High Bias |
| 28-SB-A | Soil | B13050108-010 | MA-VPH | Naphthalene | 13 | mg/kg-dry | J | High Bias |
| 28-SB-A | Soil | B13050108-010 | MA-VPH | TOTAL XYLENE | 27 | mg/kg-dry | J | High Bias |
| 28-SB-A | Soil | B13050108-010 | MA-VPH | M-P XYLENE | 23 | mg/kg-dry | J | High Bias |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 04/29/2013** |
| **Verified By/Date Verified: Angela Roddy 07/11/2013** | **Sample End Date: 05/01/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | YMW-14-SB-B | 4/29/2013 | B13050249 | B13050249-001 |
| 2 | Soil | YMW-14-SB-C | 4/29/2013 | B13050249 | B13050249-002 |
| 3 | Soil | YMW-21-SB-B | 4/29/2013 | B13050249 | B13050249-003 |
| 4 | Soil | YMW-21-SB-C | 4/29/2013 | B13050249 | B13050249-004 |
| 5 | Soil | YMW-12-SB-B | 4/30/2013 | B13050249 | B13050249-005 |
| 6 | Soil | YMW-12-SB-C | 4/30/2013 | B13050249 | B13050249-006 |
| 7 | Soil | YMW-16-SB-B | 4/30/2013 | B13050249 | B13050249-007 |
| 8 | Soil | YMW-16-SB-C | 4/30/2013 | B13050249 | B13050249-008 |
| 9 | Soil | YMW-17-SB-B | 4/30/2013 | B13050250 | B13050249-009 |
| 10 | Soil | YMW-17-SB-C | 4/30/2013 | B13050249 | B13050249-010 |
| 11 | Soil | YMW-17-SB-CD | 4/30/2013 | B13050249 | B13050249-011 |
| 12 | Water-Rinsate Blank | YOSD-1304-104 | 4/29/2013 | B13050107 | B13050107-001 |
| 13 | Water-Rinsate Blank | YOSD-1305-101 | 5/1/2013 | B13050107 | B13050107-002 |
| 14 | Water-Trip Blank | TB032813BTSSHP0262 | 4/29/2013 | B13050107 | B13050107-003 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C (to include Tetraethyllead); Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13050249 and B13050107*
- *Sample YMW-17-SB-B was not included in the data validation and its results were excluded from the database due to being sampled at an earlier date with a higher PID reading.*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |

| COMPLIANCE ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Diluted out. |
| R | RPD outside of advisory limits. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Cooler 1 arrived with a temperature of 2.3°C. Cooler 2 arrived with a temperature of 0.6°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B) was detected in Method Blank MB-71115. The associated soil samples do not require a qualification because these analyte detections were >10x the reporting limit. Barium, Cadmium, Chromium, and Lead (Method SW6010B) were detected in Method Blank MB-71116. The associated soil samples do not require a qualification because these analyte detections were either >10x the reporting limit or non-detect. Water: Chromium (Method E200.8) was detected in Method Blank MB-70946. The associated raw samples do not require a qualification because the analytes were non-detect for Chromium. Mercury (Method E245.1) was detected in Method Blank MB-70943. The associated raw samples do not require a qualification because the analytes were non-detect for Mercury. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: 2-Methylnaphthalene and Naphthalene (Method SW8270C) were detected in water Rinsate blank YOSD-1305-101 and YOSD-1304-104. A validation qualifier "U" was placed on the Rinsate Blank only for these analytes, as raw samples had values >5x the reporting limit. 2-Methylnaphthalene and Naphthalene (Method SW8270C), Lead (Method E200.8), and Chloroform (SW8260B) were detected in Rinsate Blank YOSD-1304-104. A validation qualifier "U" was placed on the Rinsate Blank, as well as raw samples with values >5x the reporting limit for organics and >10x the reporting limit for inorganics. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample YMW-14-SB-B was flagged with laboratory qualifier "S" for the % recovery of o-Terphenyl (Method MA-EPH) being outside of control limits. No validation qualifier was necessary because two other surrogates were within limits. Sample YMW-14-SB-C was flagged with laboratory qualifier "S" for the % recovery of Dibromofluoromethane (Method SW8260B) being outside of control limits. No validation qualifier was necessary because three other surrogates were within limits. Sample YMW-12-SB-C was flagged with laboratory qualifier "S" for the % recovery of Toluene-d8 (Method SW8260B) being outside of control limits; no validation qualifier was necessary because three other surrogates were within limits. Also, sample YMW-12-SB-C was flagged for surrogate Nitrobenzene-d5 (SW8270C) being outside of control limits. No validation qualifier was necessary because two other surrogates were within control limits. Sample YMW-16-SB-B was flagged with laboratory qualifier "S" for surrogate Toluene-d8 (Method 8260B); VPH Aliphatics surrogate (MA-VPH); and o-Terphenyl (MA-EPH) being outside of control limits. No validation qualifier was necessary because other surrogates were within limits. Sample YMW-17-SB-B was flagged with laboratory qualifier "S" for the % recovery of o-Terphenyl (Method MA-EPH); VPH Aliphatics surrogate (MA-VPH); 2-Flurorobipheynyl and Terphenyl-d14 (Method SW8270C being outside of control limits. No validation qualifier was necessary because two other surrogates were within limits for these methods, as well as they were just outside of control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS-70980 was flagged with laboratory qualifier "S" for analytes 2-Methylnapthalene, Benzo(a)pyrene, Benzo(b)fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and surrogates Nitrobenzene-d5, Terphenyl-d14 (Method SW8270C) for the % recovery being outside of control limits. No validation qualifier was necessary because matrix spike and matrix spike duplicate, as well as the closing LCS were within limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B1305020249-001AMS3 was flagged with laboratory qualifier "S" for the % recovery of the analytes Arsenic, Barium, and Selenium (SW6010B/SW6020) being outside of control limits. A validation qualifier was not necessary because post-distillation spikes were within control limits for these analytes. QC sample B13050255-009AM3 was flagged with laboratory qualifier "S" for the % recovery of the analyte Lead (Method SW6010B) being outside of control limits. No validation qualifier was necessary because the post-distillation spike was within limits. QC sample B13050249-003AMSD was flagged with laboratory qualifier "S" for the analyte n-Nonane (Method MA-EPH) % recovery being outside of control limits. No validation qualifier was necessary because the LCS was within limits for this analyte. QC sample B13050255-001AMS was flagged with laboratory qualifier "S" for the analytes Methyl tert-butyl ether and surrogate VPH Aliphatics (Method MA-VPH), as well as QC sample B13050255-001AMSD for the analytes Methyl tert-butyl either, Benzene, VPH Aromatics surrogate, VPH Aliphatics Surrogate. The analyst noted spike recoveries were not calculated for spike amounts below the reporting limit for the compound or spike amounts that were significantly less than the amount found in the sample. No validation qualifier was necessary because the LCS was within limits for all analytes listed. Water: QC matrix spike B13050107-001D_MS and matrix spike duplicate B13050107-001D_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: QC sample B13050255-009AMD3 was flagged with laboratory qualifier "R" for the RPD being outside of control limits for the analyte Lead (SW6010B). No validation qualifier was necessary because the post-distillation spike was within control limits for RPD. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample YMW-17-SB-C and its duplicate YMW-17-SB-CD were collected, and had RPDs outside of control limits for 2-Methylnaphthalene (Method SW8270C) at 59% and Total Extractable Hydrocarbons (Method MA-EPH) at 55%. The associated soil samples are flagged with validation qualifier "J" for these analytes. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.
- In the event a surrogate concentration was diluted out, a laboratory qualifier “O” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1304-104 | Water | B13050107-001 | SW8270C | 2-Methylnaphthalene | 0.32 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | SW8260B | Chloroform | 3.2 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | SW8270C | Naphthalene | 1.2 | ug/L | U | |
| YOSD-1304-104 | Water | B13050107-001 | E200.8 | Lead | 0.001 | mg/L | U | |
| YOSD-1305-101 | Water | B13050107-002 | SW8270C | Naphthalene | 1.3 | ug/L | U | |
| YOSD-1305-101 | Water | B13050107-002 | SW8270C | 2-Methylnaphthalene | 0.33 | ug/L | U | |
| YMW-12-SB-B | Soil | B13050249-005 | SW6010B | Lead | 7 | mg/kg | U | |
| YMW-12-SB-C | Soil | B13050249-006 | SW6010B | Lead | 8 | mg/kg | U | |
| YMW-14-SB-C | Soil | B13050249-002 | SW6010B | Lead | 5 | mg/kg | U | |
| YMW-16-SB-C | Soil | B13050249-008 | SW6010B | Lead | 5 | mg/kg | U | |
| YMW-17-SB-C | Soil | B13050249-010 | SW6010B | Lead | 4 | mg/kg | U | |
| YMW-17-SB-CD | Soil | B13050249-011 | SW6010B | Lead | 5 | mg/kg | U | |
| YMW-21-SB-C | Soil | B13050249-004 | SW6010B | Lead | 7 | mg/kg | U | |
| YMW-12-SB-B | Soil | B13050249-005 | SW8270C | 2-Methylnaphthalene | 7.7 | mg/kg | J | RPD |
| YMW-12-SB-C | Soil | B13050249-006 | SW8270C | 2-Methylnaphthalene | 2.7 | mg/kg | J | RPD |
| YMW-14-SB-B | Soil | B13050249-001 | SW8270C | 2-Methylnaphthalene | 19 | mg/kg | J | RPD |
| YMW-14-SB-C | Soil | B13050249-002 | SW8270C | 2-Methylnaphthalene | 6.6 | mg/kg | J | RPD |
| YMW-16-SB-B | Soil | B13050249-007 | SW8270C | 2-Methylnaphthalene | 3.6 | mg/kg | J | RPD |
| YMW-16-SB-C | Soil | B13050249-008 | SW8270C | 2-Methylnaphthalene | 0.012 | mg/kg | J | RPD |
| YMW-17-SB-C | Soil | B13050249-010 | SW8270C | 2-Methylnaphthalene | 0.064 | mg/kg | J | RPD |
| YMW-17-SB-CD | Soil | B13050249-011 | SW8270C | 2-Methylnaphthalene | 0.035 | mg/kg | J | RPD |
| YMW-21-SB-B | Soil | B13050249-003 | SW8270C | 2-Methylnaphthalene | 0.39 | mg/kg | J | RPD |
| YMW-21-SB-C | Soil | B13050249-004 | SW8270C | 2-Methylnaphthalene | <0.0039 | mg/kg | J | RPD |
| YMW-12-SB-B | Soil | B13050249-005 | MA-EPH | Total Extractable Hydrocarbons | 4630 | mg/kg | J | RPD |
| YMW-12-SB-C | Soil | B13050249-006 | MA-EPH | Total Extractable Hydrocarbons | 1620 | mg/kg | J | RPD |
| YMW-14-SB-B | Soil | B13050249-001 | MA-EPH | Total Extractable Hydrocarbons | 5620 | mg/kg | J | RPD |
| YMW-14-SB-C | Soil | B13050249-002 | MA-EPH | Total Extractable Hydrocarbons | 1860 | mg/kg | J | RPD |
| YMW-16-SB-B | Soil | B13050249-007 | MA-EPH | Total Extractable Hydrocarbons | 4100 | mg/kg | J | RPD |
| YMW-16-SB-C | Soil | B13050249-008 | MA-EPH | Total Extractable Hydrocarbons | 46 | mg/kg | J | RPD |
| YMW-17-SB-C | Soil | B13050249-010 | MA-EPH | Total Extractable Hydrocarbons | 126 | mg/kg | J | RPD |
| YMW-17-SB-CD | Soil | B13050249-011 | MA-EPH | Total Extractable Hydrocarbons | 72 | mg/kg | J | RPD |
| YMW-21-SB-B | Soil | B13050249-003 | MA-EPH | Total Extractable Hydrocarbons | 1240 | mg/kg | J | RPD |
| YMW-21-SB-C | Soil | B13050249-004 | MA-EPH | Total Extractable Hydrocarbons | <12 | mg/kg | J | RPD |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/01/2013** |
| **Verified By/Date Verified: Angela Roddy 07/12/2013** | **Sample End Date: 05/02/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 46-SB-A | 5/1/2013 | B13050255 | B13050255-001 |
| 2 | Soil | 44-SB-A | 5/1/2013 | B13050255 | B13050255-002 |
| 3 | Soil | 44-SB-B | 5/1/2013 | B13050255 | B13050255-003 |
| 4 | Soil | 44-SB-C | 5/1/2013 | B13050255 | B13050255-004 |
| 5 | Soil | 30-SB-A | 5/1/2013 | B13050255 | B13050255-005 |
| 6 | Soil | 30-SB-B | 5/1/2013 | B13050255 | B13050255-006 |
| 7 | Soil | 45-SB-A | 5/1/2013 | B13050255 | B13050255-007 |
| 8 | Soil | 45-SB-B | 5/1/2013 | B13050255 | B13050255-008 |
| 9 | Soil | 29-SB-A | 5/1/2013 | B13050255 | B13050255-009 |
| 10 | Water-Rinsate Blank | YOSD-1305-102 | 5/2/2013 | B13050492 | B13050492-001 |
| 11 | Water-Trip Blank | TB031913BTSSHP0262 | 5/2/2013 | B13050492 | B13050492-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, TCLP Extractable-SW7470A, SW6020; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds; Semi-Volatile Organic Compounds-low conc-SW8270C (to include Tetraethyllead), TCLP Extractable; Volatile Organic Compounds, TCLP Extractable-SW8260B; Ignitablity-SW1010M; Reactivity-SW846 Ch 7; Pesticides, TCLP Extractable-SW8081A; Herbicides, TCLP Extractable-SW8151A; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13050255 and B13050492*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Diluted out. |
| R | RPD outside of advisory limits. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Cooler 1 arrived with a temperature of 2.3°C. Coolers 2 and 3 arrived with temperatures of 1.0°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium, Cadmium, Chromium, and Lead (Method SW6010B) were detected in Method Blank MB-71116. The associated soil samples do not require a qualification because these analyte detections were either >10x the reporting limit or non-detect. Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, and Silver (SW6020) were detected in Method Blank MB-71110. No validation qualifier was necessary because the blank was rerun without detections. Water: Arsenic, Chromium, and Lead (Method E200.8) was detected in Method Blank MB-71091. The associated raw samples do not require a qualification because the analytes were non-detect. 2-Methylnapthalene and Naphthalene (SW8270C) were detected in Method Blank MB-71347-71331-71124. No validation qualifier was necessary because the associated samples were non-detect for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Methylene chloride (SW8260B) was detected in Rinsate blank YOSD-1305-102 and flagged with laboratory qualifier "J". Toluene (SW8260B) was detected in Tri p blank 031913 B-TS SHP0262 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because these are estimated values and are below the reporting limits. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 46-SB-A was flagged with laboratory qualifier "S" for the % recovery of Toluene-d8 (Method SW8260B) and Nitrobenzene-d5 (Method SW8270C) being outside of control limits. No validation qualifier was necessary because other surrogates were within limits. Sample 46-SB-A was also flagged with laboratory qualifier "S" for VPH Aromatics surrogate and VPH Aliphatics surrogate (Method MA-VPH) % recovery being above control limits. A validation qualifier "J" was placed on all detected analytes, indicating high bias. Sample 44-SB-A was flagged with laboratory qualifier "S" for the % recovery of Toluene-d8 (Method SW8260B) and Nitrobenzene-d5 (Method SW8270C) being outside of control limits. No validation qualifier was necessary because other surrogates were within limits. Sample 44-SB-B was flagged with laboratory qualifier "S" for the % recovery of o-Terphenyl (MA-EPH) and Nitrobenzene-d5 (SW8270C) being outside of control limits. No validation qualifier was necessary because other surrogates were within limits. Sample 30-SB-A was flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) being outside of control limits. No validation qualifier was necessary because other surrogates were within limits. Sample 30-SB-B was flagged with laboratory qualifier "S" for VPH Aliphatics surrogate (Method MA-VPH) % recovery being just above control limits. No validation qualifier was necessary because this % recovery was just outside of control limits with another surrogate within limits. Sample 45-SB-A was flagged with laboratory qualifier "S" for the % recovery of o-Terphenyl (MA-EPH); Nitrobenzene-d5 and 2-Fluorobiphenyl (SW8270C) being outside of control limits. A validation qualifier "J" was placed on all detected analytes, indicating high bias, for the Method SW8270C-Low Concentration only; Method MA-EPH had other surrogates within control limits. Sample 45-SB-B was flagged with laboratory qualifier "S" for the % recovery of Terphenyl-d14 (SW8270C) being outside of control limits. No validation qualifier was necessary because other surrogates were within limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: LCS-70980 was flagged with laboratory qualifier "S" for analytes 2-Methylnapthalene, Benzo(a)pyrene, Benzo(b)fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and surrogates Nitrobenzene-d5, Terphenyl-d14 (Method SW8270C) for the % recovery being outside of control limits. No validation qualifier was necessary because matrix spike and matrix spike duplicate, as well as the closing LCS were within limits. Water: LCS_050813 was flagged with laboratory qualifier "S" for the analyte 2-Chloroethyl vinyl ether (SW8260B) % recovery being outside of control limits. No validation qualifier was necessary because the raw samples were non-detect for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B13050255-009AMS3 was flagged with laboratory qualifier "S" for the % recovery of the analyte Lead, Arsenic, and Selenium (Method SW6010B); B13050255-009AMSD3-Arsenic and Selenium (Method SW6020) being outside of control limits. No validation qualifier was necessary because the post-distillation spike was within limits. QC sample B13050112-014AMS and B13050112-014AMSD was flagged with laboratory qualifier "S" for the analyte n-Nonane and n-Decane (Method MA-EPH) % recovery being outside of control limits. No validation qualifier was necessary because the LCS was within limits for this analyte. QC sample B13050255-001AMS was flagged with laboratory qualifier "S" for the analytes Methyl tert-butyl ether and surrogate VPH Aliphatics (Method MA-VPH), as well as QC sample B13050255-001AMSD for the analytes Methyl tert-butyl either, Benzene, VPH Aromatics surrogate, VPH Aliphatics Surrogate. The analyst noted spike recoveries were not calculated for spike amounts below the reporting limit for the compound or spike amounts that were significantly less than the amount found in the sample. No validation qualifier was necessary because the LCS was within limits for all analytes listed. QC sample B13050255-009AMS and B13050255-009AMSD were flagged with laboratory qualifier "S" for the analytes n-Nonane and n-Decane (Method MA-EPH) % recovery being outside of control limits. No validation qualifier was necessary because the LCS was within limits for these analytes. QC sample b13050255-002ams and b13050255-002amsd were flagged with laboratory qualifier "S" for the analytes 1,1,2,2-Tetrachloroethane and 1,2,3-Trichloropropane (SW8260B) % recovery being outside of control limits. No validation qualifier was necessary because the LCS was within limits. For QC for Method SW8270C, extra analytes were run for TCLP Extraction. Various analytes were flagged with laboratory qualifier "S"; however, the LCS was within limits on a rerun. No validation qualifier was necessary. Water: QC matrix spike B13050350-003A_MS and matrix spike duplicate B13050350-003A_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: QC sample B13050255-009AMD3 was flagged with laboratory qualifier "R" for the RPD being outside of control limits for the analyte Lead (SW6010B). No validation qualifier was necessary because the post-distillation spike was within control limits for RPD. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not collected with this batch of data. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.
- In the event a surrogate concentration was diluted out, a laboratory qualifier "O" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

**Validator Qualified Analytical Results**

| Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag | Comments |
|---|---|---|---|---|---|---|---|---|
| 46-SB-A | Soil | B13050255-001 | MA-VPH | C9-C10 AROMATICS | 697 | mg/kg | J | High Bias |
| 46-SB-A | Soil | B13050255-001 | MA-VPH | C9-C12 ALIPHATICS | 1220 | mg/kg | J | High Bias |
| 46-SB-A | Soil | B13050255-001 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 1910 | mg/kg | J | High Bias |
| 46-SB-A | Soil | B13050255-001 | MA-VPH | C5-C8 ALIPHATICS | 67 | mg/kg | J | High Bias |
| 45-SB-A | Soil | B13050255-007 | SW8270C-LL | Acenaphthene | 1.1 | mg/kg | J | High Bias |
| 45-SB-A | Soil | B13050255-007 | SW8270C-LL | Anthracene | 0.86 | mg/kg | J | High Bias |
| 45-SB-A | Soil | B13050255-007 | SW8270C-LL | 2-Methylnaphthalene | 49 | mg/kg | J | High Bias |
| 45-SB-A | Soil | B13050255-007 | SW8270C-LL | Naphthalene | 12 | mg/kg | J | High Bias |
| 45-SB-A | Soil | B13050255-007 | SW8270C-LL | Pyrene | 2.1 | mg/kg | J | High Bias |
| 45-SB-A | Soil | B13050255-007 | SW8270C-LL | Phenanthrene | 13 | mg/kg | J | High Bias |
| 45-SB-A | Soil | B13050255-007 | SW8270C-LL | Fluorene | 5.4 | mg/kg | J | High Bias |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/02/2013** |
| **Verified By/Date Verified: Angela Roddy 07/16/2013** | **Sample End Date: 05/02/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | YMW-15-SB-B | 5/2/2013 | B13050501 | B13050501-001 |
| 2 | Soil | YMW-15-SB-C | 5/2/2013 | B13050501 | B13050501-002 |
| 3 | Soil | YMW-18-SB-C | 5/2/2013 | B13050501 | B13050501-003 |
| 4 | Water-Rinsate Blank | YOSD-1305-102 | 5/2/2013 | B13050492 | B13050492-001 |
| 5 | Water-Trip Blank | TB031913BTSSHP0262 | 5/2/2013 | B13050492 | B13050492-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C, Volatile Organic Compounds -SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13050501 and B13050492*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD outside of advisory limits. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

N/A

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with temperatures of 1.0°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium, Chromium (Method SW6010B) and Selenium (Method SW6020) were detected in Method Blank MB-71170. The associated soil samples do not require a qualification because these analyte detections were either >10x the reporting limit or non-detect. Mercury (SW7471A) was detected in Method Blank MB-71137. No validation qualifier was necessary because Mercury was non-detect in associated soil samples. Water: Arsenic, Chromium, and Lead (Method E200.8) was detected in Method Blank MB-71091. The associated raw samples do not require a qualification because the analytes were non-detect. 2-Methylnapthalene and Naphthalene (SW8270C) were detected in Method Blank MB-71347-71331-71124. No validation qualifier was necessary because the associated samples were non-detect for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Methylene chloride (SW8260B) was detected in Rinsate blank YOSD-1305-102 and flagged with laboratory qualifier "J". Toluene (SW8260B) was detected in Tri p blank 031913 B-TS SHP0262 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because these are estimated values and are below the reporting limits. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample YMW-15-SB-B was flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) being outside of control limits. No validation qualifier was necessary because other surrogates were within limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: LCS-71158 was flagged with laboratory qualifier "S" for analyte n-Pentane (Method MA-VPH) for the % recovery being outside of control limits. No validation qualifier was necessary because matrix spike and matrix spike duplicate, as well as the closing LCS were within limits. Water: LCS_050813 was flagged with laboratory qualifier "S" for the analyte 2-Chloroethyl vinyl ether (SW8260B) % recovery being outside of control limits. No validation qualifier was necessary because the raw samples were non-detect for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample b13050255-002ams and b13050255-002amsd were flagged with laboratory qualifier "S" for the analytes 1,1,2,2-Tetrachloroethane and 1,2,3-Trichloropropane (SW8260B) % recovery being outside of control limits. No validation qualifier was necessary because the LCS was within limits. QC sample B13050255-009AMS and B13050255-009AMSD were flagged with laboratory qualifier "S" for the analytes n-Nonane and n-Decane (Method MA-EPH) % recovery being outside of control limits. No validation qualifier was necessary because the LCS was within limits for these analytes. QC samples B13050505-010AMS3 and B13050505-010AMSD3 were flagged with laboratory qualifier "S" for the % recovery of the analytes Arsenic and Selenium (Method SW6020 being outside of control limits. No validation qualifier was necessary because the Standard Reference Material and Laboratory Fortified Blank were within control limits. Water: QC matrix spike B13050350-003A_MS and matrix spike duplicate B13050350-003A_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | | Yes | **X** | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: QC samples B13050505-010AMS3 and B13050505-010AMSD3 were flagged with laboratory qualifier "R" for the RPD being outside of control limits for the analytes Arsenic and Selenium (Method SW6020). No validation qualifier was necessary because the Standard Reference Material and Laboratory Fortified Blank were within control limits. This matrix spike and spike duplicate were not a sample from this batch and could have problems with recoveries related to this sample only. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/02/2013** |
| **Verified By/Date Verified: Angela Roddy 07/16/2013** | **Sample End Date: 05/03/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 32-SB-A | 5/2/2013 | B13050505 | B13050505-001 |
| 2 | Soil | 47-SB-A | 5/2/2013 | B13050505 | B13050505-002 |
| 3 | Soil | 31-SB-A | 5/2/2013 | B13050505 | B13050505-003 |
| 4 | Soil | 19-SB-A | 5/2/2013 | B13050505 | B13050505-004 |
| 5 | Soil | 33-SB-A | 5/2/2013 | B13050505 | B13050505-005 |
| 6 | Soil | 33-SB-B | 5/2/2013 | B13050505 | B13050505-006 |
| 7 | Soil | 34-SB-A | 5/2/2013 | B13050505 | B13050505-007 |
| 8 | Soil | 105-SB-A | 5/3/2013 | B13050505 | B13050505-008 |
| 9 | Soil | 104-SB-A | 5/3/2013 | B13050505 | B13050505-009 |
| 10 | Soil | 93-SB-A | 5/3/2013 | B13050505 | B13050505-010 |
| 11 | Water-Rinsate Blank | YOSD-1305-102 | 5/2/2013 | B13050492 | B13050492-001 |
| 12 | Water-Trip Blank | TB031913BTSSHP0262 | 5/2/2013 | B13050492 | B13050492-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C, Volatile Organic Compounds -SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13050505 and B13050492*

- *Sample 34-SB-A was not included in the data validation and its results were excluded from the database due to being sampled at a later date with a higher PID reading.*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Diluted out. |
| R | RPD outside of advisory limits. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. However, sample B13050505-010 was missing values for Arsenic and Selenium in the first report. The report was re-issued by the lab with these values included. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with temperatures of 1.0°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium, Chromium (Method SW6010B) and Selenium (Method SW6020) were detected in Method Blank MB-71170. The associated soil samples do not require a qualification because these analyte detections were either >10x the reporting limit or non-detect. Water: Arsenic, Chromium, and Lead (Method E200.8) was detected in Method Blank MB-71091. The associated raw samples do not require a qualification because the analytes were non-detect. 2-Methylnapthalene and Naphthalene (SW8270C) were detected in Method Blank MB-71347-71331-71124. No validation qualifier was necessary because the associated samples were non-detect for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Methylene chloride (SW8260B) was detected in Rinsate blank YOSD-1305-102 and flagged with laboratory qualifier "J". Toluene (SW8260B) was detected in Tri p blank 031913 B-TS SHP0262 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because these are estimated values and are below the reporting limits. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 47-SB-A was flagged with laboratory qualifier "S" for the % recovery of o-Terphenyl (SW8015M) and Nitrobenzene-d5 (Method SW8270C) being outside of control limits. No validation qualifier was necessary because other surrogates were within limits; also, Method SW8015M is a screen only. Sample 31-SB-A was flagged with laboratory qualifier "S" for the % recovery of 2-Fluorobiphenyl (Method SW8270C) being outside of control limits. No validation qualifier was necessary because other surrogates were within limits. Sample 19-SB-A was flagged with laboratory qualifier "S" for the % recovery of 2-Fluorobiphenyl and Nitrobenzene-d5 (Method SW8270C) being above control limits. A validation qualifier "J" was placed on all detected analytes. Sample 33-SB-A was flagged with laboratory qualifier "S" for the % recovery of o-Terphenyl (SW8015M) being outside of control limits. No validation qualifier was necessary because this is a screen only. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: LCS-71158 was flagged with laboratory qualifier "S" for analyte n-Pentane (Method MA-VPH) for the % recovery being outside of control limits. No validation qualifier was necessary because matrix spike and matrix spike duplicate, as well as the closing LCS were within limits. Water: LCS_050813 was flagged with laboratory qualifier "S" for the analyte 2-Chloroethyl vinyl ether (SW8260B) % recovery being outside of control limits. No validation qualifier was necessary because the raw samples were non-detect for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Soil: QC sample B13050255-009AMS and B13050255-009AMSD were flagged with laboratory qualifier "S" for the analytes n-Nonane and n-Decane (Method MA-EPH) % recovery being outside of control limits. No validation qualifier was necessary because the LCS was within limits for these analytes. QC sample B13050505-010AMSD3 was flagged with laboratory qualifier "S" for the % recovery of the analyte Selenium (Method SW6020) being outside of control limits. No validation qualifier was necessary because the Standard Reference Material and Laboratory Fortified Blank were within control limits. QC samples B13050505-004AMS and B13050505-004AMSD were flagged with laboratory qualifier "S" for the % recovery of the analytes Anthracene, Pyrene, Acenapthene, Fluoranthene, and Naphthalene (Method SW8270C). No validation qualifier was necessary because the LCS was within limits for these analytes. Water: QC matrix spike B13050350-003A_MS and matrix spike duplicate B13050350-003A_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.
- In the event a surrogate is diluted out, a laboratory qualifier of “O” is put on the data.

**Validator Qualified Analytical Results**

| Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag | Comments |
|---|---|---|---|---|---|---|---|---|
| 19-SB-A | Soil | B13050505-004 | SW8270C | Phenanthrene | 1.2 | mg/kg | J | High Bias |
| 19-SB-A | Soil | B13050505-004 | SW8270C | Fluorene | 0.55 | mg/kg | J | High Bias |
| 19-SB-A | Soil | B13050505-004 | SW8270C | 2-Methylnaphthalene | 5.8 | mg/kg | J | High Bias |
| 19-SB-A | Soil | B13050505-004 | SW8270C | Naphthalene | 2.7 | mg/kg | J | High Bias |
| 19-SB-A | Soil | B13050505-004 | SW8270C | Pyrene | 0.18 | mg/kg | J | High Bias |
| 19-SB-A | Soil | B13050505-004 | SW8270C | Anthracene | 0.22 | mg/kg | J | High Bias |
| 19-SB-A | Soil | B13050505-004 | SW8270C | Acenaphthene | 0.19 | mg/kg | J | High Bias |

| Validation Qualifer Definitions: | |
|---|---|
| J | QC Exceedance |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/06/2013** |
| **Verified By/Date Verified: Angela Roddy 07/16/2013** | **Sample End Date: 05/08/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 35-SB-A | 5/6/2013 | B13050598 | B13050598-001 |
| 2 | Soil | 8-SB-A | 5/6/2013 | B13050598 | B13050598-002 |
| 3 | Soil | 7-SB-A | 5/6/2013 | B13050598 | B13050598-003 |
| 4 | Soil | 7-SB-B | 5/6/2013 | B13050598 | B13050598-004 |
| 5 | Water-Rinsate Blank | YOSD-1305-104 | 5/8/2013 | B13050929 | B13050929-001 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C, Volatile Organic Compounds -SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13050598 and B13050929*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with temperatures of 2.1°C and 0.0°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B) was detected in Method Blank MB-71171. The associated soil samples do not require a qualification because Barium analyte detections were >10x the reporting limit. Water: Arsenic, Cadmium, Chromium, and Silver (Method E200.8) were detected in Method Blank MB-71226. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnaphthalene and Naphthalene (Method SW8270C) were detected in Rinsate Blank YOSD-1305-104. A validation qualifier "U" was only necessary for the Rinsate Blank because raw soil sample values for these analytes are >5x the reporting limit or non-detect. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 7-SB-A was flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) being outside of control limits. No validation qualifier was necessary because other surrogates were within limits. Sample 8-SB-A was flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5, Terphenyl-d14 (SW8270C) and VPH Aliphatic Surrogate (Method MA-VPH) being outside of control limits. A validation qualifier "J" was placed on detected analytes of Method VPH only, indicating high bias. Other surrogates were within limits for Method SW8270C. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: LCS-71158 was flagged with laboratory qualifier "S" for analyte n-Pentane (Method MA-VPH) for the % recovery being outside of control limits. No validation qualifier was necessary because matrix spike and matrix spike duplicate, as well as the closing LCS were within limits. LCS-71113 was flagged with laboratory qualifier "S" for the analytes 2-Methylnaphthalene and Acenaphthylene (Method SW8270C). No validation qualifier was necessary because this LCS was rerun and within control limits. Water: LCS_051013 was flagged with laboratory qualifier "S" for the analyte 2-Chloroethyl vinyl ether (SW8260B) % recovery being outside of control limits. No validation qualifier was necessary because the raw samples were non-detect for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC samples B13050806-013AMS3 was flagged with laboratory qualifier "S" for the % recovery of the analyte Selenium (Method SW6020) being outside of control limits. No validation qualifier was necessary because the post distillation spike was within control limits. QC samples B13050505-004AMS and B13050505-004AMSD were flagged with laboratory qualifier "S" for the % recovery of the analytes Anthracene, Pyrene, Acenapthene, Fluoranthene, and Naphthalene (Method SW8270C). No validation qualifier was necessary because the LCS was within limits for these analytes. Water: QC matrix spike B13050937-006B_MS and matrix spike duplicate B13050937-006B_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1305-104 | Water | B13050929-001 | SW8270C | 2-Methylnaphthalene | 0.64 | ug/L | U | |
| YOSD-1305-104 | Water | B13050929-001 | SW8270C | Naphthalene | 0.52 | ug/L | U | |
| 8-SB-A | Soil | B13050598-002 | MA-VPH | BENZENE | 11 | mg/kg | J | High Bias |
| 8-SB-A | Soil | B13050598-002 | MA-VPH | TOTAL XYLENE | 68 | mg/kg | J | High Bias |
| 8-SB-A | Soil | B13050598-002 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 12100 | mg/kg | J | High Bias |
| 8-SB-A | Soil | B13050598-002 | MA-VPH | C9-C12 ALIPHATICS | 7710 | mg/kg | J | High Bias |
| 8-SB-A | Soil | B13050598-002 | MA-VPH | C9-C10 AROMATICS | 2730 | mg/kg | J | High Bias |
| 8-SB-A | Soil | B13050598-002 | MA-VPH | C5-C8 ALIPHATICS | 3260 | mg/kg | J | High Bias |
| 8-SB-A | Soil | B13050598-002 | MA-VPH | Ethylbenzene | 103 | mg/kg | J | High Bias |
| 8-SB-A | Soil | B13050598-002 | MA-VPH | o-Xylene | 14 | mg/kg | J | High Bias |
| 8-SB-A | Soil | B13050598-002 | MA-VPH | M-P XYLENE | 54 | mg/kg | J | High Bias |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/07/2013** |
| **Verified By/Date Verified: Angela Roddy 07/17/2013** | **Sample End Date: 05/08/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 12-SB-A | 5/7/2013 | B13050908 | B13050908-001 |
| 2 | Soil | 13-SB-A | 5/7/2013 | B13050908 | B13050908-002 |
| 3 | Soil | 4-SB-A | 5/7/2013 | B13050908 | B13050908-003 |
| 4 | Soil | 5-SB-A | 5/7/2013 | B13050908 | B13050908-004 |
| 5 | Soil | 15-SB-A | 5/8/2013 | B13050908 | B13050908-005 |
| 6 | Soil | 15-SB-AD | 5/8/2013 | B13050908 | B13050908-006 |
| 7 | Soil | 18-SB-A | 5/8/2013 | B13050908 | B13050908-007 |
| 8 | Water-Rinsate Blank | YOSD-1305-104 | 5/8/2013 | B13050929 | B13050929-001 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13050908 and B13050929*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with a temperature of 0.0°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium, Chromium, and Lead (Method SW6010B) were detected in Method Blank MB-71257. The associated soil samples do not require a qualification because analyte detections were >10x the reporting limit. Water: Arsenic, Cadmium, Chromium, and Silver (Method E200.8) were detected in Method Blank MB-71226. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnaphthalene and Naphthalene (Method SW8270C) were detected in Rinsate Blank YOSD-1305-104. A validation qualifier "U" is only necessary for the Rinsate blank because raw soil sample values for these analytes are >5x the reporting limit or non-detect. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 5-SB-A was flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) being outside of control limits. No validation qualifier was necessary because other surrogates were within limits. Sample13-SB-A was flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatic Surrogate (Method MA-VPH) being outside of control limits. A validation qualifier "was not necessary because other surrogates were within limits, and the above named surrogate was barely outside of control limits. Sample 4-SB-A was flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatic and Aromatic surrogates (MA-VPH) and o-Terphenyl (Method MA-EPH) being above control limits. A validation qualifier "J" was placed on all detected analytes for the method MA-VPH only, indicating high bias. Sample 15-SB-A was flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatics and VPH Aromatics Surrogate (Method MA-VPH); o-Terphenyl (MA-EPH) and 2-Fluorobiphenyl (SW8270C). A validation qualifier "J" was placed on all detected analytes for the method MA-VPH only, indicating high bias, because the other methods had other surrogates within control limits. Sample duplicate 15-SB-AD and sample 18-SB-A were flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatic and Aromatic surrogates (MA-VPH) and o-Terphenyl (MA-EPH). No validation qualifier was necessary because other surrogates were within limits for these methods. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Water: LCS_051013 was flagged with laboratory qualifier "S" for the analyte 2-Chloroethyl vinyl ether (SW8260B) % recovery being outside of control limits. No validation qualifier was necessary because the raw samples were non-detect for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC samples B13051039-004AMS3 and B13051039-004AMSD3 were flagged with laboratory qualifier "S" for the % recovery of the analyte Selenium (Method SW6020) being outside of control limits. No validation qualifier was necessary because the post distillation spike was within control limits. QC samples B13050891-001AMS and B13050891-001AMSD were flagged with laboratory qualifier "S" for the % recovery of the analyte Ethyl benzene (Method MA-VPH). No validation qualifier was necessary because the LCS was within limits for all analytes. QC samples B13050908-003AMS and B13050908-003AMSD were flagged with laboratory qualifier "S" for the % recovery of the following analytes: Acenaphthene, Anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Fluoranthene, Pyrene, and the surrogates Nitrobenzene-d5 and 2-Fluorobiphenyl (Method SW8270C). No validation qualifier was necessary because the LCS was within limits for all analytes. Water: QC matrix spike B13050937-006B_MS and matrix spike duplicate B13050937-006B_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chloroethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample 15-SB-A and its duplicate 15-SB-AD analyte values were within RPD control limits per QAPP. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

**Validator Qualified Analytical Results**

| Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag | Comments |
|---|---|---|---|---|---|---|---|---|
| YOSD-1305-104 | Water | B13050929-001 | SW8270C | 2-Methylnaphthalene | 0.64 | ug/L | U | |
| YOSD-1305-104 | Water | B13050929-001 | SW8270C | Naphthalene | 0.52 | ug/L | U | |
| 15-SB-A | Soil | B13050908-005 | MA-VPH | BENZENE | 3.5 | mg/kg | J | High Bias |
| 15-SB-A | Soil | B13050908-005 | MA-VPH | C5-C8 ALIPHATICS | 1120 | mg/kg | J | High Bias |
| 15-SB-A | Soil | B13050908-005 | MA-VPH | C9-C10 AROMATICS | 2820 | mg/kg | J | High Bias |
| 15-SB-A | Soil | B13050908-005 | MA-VPH | C9-C12 ALIPHATICS | 2890 | mg/kg | J | High Bias |
| 15-SB-A | Soil | B13050908-005 | MA-VPH | Ethylbenzene | 56 | mg/kg | J | High Bias |
| 15-SB-A | Soil | B13050908-005 | MA-VPH | M-P XYLENE | 164 | mg/kg | J | High Bias |
| 15-SB-A | Soil | B13050908-005 | MA-VPH | Naphthalene | 90 | mg/kg | J | High Bias |
| 15-SB-A | Soil | B13050908-005 | MA-VPH | o-Xylene | 9.9 | mg/kg | J | High Bias |
| 15-SB-A | Soil | B13050908-005 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 8890 | mg/kg | J | High Bias |
| 15-SB-A | Soil | B13050908-005 | MA-VPH | TOTAL XYLENE | 174 | mg/kg | J | High Bias |
| 4-SB-A | Soil | B13050908-003 | MA-VPH | TOTAL XYLENE | 12 | mg/kg | J | High Bias |
| 4-SB-A | Soil | B13050908-003 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 6460 | mg/kg | J | High Bias |
| 4-SB-A | Soil | B13050908-003 | MA-VPH | M-P XYLENE | 12 | mg/kg | J | High Bias |
| 4-SB-A | Soil | B13050908-003 | MA-VPH | BENZENE | 6.4 | mg/kg | J | High Bias |
| 4-SB-A | Soil | B13050908-003 | MA-VPH | C5-C8 ALIPHATICS | 1870 | mg/kg | J | High Bias |
| 4-SB-A | Soil | B13050908-003 | MA-VPH | C9-C12 ALIPHATICS | 2320 | mg/kg | J | High Bias |
| 4-SB-A | Soil | B13050908-003 | MA-VPH | C9-C10 AROMATICS | 1800 | mg/kg | J | High Bias |
| 4-SB-A | Soil | B13050908-003 | MA-VPH | Naphthalene | 56 | mg/kg | J | High Bias |
| 4-SB-A | Soil | B13050908-003 | MA-VPH | Ethylbenzene | 105 | mg/kg | J | High Bias |

| Validation Qualifer Definitions: | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/08/2013** |
| **Verified By/Date Verified: Angela Roddy 07/24/2013** | **Sample End Date: 05/10/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 6-SB-A | 5/9/2013 | B13051003 | B13051003-001 |
| 2 | Soil | 16-SB-A | 5/9/2013 | B13051003 | B13051003-002 |
| 3 | Soil | 16-SB-B | 5/9/2013 | B13051003 | B13051003-003 |
| 4 | Soil | 17-SB-A | 5/10/2013 | B13051003 | B13051003-004 |
| 5 | Soil | 17-SB-B | 5/10/2013 | B13051003 | B13051003-005 |
| 6 | Soil | 17-SB-C | 5/10/2013 | B13051003 | B13051003-006 |
| 7 | Water-Rinsate Blank | YOSD-1305-104 | 5/8/2013 | B13050929 | B13050929-001 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13051003 and B13050929*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| O | Diluted out. |
| S | Spike recovery outside of advisory limits. |
| 1 | The spike value was significantly less than the amount found in the sample. Normal QC limits may not be achievable. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with a temperature of 2.2°C and 0.0°C respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B) was detected in Method Blank MB-71325. The associated soil samples do not require a qualification because analyte detections were >10x the reporting limit. Water: Arsenic, Cadmium, Chromium, and Silver (Method E200.8) were detected in Method Blank MB-71226. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnaphthalene and Naphthalene (Method SW8270C) were detected in Rinsate Blank YOSD-1305-104. No validation qualifier is necessary related to the raw soil sample values for these analytes are >5x the reporting limit or non-detect. However, a validation qualifier "U" was placed on the Rinsate Blank for these analytes. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 17-SB-B was flagged with laboratory qualifier "S" for the % recovery of 2-Fluorobiphenyl and Nitrobenzene-d5 (Method SW8270C) being above control limits. A validation qualifier "J" was placed on all detected analytes for this method, indicating high bias. Sample 17-SB-C was flagged with laboratory qualifier "S" for the % recovery of 2-Fluorobiphenyl (Method SW8270C) being above control limits. A validation qualifier was not necessary because two other surrogates were within limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Water: LCS_051013 was flagged with laboratory qualifier "S" for the analyte 2-Chloroethyl vinyl ether (SW8260B) % recovery being outside of control limits. No validation qualifier was necessary because the raw samples were non-detect for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B13051292-001AMSD3 was flagged with laboratory qualifier "S" for the % recovery of the analyte Silver (Method SW6010B) being outside of control limits. No validation qualifier was necessary because the post distillation spike was within control limits. QC samples B13051003-003AMS and B13051003-003AMSD were flagged with laboratory qualifier "S" and "1" for the % recovery of the analytes Benzene, Toluene, Ethyl benzene, m+p xylenes, o-Xylene, Total Purgeable Hydrocarbons, and Naphthalene (Method MA-VPH). No validation qualifier was necessary because the LCS was within limits for all analytes. QC samples B13050908-003AMS and B13050908-003AMSD were flagged with laboratory qualifier "S" for the % recovery of the following analytes: Acenaphthene, Anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Fluoranthene, Pyrene, and the surrogates Nitrobenzene-d5 and 2-Fluorobiphenyl (Method SW8270C). No validation qualifier was necessary because the LCS was within limits for all analytes. Water: QC matrix spike B13050937-006B_MS and matrix spike duplicate B13050937-006B_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chloroethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample 15-SB-A and its duplicate 15-SB-AD analyte values were within RPD control limits per QAPP. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.
- In the event a surrogate was diluted out, a laboratory qualifier “O” was placed on the data. A validation qualifier was not necessary in these instances.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1305-104 | Water | B13050929-001 | SW8270C | 2-Methylnaphthalene | 0.64 | ug/L | U | |
| YOSD-1305-104 | Water | B13050929-001 | SW8270C | Naphthalene | 0.52 | ug/L | U | |
| 17-SB-B | Soil | B13051003-005 | SW8270C | Fluorene | 8.5 | mg/kg | J | High Bias |
| 17-SB-B | Soil | B13051003-005 | SW8270C | Fluoranthene | 0.45 | mg/kg | J | High Bias |
| 17-SB-B | Soil | B13051003-005 | SW8270C | Acenaphthene | 4.1 | mg/kg | J | High Bias |
| 17-SB-B | Soil | B13051003-005 | SW8270C | Benzo(b)fluoranthene | 0.18 | mg/kg | J | High Bias |
| 17-SB-B | Soil | B13051003-005 | SW8270C | Chrysene | 0.77 | mg/kg | J | High Bias |
| 17-SB-B | Soil | B13051003-005 | SW8270C | Pyrene | 1.6 | mg/kg | J | High Bias |
| 17-SB-B | Soil | B13051003-005 | SW8270C | 2-Methylnaphthalene | 103 | mg/kg | J | High Bias |
| 17-SB-B | Soil | B13051003-005 | SW8270C | Anthracene | 0.84 | mg/kg | J | High Bias |
| 17-SB-B | Soil | B13051003-005 | SW8270C | Benzo(a)anthracene | 0.28 | mg/kg | J | High Bias |
| 17-SB-B | Soil | B13051003-005 | SW8270C | Phenanthrene | 16 | mg/kg | J | High Bias |
| 17-SB-B | Soil | B13051003-005 | SW8270C | Naphthalene | 43 | mg/kg | J | High Bias |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/13/2013** |
| **Verified By/Date Verified: Angela Roddy 07/24/2013** | **Sample End Date: 05/15/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 21-SB-A | 5/13/2013 | B13051294 | B13051294-001 |
| 2 | Soil | 36-SB-A | 5/13/2013 | B13051294 | B13051294-002 |
| 3 | Soil | 36-SB-B | 5/13/2013 | B13051294 | B13051294-003 |
| 4 | Soil | 36-SB-C | 5/13/2013 | B13051294 | B13051294-004 |
| 5 | Soil | 37-SB-A | 5/13/2013 | B13051294 | B13051294-005 |
| 6 | Soil | 98-SB-A | 5/14/2013 | B13051294 | B13051294-006 |
| 7 | Soil | 99-SB-A | 5/14/2013 | B13051294 | B13051294-007 |
| 8 | Soil | 108-SB-A | 5/14/2013 | B13051294 | B13051294-008 |
| 9 | Soil | 109-SB-A | 5/14/2013 | B13051294 | B13051294-009 |
| 10 | Soil | 97-SB-A | 5/14/2013 | B13051294 | B13051294-010 |
| 11 | Soil | 81-SB-A | 5/14/2013 | B13051294 | B13051294-011 |
| 12 | Water-Rinsate Blank | YOSD-1305-105 | 5/15/2013 | B13051451 | B13051451-001 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13051294 and B13051451*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| B | The analyte was detected in the method blank. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with a temperature of 0.7°C and 1.1°C respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Water: Chromium (Method E200.8) was detected in Method Blank MB-71371. The associated raw samples do not require a qualification because the analytes were non-detect for Chromium. Mercury (Method E245.1) was detected in Method Blank MB-71365. The associated raw sample so not require a qualification because associated raw samples were non-detect for Mercury. 2-Methylnapthalene and Naphthalene (Method SW8270C) were detected in MB-71750-71636-71466. A laboratory qualifier "B" is placed on the raw samples, as to indicate they were found in the method blank as well. A validation qualifier "U" is placed on the associated raw sample, YOSD-1305-105; as well as for this is a Rinsate Blank, which is discussed below. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnaphthalene and Naphthalene (Method SW8270C) were detected in Rinsate Blank YOSD-1305-105. A validation qualifier "U" was placed on the Rinsate Blank and associated raw soil samples with values <5x the reporting limit for these analytes. Chloroform (Method SW8260B) and Selenium (Method E200.8) were also detected in Rinsate Blank YOSD-1305-105. A validation qualifier "U" was placed on the Rinsate Blank only. Chloromethane (SW8260B) was also detected in Rinsate Blank YOSD-1305-105 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 81-SB-A was flagged with laboratory qualifier "S" for the % recovery of 2-Fluorobiphenyl (Method SW8270C) being above control limits. A validation qualifier was not necessary because two other surrogates were within limits. Sample 36-SB-A, 36-SB-B, and 36-SB-C were flagged with laboratory qualifier "S" for the % recovery of Dibromofluoromethane (SW8260B) being above control limits. A validation qualifier was not necessary because three other surrogates were within limits. Sample 99-SB-A was flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatics Surrogate (Method MA-VPH) and Nitrolbenzene-d5(SW8270C) being above control limits. A validation qualifier "J" was placed on the detected analytes of Method MA-VPH only, indicating high bias. Method SW8270C had other surrogates within control limits. Sample 108-SB-A was flagged with laboratory qualifier "S" for the % recovery of VPH Aromatics Surrogate (Method MA-VPH) being above control limits. This surrogate was barely out of control limits with another surrogate for this method within control limits. No validation qualifier was necessary. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B13051294-002AMS3 and B13051294-002AMSD3 were flagged with laboratory qualifier "S" for the % recovery of the analytes Barium and Selenium (Method SW6020) and VPH Aliphatics Surrogate (Method MA-VPH) being outside of control limits. No validation qualifier was necessary because the post distillation spike and LCS were within control limits. QC sample B13051386-009AMS3 and B13051386-009AMSD3 were flagged with laboratory qualifier "S" for the % recovery of the analyte Selenium (Method SW6020). No validation qualifier was necessary because the post distillation spike was within control limits. Water: QC matrix spike B13051529-005_MS and matrix spike duplicate B13051529-005_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chloroethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not submitted with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1305-105 | Water | B13051451-001 | SW8270C | 2-Methylnaphthalene | 0.21 | ug/L | U | |
| YOSD-1305-105 | Water | B13051451-001 | SW8270C | Naphthalene | 0.34 | ug/L | U | |
| YOSD-1305-105 | Water | B13051451-001 | E200.8 | Selenium | 0.002 | ug/L | U | |
| YOSD-1305-105 | Water | B13051451-001 | SW8260B | Chloroform | 5.9 | ug/L | U | |
| 109-SB-A | Soil | B13051294-009 | SW8270C | 2-Methylnaphthalene | 0.0034 | mg/kg | U | |
| 36-SB-A | Soil | B13051294-002 | SW8270C | 2-Methylnaphthalene | 0.016 | mg/kg | U | |
| 36-SB-B | Soil | B13051294-003 | SW8270C | 2-Methylnaphthalene | 0.010 | mg/kg | U | |
| 36-SB-C | Soil | B13051294-004 | SW8270C | 2-Methylnaphthalene | 0.0041 | mg/kg | U | |
| 37-SB-A | Soil | B13051294-005 | SW8270C | 2-Methylnaphthalene | 0.0074 | mg/kg | U | |
| 81-SB-A | Soil | B13051294-011 | SW8270C | 2-Methylnaphthalene | 0.15 | mg/kg | U | |
| 36-SB-A | Soil | B13051294-002 | SW8270C | Naphthalene | 0.013 | mg/kg | U | |
| 36-SB-B | Soil | B13051294-003 | SW8270C | Naphthalene | 0.012 | mg/kg | U | |
| 36-SB-C | Soil | B13051294-004 | SW8270C | Naphthalene | 0.0042 | mg/kg | U | |
| 37-SB-A | Soil | B13051294-005 | SW8270C | Naphthalene | 0.0042 | mg/kg | U | |
| 81-SB-A | Soil | B13051294-011 | SW8270C | Naphthalene | 0.31 | mg/kg | U | |
| 99-SB-A | Soil | B13051294-007 | MA-VPH | TOTAL XYLENE | 11 | mg/kg | J | High Bias |
| 99-SB-A | Soil | B13051294-007 | MA-VPH | Ethylbenzene | 56 | mg/kg | J | High Bias |
| 99-SB-A | Soil | B13051294-007 | MA-VPH | Naphthalene | 25 | mg/kg | J | High Bias |
| 99-SB-A | Soil | B13051294-007 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 6700 | mg/kg | J | High Bias |
| 99-SB-A | Soil | B13051294-007 | MA-VPH | C9-C12 ALIPHATICS | 3250 | mg/kg | J | High Bias |
| 99-SB-A | Soil | B13051294-007 | MA-VPH | o-Xylene | 11 | mg/kg | J | High Bias |
| 99-SB-A | Soil | B13051294-007 | MA-VPH | C5-C8 ALIPHATICS | 1800 | mg/kg | J | High Bias |
| 99-SB-A | Soil | B13051294-007 | MA-VPH | C9-C10 AROMATICS | 1820 | mg/kg | J | High Bias |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/15/2013** |
| **Verified By/Date Verified: Angela Roddy 07/24/2013** | **Sample End Date: 05/15/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 82-SB-A | 5/15/2013 | B13051446 | B13051446-001 |
| 2 | Soil | 82-SB-AD | 5/15/2013 | B13051446 | B13051446-002 |
| 3 | Soil | 83-SB-A | 5/15/2013 | B13051446 | B13051446-003 |
| 4 | Soil | 84-SB-A | 5/15/2013 | B13051446 | B13051446-004 |
| 5 | Soil | 85-SB-A | 5/15/2013 | B13051446 | B13051446-005 |
| 6 | Soil | 86-SB-A | 5/15/2013 | B13051446 | B13051446-006 |
| 7 | Soil | 100-SB-A | 5/15/2013 | B13051446 | B13051446-007 |
| 8 | Soil | 101-SB-A | 5/15/2013 | B13051446 | B13051446-008 |
| 9 | Water-Rinsate Blank | YOSD-1305-105 | 5/15/2013 | B13051451 | B13051451-001 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13051446 and B13051451*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| B | The analyte was detected in the method blank. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with a temperature of 1.7°C and 1.1°C respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6020) was detected in Method Blank MB-71432. A validation qualifier was not necessary because the raw soil sample had values >10x the reporting limit for Barium. Water: Chromium (Method E200.8) was detected in Method Blank MB-71371. The associated raw samples do not require a qualification because the analytes were non-detect for Chromium. Mercury (Method E245.1) was detected in Method Blank MB-71365. The associated raw sample so not require a qualification because associated raw samples were non-detect for Mercury. 2-Methylnapthalene and Naphthalene (Method SW8270C) were detected in MB-71750-71636-71466. A laboratory qualifier "B" is placed on the raw samples, as to indicate they were found in the method blank as well. A validation qualifier "U" is placed on the associated raw sample, YOSD-1305-105; as well as for this is a Rinsate Blank, which is discussed below. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnaphthalene and Naphthalene (Method SW8270C) were detected in Rinsate Blank YOSD-1305-105. A validation qualifier "U" was placed on the Rinsate Blank and associated raw soil samples with values <5x the reporting limit for these analytes. Chloroform (Method SW8260B) and Selenium (Method E200.8) were also detected in Rinsate Blank YOSD-1305-105. A validation qualifier "U" was only necessary for the Rinsate Blank for these analytes, as the values are non-detect in associated raw soil samples. Chloromethane (SW8260B) was also detected in Rinsate Blank YOSD-1305-105 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 85-SB-A was flagged with laboratory qualifier "S" for the % recovery of Nitrolbenzene-d5 (SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for this analyte. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B13051294-002AMSD was flagged with laboratory qualifier "S" for the % recovery of the VPH Aliphatics Surrogate (Method MA-VPH) being outside of control limits. No validation qualifier was necessary because the LCS was within control limits. QC sample B13051446-008AMS3 and B13051446-008AMSD3 were flagged with laboratory qualifier "S" for the % recovery of the analyte Selenium (Method SW6020). No validation qualifier was necessary because the Laboratory Fortified Blank was within control limits. Water: QC matrix spike B13051529-005_MS and matrix spike duplicate B13051529-005_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chloroethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: 82-SB-A and its duplicate 82-SB-AD had RPDs outside of control limits for the analytes: Moisture % by Weight (Method SW3550A) at 62% and a PRDL for Total Extractable Hydrocarbons. A validation qualifier "J" was placed on these analytes. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1305-105 | Water | B13051451-001 | SW8270C | 2-Methylnaphthalene | 0.21 | ug/L | U | |
| YOSD-1305-105 | Water | B13051451-001 | SW8270C | Naphthalene | 0.34 | ug/L | U | |
| YOSD-1305-105 | Water | B13051451-001 | E200.8 | Selenium | 0.002 | ug/L | U | |
| YOSD-1305-105 | Water | B13051451-001 | SW8260B | Chloroform | 5.9 | ug/L | U | |
| 100-SB-A | Soil | B13051446-007 | SW8270C | 2-Methylnaphthalene | 0.0059 | mg/kg | U | |
| 82-SB-A | Soil | B13051446-001 | SW3550A | MOISTURE % BY WT. | 9.5 | mg/kg | J | RPD |
| 82-SB-AD | Soil | B13051446-002 | SW3550A | MOISTURE % BY WT. | 18 | mg/kg | J | RPD |
| 83-SB-A | Soil | B13051446-003 | SW3550A | MOISTURE % BY WT. | 7.0 | mg/kg | J | RPD |
| 84-SB-A | Soil | B13051446-004 | SW3550A | MOISTURE % BY WT. | 20 | mg/kg | J | RPD |
| 85-SB-A | Soil | B13051446-005 | SW3550A | MOISTURE % BY WT. | 4.1 | mg/kg | J | RPD |
| 86-SB-A | Soil | B13051446-006 | SW3550A | MOISTURE % BY WT. | 9.1 | mg/kg | J | RPD |
| 100-SB-A | Soil | B13051446-007 | SW3550A | MOISTURE % BY WT. | 4.2 | mg/kg | J | RPD |
| 101-SB-A | Soil | B13051446-008 | SW3550A | MOISTURE % BY WT. | 4.0 | mg/kg | J | RPD |
| 100-SB-A | Soil | B13051446-007 | MA-EPH | Total Extractable Hydrocarbons | 348 | mg/kg | J | PRDL |
| 101-SB-A | Soil | B13051446-008 | MA-EPH | Total Extractable Hydrocarbons | <10 | mg/kg | J | PRDL |
| 82-SB-A | Soil | B13051446-001 | MA-EPH | Total Extractable Hydrocarbons | 34 | mg/kg | J | PRDL |
| 82-SB-AD | Soil | B13051446-002 | MA-EPH | Total Extractable Hydrocarbons | <12 | mg/kg | J | PRDL |
| 83-SB-A | Soil | B13051446-003 | MA-EPH | Total Extractable Hydrocarbons | 26 | mg/kg | J | PRDL |
| 84-SB-A | Soil | B13051446-004 | MA-EPH | Total Extractable Hydrocarbons | <12 | mg/kg | J | PRDL |
| 85-SB-A | Soil | B13051446-005 | MA-EPH | Total Extractable Hydrocarbons | 4730 | mg/kg | J | PRDL |
| 86-SB-A | Soil | B13051446-006 | MA-EPH | Total Extractable Hydrocarbons | <11 | mg/kg | J | PRDL |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/16/2013** |
| **Verified By/Date Verified: Angela Roddy 07/24/2013** | **Sample End Date: 05/22/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 38-SB-A | 5/16/2013 | B13051564 | B13051564-001 |
| 2 | Soil | 9-SB-A | 5/16/2013 | B13051564 | B13051564-002 |
| 3 | Soil | 11-SB-A | 5/16/2013 | B13051564 | B13051564-003 |
| 4 | Soil | 22-SB-A | 5/16/2013 | B13051564 | B13051564-004 |
| 5 | Soil | 22-SB-B | 5/16/2013 | B13051564 | B13051564-005 |
| 6 | Soil | 22-SB-C | 5/16/2013 | B13051564 | B13051564-006 |
| 7 | Soil | 23-SB-A | 5/16/2013 | B13051564 | B13051564-007 |
| 8 | Soil | 23-SB-B | 5/16/2013 | B13051564 | B13051564-008 |
| 9 | Soil | 23-SB-C | 5/16/2013 | B13051564 | B13051564-009 |
| 10 | Water-Rinsate Blank | YOSD-1305-106 | 5/20/2013 | B13051955 | B13051955-001 |
| 11 | Water-Rinsate Blank | YOSD-1305-107 | 5/22/2013 | B13051955 | B13051955-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13051564 and B13051955*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with a temperature of 1.7°C and 0.9°C respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium, Lead, and Silver (Method SW6020) were detected in Method Blank MB-71432. A validation qualifier was not necessary because the raw soil sample had values either >10x the reporting limit or non-detect for these analytes. Water: Cadmium, Chromium, and Silver (Method E200.8) were detected in Method Blank MB-71559. The associated raw samples do not require a qualification because the analytes were non-detect for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C) and Chloroform (Method SW8260B) were detected in Rinsate Blank YOSD-1305-106. A validation qualifier "U" was placed on the Rinsate Blank. The associated raw soil samples were either non-detect or had values >5x the reporting limit for these analytes. Chloromethane (SW8260B) was also detected in Rinsate Blank YOSD-1305-106 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 11-SB-A was flagged with laboratory qualifier "S" for the % recovery of Nitrolbenzene-d5 (SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for this analyte. Sample 22-SB-B was flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatics and VPH Aromatics Surrogates (Method MA-VPH) and o-Terphenyl (MA-EPH) being above control limits. A validation qualifier "J" was only necessary for detected analytes of the Method MA-VPH, indicating high bias, for which both surrogates were above control limits. Samples 22-SB-C and 23-SB-A were flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatics and VPH Aromatics Surrogates (Method MA-VPH) being above control limits. A validation qualifier "J" was placed on all detected analytes for this method, indicating high bias. Sample 23-SB-B was flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatics Surrogate (Method MA-VPH) and o-Terphenyl (MA-EPH) being above control limits. A validation qualifier was not necessary because the VPH surrogate was barely outside of control limits with another surrogate within limits, as well as other surrogates within control limits for Method MA-EPH. Sample 23-SB-C was flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatics Surrogate (Method MA-VPH) being above control limits. A validation qualifier "J" was placed on all detected analytes for this method, indicating high bias. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: LCS-71446 was flagged with laboratory qualifier "S" for the % recovery of n-Pentane (Method MA-VPH) being outside of control limits. A validation qualifier was not necessary because the closing LCS was within limits for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B13051818-001AMS3 and B13051818-001AMSD3 were flagged with laboratory qualifier "S" for the % recovery of the analytes Arsenic and Selenium (Method SW6020). No validation qualifier was necessary because the post-distillation spike was within control limits. Water: QC matrix spike B13051955-002D_MS and matrix spike duplicate B13051955-002D_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not submitted with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1305-106 | Water | B13051955-001 | SW8260B | Chloroform | 5.8 | ug/L | U | |
| YOSD-1305-106 | Water | B13051955-001 | SW8270C | Naphthalene | 0.26 | ug/L | U | |
| 22-SB-B | Soil | B13051564-005 | MA-VPH | C9-C10 AROMATICS | 1330 | mg/kg | J | High Bias |
| 22-SB-B | Soil | B13051564-005 | MA-VPH | C9-C12 ALIPHATICS | 2370 | mg/kg | J | High Bias |
| 22-SB-B | Soil | B13051564-005 | MA-VPH | C5-C8 ALIPHATICS | 1210 | mg/kg | J | High Bias |
| 22-SB-B | Soil | B13051564-005 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 5080 | mg/kg | J | High Bias |
| 22-SB-B | Soil | B13051564-005 | MA-VPH | TOTAL XYLENE | 8.6 | mg/kg | J | High Bias |
| 22-SB-B | Soil | B13051564-005 | MA-VPH | o-Xylene | 8.6 | mg/kg | J | High Bias |
| 22-SB-C | Soil | B13051564-006 | MA-VPH | C5-C8 ALIPHATICS | 1940 | mg/kg | J | High Bias |
| 22-SB-C | Soil | B13051564-006 | MA-VPH | C9-C10 AROMATICS | 1540 | mg/kg | J | High Bias |
| 22-SB-C | Soil | B13051564-006 | MA-VPH | o-Xylene | 10 | mg/kg | J | High Bias |
| 22-SB-C | Soil | B13051564-006 | MA-VPH | TOTAL XYLENE | 10 | mg/kg | J | High Bias |
| 22-SB-C | Soil | B13051564-006 | MA-VPH | C9-C12 ALIPHATICS | 2780 | mg/kg | J | High Bias |
| 22-SB-C | Soil | B13051564-006 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 6300 | mg/kg | J | High Bias |
| 23-SB-A | Soil | B13051564-007 | MA-VPH | C9-C10 AROMATICS | 2460 | mg/kg | J | High Bias |
| 23-SB-A | Soil | B13051564-007 | MA-VPH | Ethylbenzene | 61 | mg/kg | J | High Bias |
| 23-SB-A | Soil | B13051564-007 | MA-VPH | TOTAL XYLENE | 20 | mg/kg | J | High Bias |
| 23-SB-A | Soil | B13051564-007 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 9300 | mg/kg | J | High Bias |
| 23-SB-A | Soil | B13051564-007 | MA-VPH | C5-C8 ALIPHATICS | 2090 | mg/kg | J | High Bias |
| 23-SB-A | Soil | B13051564-007 | MA-VPH | C9-C12 ALIPHATICS | 4170 | mg/kg | J | High Bias |
| 23-SB-A | Soil | B13051564-007 | MA-VPH | M-P XYLENE | 6.0 | mg/kg | J | High Bias |
| 23-SB-A | Soil | B13051564-007 | MA-VPH | BENZENE | 5.6 | mg/kg | J | High Bias |
| 23-SB-A | Soil | B13051564-007 | MA-VPH | o-Xylene | 14 | mg/kg | J | High Bias |
| 23-SB-A | Soil | B13051564-007 | MA-VPH | Naphthalene | 43 | mg/kg | J | High Bias |
| 23-SB-C | Soil | B13051564-009 | MA-VPH | C9-C10 AROMATICS | 711 | mg/kg | J | High Bias |
| 23-SB-C | Soil | B13051564-009 | MA-VPH | C5-C8 ALIPHATICS | 991 | mg/kg | J | High Bias |
| 23-SB-C | Soil | B13051564-009 | MA-VPH | C9-C12 ALIPHATICS | 1390 | mg/kg | J | High Bias |
| 23-SB-C | Soil | B13051564-009 | MA-VPH | Naphthalene | 11 | mg/kg | J | High Bias |
| 23-SB-C | Soil | B13051564-009 | MA-VPH | o-Xylene | 4.9 | mg/kg | J | High Bias |
| 23-SB-C | Soil | B13051564-009 | MA-VPH | BENZENE | 1.5 | mg/kg | J | High Bias |
| 23-SB-C | Soil | B13051564-009 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 2680 | mg/kg | J | High Bias |
| 23-SB-C | Soil | B13051564-009 | MA-VPH | TOTAL XYLENE | 6.5 | mg/kg | J | High Bias |
| 23-SB-C | Soil | B13051564-009 | MA-VPH | M-P XYLENE | 1.6 | mg/kg | J | High Bias |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/17/2013** |
| **Verified By/Date Verified: Angela Roddy 07/26/2013** | **Sample End Date: 05/22/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 1-SB-A | 5/17/2013 | B13051630 | B13051630-001 |
| 2 | Soil | 2-SB-A | 5/17/2013 | B13051630 | B13051630-002 |
| 3 | Soil | 3-SB-A | 5/17/2013 | B13051630 | B13051630-003 |
| 4 | Soil | 52-SB-A | 5/17/2013 | B13051630 | B13051630-004 |
| 5 | Soil | 52-SB-B | 5/17/2013 | B13051630 | B13051630-005 |
| 6 | Soil | 52-SB-C | 5/17/2013 | B13051630 | B13051630-006 |
| 7 | Water-Rinsate Blank | YOSD-1305-106 | 5/20/2013 | B13051955 | B13051955-001 |
| 8 | Water-Rinsate Blank | YOSD-1305-107 | 5/22/2013 | B13051955 | B13051955-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13051630 and B13051955*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

J Estimated value. The analyte was present but less than the reporting limit.

S Spike recovery outside of advisory limits.

**Validation qualifiers used in this review:**

U Blank Exceedance

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with a temperature of 1.1°C and 0.9°C respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium, Lead, and Silver (Method SW6020) were detected in Method Blank MB-71493. A validation qualifier was not necessary because the raw soil sample had values either >10x the reporting limit or non-detect for these analytes. Water: Cadmium and Chromium (Method E200.8) were detected in Method Blank MB-71559. The associated raw samples do not require a qualification because the analytes were non-detect for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C) and Chloroform (Method SW8260B) were detected in Rinsate Blank YOSD-1305-106. A validation qualifier "U" was placed on the Rinsate Blank. The associated raw soil samples were non-detect for these analytes. Chloromethane (SW8260B) was also detected in Rinsate Blank YOSD-1305-106 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All surrogate recoveries were within control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B13051818-001AMS3 and B13051818-001AMSD3 were flagged with laboratory qualifier "S" for the % recovery of the analytes Arsenic and Selenium (Method SW6020). No validation qualifier was necessary because the post-distillation spike was within control limits. QC sample B13051669-001AMS and B13051669-001AMSD were flagged with laboratory qualifier "S" for the % recovery of the analyte Total Extractable Hydrocarbons (Method SW8015M) being below control limits. A validation qualifier was not necessary because the LCS was within control limits for this analyte. Water: QC matrix spike B13051955-002D_MS and matrix spike duplicate B13051955-002D_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not submitted with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1305-106 | Water | B13051955-001 | SW8260B | Chloroform | 5.8 | ug/L | U | |
| YOSD-1305-106 | Water | B13051955-001 | SW8270C | Naphthalene | 0.26 | ug/L | U | |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/20/2013** |
| **Verified By/Date Verified: Angela Roddy 07/26/2013** | **Sample End Date: 05/22/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 56-SB-A | 5/20/2013 | B13051935 | B13051935-001 |
| 2 | Soil | 54-SB-A | 5/20/2013 | B13051935 | B13051935-002 |
| 3 | Soil | 53-SB-A | 5/21/2013 | B13051935 | B13051935-003 |
| 4 | Soil | 64-SB-A | 5/21/2013 | B13051935 | B13051935-004 |
| 5 | Soil | 64-SB-B | 5/21/2013 | B13051935 | B13051935-005 |
| 6 | Soil | 63-SB-A | 5/21/2013 | B13051935 | B13051935-006 |
| 7 | Soil | 61-SB-A | 5/21/2013 | B13051935 | B13051935-007 |
| 8 | Soil | 61-SB-B | 5/21/2013 | B13051935 | B13051935-008 |
| 9 | Soil | 61-SB-C | 5/21/2013 | B13051935 | B13051935-009 |
| 10 | Soil | 62-SB-A | 5/21/2013 | B13051935 | B13051935-010 |
| 11 | Soil | 62-SB-B | 5/21/2013 | B13051935 | B13051935-011 |
| 12 | Soil | 57-SB-A | 5/21/2013 | B13051935 | B13051935-012 |
| 13 | Soil | 57-SB-B | 5/21/2013 | B13051935 | B13051935-013 |
| 14 | Soil | 55-SB-A | 5/21/2013 | B13051935 | B13051935-014 |
| 15 | Soil | 63-SB-B | 5/21/2013 | B13051935 | B13051935-015 |
| 16 | Water-Rinsate Blank | YOSD-1305-106 | 5/20/2013 | B13051955 | B13051955-001 |
| 17 | Water-Rinsate Blank | YOSD-1305-107 | 5/22/2013 | B13051955 | B13051955-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13051935 and B13051955*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with temperatures of 0.9°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6020) was detected in Method Blank MB-71648. A validation qualifier was not necessary because the raw soil samples had values >10x the reporting limit for Barium. Water: Cadmium and Chromium (Method E200.8) were detected in Method Blank MB-71559. The associated raw samples do not require a qualification because the analytes were non-detect for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C) and Chloroform (Method SW8260B) were detected in Rinsate Blank YOSD-1305-106. A validation qualifier "U" was placed on the Rinsate Blank, as well as the associated raw soil samples with values <5x the reporting limit for Naphthalene. Chloromethane (SW8260B) was also detected in Rinsate Blank YOSD-1305-106 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Sample 56-SB-A was flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatics and VPH Aromatics Surrogates (MA-VPH) being below control limits. A validation qualifier was not necessary because these surrogates were just below the control limits. Samples 54-SB-A, 61-SB-B, 61-SB-C, 62-SB-A, 62-SB-B, 57-SB-A, 57-SB-B, 55-SB-A, and 63-SB-B were flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for this method. Samples 64-SB-A, 64-SB-B, and 63-SB-A were flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) and o-Terphenyl (MA-EPH) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for these methods. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B13051935-015AMS3 and B13051935-015AMSD3 were flagged with laboratory qualifier "S" for the % recovery of the analyte Selenium (Method SW6020). No validation qualifier was necessary because the post-distillation spike was within control limits. QC sample B13051935-012AMS was flagged with laboratory qualifier "S" for the % recovery of the analytes Anthracene, Benzo(a)pyrene, Dibenzo(a,h)anthracene, Fluoranthene, Pyrene, and Surrogates Nitrobenzene-d5 and Terpehnyl-d14 (Method SW8270C). B13051935-012AMSD was flagged with laboratory qualifier "S" for the % recovery of the analytes Benzo(a)pyrene, Pyrene, and Surrogates Nitrobenzene-d5 and Terpehnyl-d14 (Method SW8270C). A validation qualifier was not necessary because the LCS was within control limits for this method. Water: QC matrix spike B13051955-002D_MS and matrix spike duplicate B13051955-002D_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not submitted with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of "A" was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

**Validator Qualified Analytical Results**

| Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag | Comments |
|---|---|---|---|---|---|---|---|---|
| YOSD-1305-106 | Water | B13051955-001 | SW8260B | Chloroform | 5.8 | ug/L | U | |
| YOSD-1305-106 | Water | B13051955-001 | SW8270C | Naphthalene | 0.26 | ug/L | U | |
| 54-SB-A | Soil | B13051935-002 | SW8270C | Naphthalene | 6.1 | mg/kg | U | |
| 56-SB-A | Soil | B13051935-001 | SW8270C | Naphthalene | 8.2 | mg/kg | U | |
| 57-SB-A | Soil | B13051935-012 | SW8270C | Naphthalene | 0.0090 | mg/kg | U | |
| 61-SB-A | Soil | B13051935-007 | SW8270C | Naphthalene | 0.52 | mg/kg | U | |
| 61-SB-C | Soil | B13051935-009 | SW8270C | Naphthalene | 6.4 | mg/kg | U | |
| 62-SB-B | Soil | B13051935-011 | SW8270C | Naphthalene | 7.6 | mg/kg | U | |
| 63-SB-A | Soil | B13051935-006 | SW8270C | Naphthalene | 19 | mg/kg | U | |
| 63-SB-B | Soil | B13051935-015 | SW8270C | Naphthalene | 10 | mg/kg | U | |
| 64-SB-A | Soil | B13051935-004 | SW8270C | Naphthalene | 4.3 | mg/kg | U | |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/22/2013** |
| **Verified By/Date Verified: Angela Roddy 07/26/2013** | **Sample End Date: 05/24/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 74-SB-A | 5/22/2013 | B13051957 | B13051957-001 |
| 2 | Soil | 74-SB-AD | 5/22/2013 | B13051957 | B13051957-002 |
| 3 | Soil | 58-SB-A | 5/22/2013 | B13051957 | B13051957-003 |
| 4 | Soil | 58-SB-B | 5/22/2013 | B13051957 | B13051957-004 |
| 5 | Soil | 60-SB-A | 5/22/2013 | B13051957 | B13051957-005 |
| 6 | Soil | 73-SB-A | 5/22/2013 | B13051957 | B13051957-006 |
| 7 | Soil | 59-SB-A | 5/22/2013 | B13051957 | B13051957-007 |
| 8 | Soil | 75-SB-A | 5/22/2013 | B13051957 | B13051957-008 |
| 9 | Soil | 75-SB-B | 5/22/2013 | B13051957 | B13051957-009 |
| 10 | Water-Trip Blank | TB050213BTSSHP0262 | 5/24/2013 | B13052119 | B13052119-001 |
| 11 | Water-Rinsate Blank | YOSD-1305-108 | 5/24/2013 | B13052119 | B13052119-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13051957 and B13052119*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with temperatures of 0.7°C and 2.0°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Silver (Method SW6020) was detected in Method Blank MB-71649. A validation qualifier was not necessary because the raw soil samples had non-detect values for Silver. Water: Chromium (Method E200.8) was detected in Method Blank MB-71618. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Benzo(k)fluoranthene, Benzo(a)anthracene, Naphthalene, Pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, and Fluoranthene (Method SW8270C) were detected in Rinsate Blank YOSD-1305-108. A validation qualifier "U" was placed on the Rinsate Blank, as well as the associated raw soil samples with values <5x the reporting limit for these analytes. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 74-SB-A was flagged with laboratory qualifier "S" for the % recovery of Terphenyl-d14 (SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for this method. Samples 60-SB-A and 58-SB-A were flagged with laboratory qualifier S" for the % recovery of VPH Aliphatics Surrogate (MA-VPH) being above control limits. A validation qualifier "J" was placed on all detected analytes for this method, indicating high bias. Sample 58-SB-B was flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) and VPH Aliphatics Surrogate (MA-VPH) being just above control limits. A validation qualifier was not necessary because other surrogates were within limits for these methods. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS_052913 was flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chloroethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B13052033-001AMSD3 was flagged with laboratory qualifier "S" for the % recovery of the analyte Barium (Method SW6020). No validation qualifier was necessary because the post-distillation spike was within control limits. QC sample B13051935-012AMS was flagged with laboratory qualifier "S" for the % recovery of the analytes Anthracene, Benzo(a)pyrene, Dibenzo(a,h)anthracene, Fluoranthene, Pyrene, and Surrogates Nitrobenzene-d5 and Terpehnyl-d14 (Method SW8270C). B13051935-012AMSD was flagged with laboratory qualifier "S" for the % recovery of the analytes Benzo(a)pyrene, Pyrene, and Surrogates Nitrobenzene-d5 and Terpehnyl-d14 (Method SW8270C). A validation qualifier was not necessary because the LCS was within control limits for this method. QC sample B13051957-007AMSD was flagged with laboratory qualifier "S" for the % recovery of the analytes Anthracene (Method SW8270C) being outside of control limits. A validation qualifier was not necessary because the LCS was within control limits for this method. QC sample B13051957-001AMS and B13051957-001AMSD were flagged with laboratory qualifier "S" for the majority of the analytes for Method SW8270C. Due to matrix interference, this QC sample was run as a sample duplicate instead. Water: QC matrix spike B13052119-001D_MS and matrix spike duplicate B13052119-001D_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample 74-SB-A and its duplicate 74-SB-AD had an RPD outside of control limits for Chromium (Method SW6020) at 51%. Raw soil samples were flagged with laboratory qualifier "J" for this analyte. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(k)fluoranthene | 0.43 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(a)anthracene | 0.50 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Naphthalene | 0.29 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Pyrene | 0.55 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(b)fluoranthene | 0.32 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(g,h,i)perylene | 0.47 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(a)pyrene | 0.24 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Chrysene | 0.48 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Fluoranthene | 0.53 | ug/L | U | |
| 58-SB-A | Soil | B13051957-003 | SW8270C | Benzo(a)anthracene | 0.17 | mg/kg | U | |
| 58-SB-A | Soil | B13051957-003 | SW8270C | Dibenzo(a,h)anthracene | 0.048 | mg/kg | U | |
| 58-SB-A | Soil | B13051957-003 | SW8270C | Benzo(g,h,i)perylene | 0.12 | mg/kg | U | |
| 58-SB-A | Soil | B13051957-003 | SW8270C | Pyrene | 0.19 | mg/kg | U | |
| 58-SB-A | Soil | B13051957-003 | SW8270C | Benzo(k)fluoranthene | 0.12 | mg/kg | U | |
| 58-SB-B | Soil | B13051957-004 | SW8270C | Benzo(k)fluoranthene | 0.044 | mg/kg | U | |
| 58-SB-B | Soil | B13051957-004 | SW8270C | Benzo(a)pyrene | 0.078 | mg/kg | U | |
| 58-SB-B | Soil | B13051957-004 | SW8270C | Chrysene | 0.12 | mg/kg | U | |
| 58-SB-B | Soil | B13051957-004 | SW8270C | Benzo(b)fluoranthene | 0.13 | mg/kg | U | |
| 58-SB-B | Soil | B13051957-004 | SW8270C | Benzo(a)anthracene | 0.13 | mg/kg | U | |
| 58-SB-B | Soil | B13051957-004 | SW8270C | Benzo(g,h,i)perylene | 0.044 | mg/kg | U | |
| 60-SB-A | Soil | B13051957-005 | SW8270C | Fluoranthene | 0.076 | mg/kg | U | |
| 60-SB-A | Soil | B13051957-005 | SW8270C | Benzo(a)anthracene | 0.055 | mg/kg | U | |
| 60-SB-A | Soil | B13051957-005 | SW8270C | Chrysene | 0.045 | mg/kg | U | |
| 60-SB-A | Soil | B13051957-005 | SW8270C | Pyrene | 0.093 | mg/kg | U | |
| 73-SB-A | Soil | B13051957-006 | SW8270C | Fluoranthene | 0.32 | mg/kg | U | |
| 73-SB-A | Soil | B13051957-006 | SW8270C | Benzo(a)pyrene | 0.12 | mg/kg | U | |
| 73-SB-A | Soil | B13051957-006 | SW8270C | Benzo(g,h,i)perylene | 0.12 | mg/kg | U | |
| 73-SB-A | Soil | B13051957-006 | SW8270C | Benzo(b)fluoranthene | 0.20 | mg/kg | U | |
| 73-SB-A | Soil | B13051957-006 | SW8270C | Benzo(a)anthracene | 0.15 | mg/kg | U | |
| 73-SB-A | Soil | B13051957-006 | SW8270C | Benzo(k)fluoranthene | 0.090 | mg/kg | U | |
| 73-SB-A | Soil | B13051957-006 | SW8270C | Chrysene | 0.17 | mg/kg | U | |
| 73-SB-A | Soil | B13051957-006 | SW8270C | Pyrene | 0.33 | mg/kg | U | |
| 74-SB-A | Soil | B13051957-001 | SW8270C | Dibenzo(a,h)anthracene | 0.17 | mg/kg | U | |
| 74-SB-AD | Soil | B13051957-002 | SW8270C | Dibenzo(a,h)anthracene | 0.15 | mg/kg | U | |
| 74-SB-AD | Soil | B13051957-002 | SW8270C | Naphthalene | 0.043 | mg/kg | U | |
| 75-SB-A | Soil | B13051957-008 | SW8270C | Pyrene | 0.067 | mg/kg | U | |
| 75-SB-A | Soil | B13051957-008 | SW8270C | Benzo(g,h,i)perylene | 0.064 | mg/kg | U | |
| 75-SB-A | Soil | B13051957-008 | SW8270C | Benzo(a)pyrene | 0.075 | mg/kg | U | |
| 75-SB-A | Soil | B13051957-008 | SW8270C | Chrysene | 0.053 | mg/kg | U | |
| 75-SB-A | Soil | B13051957-008 | SW8270C | Benzo(a)anthracene | 0.065 | mg/kg | U | |
| 75-SB-A | Soil | B13051957-008 | SW8270C | Fluoranthene | 0.079 | mg/kg | U | |
| 75-SB-A | Soil | B13051957-008 | SW8270C | Benzo(k)fluoranthene | 0.039 | mg/kg | U | |
| 75-SB-A | Soil | B13051957-008 | SW8270C | Benzo(b)fluoranthene | 0.086 | mg/kg | U | |
| 75-SB-B | Soil | B13051957-009 | SW8270C | Benzo(k)fluoranthene | 0.17 | mg/kg | U | |
| 75-SB-B | Soil | B13051957-009 | SW8270C | Naphthalene | 0.046 | mg/kg | U | |
| 58-SB-A | Soil | B13051957-003 | SW6020 | Chromium | 28 | mg/kg | J | RPD |
| 58-SB-B | Soil | B13051957-004 | SW6020 | Chromium | 22 | mg/kg | J | RPD |
| 59-SB-A | Soil | B13051957-007 | SW6020 | Chromium | 17 | mg/kg | J | RPD |
| 60-SB-A | Soil | B13051957-005 | SW6020 | Chromium | 29 | mg/kg | J | RPD |
| 73-SB-A | Soil | B13051957-006 | SW6020 | Chromium | 21 | mg/kg | J | RPD |
| 74-SB-A | Soil | B13051957-001 | SW6020 | Chromium | 16 | mg/kg | J | RPD |
| 74-SB-AD | Soil | B13051957-002 | SW6020 | Chromium | 27 | mg/kg | J | RPD |
| 75-SB-A | Soil | B13051957-008 | SW6020 | Chromium | 22 | mg/kg | J | RPD |
| 75-SB-B | Soil | B13051957-009 | SW6020 | Chromium | 18 | mg/kg | J | RPD |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 58-SB-A | Soil | B13051957-003 | MA-VPH | TOTAL XYLENE | 3.4 | mg/kg | J | High Bias |
| 58-SB-A | Soil | B13051957-003 | MA-VPH | Ethylbenzene | 9.0 | mg/kg | J | High Bias |
| 58-SB-A | Soil | B13051957-003 | MA-VPH | o-Xylene | 3.4 | mg/kg | J | High Bias |
| 58-SB-A | Soil | B13051957-003 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 1880 | mg/kg | J | High Bias |
| 58-SB-A | Soil | B13051957-003 | MA-VPH | C9-C12 ALIPHATICS | 1200 | mg/kg | J | High Bias |
| 58-SB-A | Soil | B13051957-003 | MA-VPH | C9-C10 AROMATICS | 671 | mg/kg | J | High Bias |
| 58-SB-A | Soil | B13051957-003 | MA-VPH | C5-C8 ALIPHATICS | 394 | mg/kg | J | High Bias |
| 58-SB-A | Soil | B13051957-003 | MA-VPH | Naphthalene | 6.5 | mg/kg | J | High Bias |
| 60-SB-A | Soil | B13051957-005 | MA-VPH | C9-C10 AROMATICS | 741 | mg/kg | J | High Bias |
| 60-SB-A | Soil | B13051957-005 | MA-VPH | C9-C12 ALIPHATICS | 1440 | mg/kg | J | High Bias |
| 60-SB-A | Soil | B13051957-005 | MA-VPH | C5-C8 ALIPHATICS | 113 | mg/kg | J | High Bias |
| 60-SB-A | Soil | B13051957-005 | MA-VPH | TOTAL XYLENE | 2.6 | mg/kg | J | High Bias |
| 60-SB-A | Soil | B13051957-005 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 2260 | mg/kg | J | High Bias |
| 60-SB-A | Soil | B13051957-005 | MA-VPH | Ethylbenzene | 7.4 | mg/kg | J | High Bias |
| 60-SB-A | Soil | B13051957-005 | MA-VPH | o-Xylene | 2.6 | mg/kg | J | High Bias |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |
| U | Blank Exceedance | | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/23/2013** |
| **Verified By/Date Verified: Angela Roddy 07/31/2013** | **Sample End Date: 05/24/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 54-SB-B | 5/23/2013 | B13052061 | B13052061-001 |
| 2 | Soil | 53-SB-B | 5/23/2013 | B13052061 | B13052061-002 |
| 3 | Soil | 96-SB-A | 5/23/2013 | B13052061 | B13052061-003 |
| 4 | Soil | 92-SB-A | 5/23/2013 | B13052061 | B13052061-004 |
| 5 | Soil | 80-SB-A | 5/23/2013 | B13052061 | B13052061-005 |
| 6 | Soil | 80-SB-B | 5/23/2013 | B13052061 | B13052061-006 |
| 7 | Soil | 80-SB-C | 5/23/2013 | B13052061 | B13052061-007 |
| 8 | Soil | 79-SB-B | 5/23/2013 | B13052061 | B13052061-008 |
| 9 | Soil | 79-SB-C | 5/23/2013 | B13052061 | B13052061-009 |
| 10 | Soil | 76-SB-A | 5/23/2013 | B13052061 | B13052061-010 |
| 11 | Soil | 76-SB-B | 5/23/2013 | B13052061 | B13052061-011 |
| 12 | Soil | 76-SB-C | 5/23/2013 | B13052061 | B13052061-012 |
| 13 | Soil | 91-SB-A | 5/23/2013 | B13052061 | B13052061-013 |
| 14 | Soil | 95-SB-A | 5/23/2013 | B13052061 | B13052061-014 |
| 15 | Soil | 95-SB-B | 5/23/2013 | B13052061 | B13052061-015 |
| 16 | Water-Trip Blank | TB050213BTSSHP0262 | 5/24/2013 | B13052119 | B13052119-001 |
| 17 | Water-Rinsate Blank | YOSD-1305-108 | 5/24/2013 | B13052119 | B13052119-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13052061 and B13052119*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1, 2, and 3 arrived with temperatures of 0.8°C, 1.2°C, and 2.0°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium and Lead (Method SW6010B) were detected in Method Blank MB-71681. A validation qualifier was not necessary because the raw soil samples had values >10x the reporting limit for these analytes. Water: Chromium (Method E200.8) was detected in Method Blank MB-71618. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Benzo(k)fluoranthene, Benzo(a)anthracene, Naphthalene, Pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, and Fluoranthene (Method SW8270C) were detected in Rinsate Blank YOSD-1305-108. A validation qualifier "U" was placed on the Rinsate Blank, as well as the associated raw soil samples with values <5x the reporting limit for the Method SW8270C. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Sample 54-SB-B was flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for this method. Sample 80-SB-B was flagged with laboratory qualifier S" for the % recovery of Nitrobenzene-d5, 2-Fluorobiphenyl, and Terphenyl-d14 (Method SW8270C) being below control limits. A validation qualifier "J" was placed on all detected analytes for this method, indicating high bias. Sample 80-SB-C was flagged with laboratory qualifier "S" for the % recovery of 2-Fluorobiphenyl (Method SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS_052913 was flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chloroethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B13051957-007AMS was flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Methylnaphthalene (Method SW8270C) being outside of control limits. A validation qualifier was not necessary because the LCS was within control limits for this method. Water: QC matrix spike B13052119-001D_MS and matrix spike duplicate B13052119-001D_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A field duplicate was not submitted with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| 53-SB-B | Soil | B13052061-002 | SW8270C | Fluoranthene | 0.0053 | mg/kg | U | |
| 53-SB-B | Soil | B13052061-002 | SW8270C | Pyrene | 0.0098 | mg/kg | U | |
| 53-SB-B | Soil | B13052061-002 | SW8270C | Benzo(a)anthracene | 0.0054 | mg/kg | U | |
| 53-SB-B | Soil | B13052061-002 | SW8270C | Chrysene | 0.0050 | mg/kg | U | |
| 54-SB-B | Soil | B13052061-001 | SW8270C | Benzo(b)fluoranthene | 0.12 | mg/kg | U | |
| 54-SB-B | Soil | B13052061-001 | SW8270C | Benzo(a)anthracene | 0.16 | mg/kg | U | |
| 54-SB-B | Soil | B13052061-001 | SW8270C | Pyrene | 0.28 | mg/kg | U | |
| 54-SB-B | Soil | B13052061-001 | SW8270C | Chrysene | 0.12 | mg/kg | U | |
| 54-SB-B | Soil | B13052061-001 | SW8270C | Fluoranthene | 0.25 | mg/kg | U | |
| 76-SB-A | Soil | B13052061-010 | SW8270C | Naphthalene | 0.0086 | mg/kg | U | |
| 76-SB-B | Soil | B13052061-011 | SW8270C | Benzo(g,h,i)perylene | 0.012 | mg/kg | U | |
| 76-SB-B | Soil | B13052061-011 | SW8270C | Fluoranthene | 0.015 | mg/kg | U | |
| 76-SB-B | Soil | B13052061-011 | SW8270C | Benzo(a)anthracene | 0.013 | mg/kg | U | |
| 76-SB-B | Soil | B13052061-011 | SW8270C | Benzo(a)pyrene | 0.015 | mg/kg | U | |
| 76-SB-B | Soil | B13052061-011 | SW8270C | Benzo(b)fluoranthene | 0.020 | mg/kg | U | |
| 76-SB-B | Soil | B13052061-011 | SW8270C | Chrysene | 0.011 | mg/kg | U | |
| 76-SB-B | Soil | B13052061-011 | SW8270C | Benzo(k)fluoranthene | 0.011 | mg/kg | U | |
| 76-SB-B | Soil | B13052061-011 | SW8270C | Pyrene | 0.016 | mg/kg | U | |
| 79-SB-B | Soil | B13052061-008 | SW8270C | Benzo(k)fluoranthene | 0.023 | mg/kg | U | |
| 79-SB-C | Soil | B13052061-009 | SW8270C | Chrysene | 0.0081 | mg/kg | U | |
| 79-SB-C | Soil | B13052061-009 | SW8270C | Fluoranthene | 0.013 | mg/kg | U | |
| 79-SB-C | Soil | B13052061-009 | SW8270C | Benzo(a)pyrene | 0.0081 | mg/kg | U | |
| 79-SB-C | Soil | B13052061-009 | SW8270C | Pyrene | 0.012 | mg/kg | U | |
| 79-SB-C | Soil | B13052061-009 | SW8270C | Benzo(g,h,i)perylene | 0.0079 | mg/kg | U | |
| 79-SB-C | Soil | B13052061-009 | SW8270C | Benzo(k)fluoranthene | 0.0052 | mg/kg | U | |
| 79-SB-C | Soil | B13052061-009 | SW8270C | Benzo(b)fluoranthene | 0.013 | mg/kg | U | |
| 79-SB-C | Soil | B13052061-009 | SW8270C | Benzo(a)anthracene | 0.0090 | mg/kg | U | |
| 80-SB-A | Soil | B13052061-005 | SW8270C | Benzo(g,h,i)perylene | 0.017 | mg/kg | U | |
| 80-SB-A | Soil | B13052061-005 | SW8270C | Chrysene | 0.019 | mg/kg | U | |
| 80-SB-A | Soil | B13052061-005 | SW8270C | Benzo(a)anthracene | 0.019 | mg/kg | U | |
| 80-SB-A | Soil | B13052061-005 | SW8270C | Benzo(k)fluoranthene | 0.012 | mg/kg | U | |
| 80-SB-B | Soil | B13052061-006 | SW8270C | Benzo(a)anthracene | 0.092 | mg/kg | U | |
| 80-SB-C | Soil | B13052061-007 | SW8270C | Naphthalene | 6.1 | mg/kg | U | |
| 91-SB-A | Soil | B13052061-013 | SW8270C | Benzo(b)fluoranthene | 0.0082 | mg/kg | U | |
| 91-SB-A | Soil | B13052061-013 | SW8270C | Benzo(g,h,i)perylene | 0.0043 | mg/kg | U | |
| 91-SB-A | Soil | B13052061-013 | SW8270C | Pyrene | 0.0055 | mg/kg | U | |
| 91-SB-A | Soil | B13052061-013 | SW8270C | Benzo(a)anthracene | 0.0055 | mg/kg | U | |
| 91-SB-A | Soil | B13052061-013 | SW8270C | Benzo(a)pyrene | 0.0046 | mg/kg | U | |
| 91-SB-A | Soil | B13052061-013 | SW8270C | Fluoranthene | 0.0058 | mg/kg | U | |
| 91-SB-A | Soil | B13052061-013 | SW8270C | Chrysene | 0.0043 | mg/kg | U | |
| 95-SB-A | Soil | B13052061-014 | SW8270C | Benzo(a)pyrene | 0.36 | mg/kg | U | |
| 95-SB-A | Soil | B13052061-014 | SW8270C | Pyrene | 0.91 | mg/kg | U | |
| 95-SB-A | Soil | B13052061-014 | SW8270C | Benzo(b)fluoranthene | 0.40 | mg/kg | U | |
| 95-SB-A | Soil | B13052061-014 | SW8270C | Fluoranthene | 0.97 | mg/kg | U | |
| 95-SB-B | Soil | B13052061-015 | SW8270C | Chrysene | 0.014 | mg/kg | U | |
| 95-SB-B | Soil | B13052061-015 | SW8270C | Benzo(a)anthracene | 0.013 | mg/kg | U | |
| 95-SB-B | Soil | B13052061-015 | SW8270C | Benzo(b)fluoranthene | 0.023 | mg/kg | U | |
| 95-SB-B | Soil | B13052061-015 | SW8270C | Benzo(g,h,i)perylene | 0.011 | mg/kg | U | |
| 95-SB-B | Soil | B13052061-015 | SW8270C | Benzo(k)fluoranthene | 0.0075 | mg/kg | U | |
| 95-SB-B | Soil | B13052061-015 | SW8270C | Benzo(a)pyrene | 0.015 | mg/kg | U | |
| 95-SB-B | Soil | B13052061-015 | SW8270C | Fluoranthene | 0.023 | mg/kg | U | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 95-SB-B | Soil | B13052061-015 | SW6020 | Pyrene | 0.022 | mg/kg | J | High Bias |
| 80-SB-B | Soil | B13052061-006 | SW8270C | Benzo(a)anthracene | 0.092 | mg/kg | J | High Bias |
| 80-SB-B | Soil | B13052061-006 | SW8270C | Naphthalene | 3.9 | mg/kg | J | High Bias |
| 80-SB-B | Soil | B13052061-006 | SW8270C | Phenanthrene | 1.0 | mg/kg | J | High Bias |
| 80-SB-B | Soil | B13052061-006 | SW8270C | Fluorene | 1.6 | mg/kg | J | High Bias |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(k)fluoranthene | 0.43 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(a)anthracene | 0.50 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Naphthalene | 0.29 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Pyrene | 0.55 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(b)fluoranthene | 0.32 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(g,h,i)perylene | 0.47 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(a)pyrene | 0.24 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Chrysene | 0.48 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Fluoranthene | 0.53 | ug/L | U | |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/24/2013** |
| **Verified By/Date Verified: Angela Roddy 08/1/2013** | **Sample End Date: 05/24/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 94-SB-A | 5/24/2013 | B13052121 | B13052121-001 |
| 2 | Soil | 89-SB-A | 5/24/2013 | B13052121 | B13052121-002 |
| 3 | Soil | 89-SB-B | 5/24/2013 | B13052121 | B13052121-003 |
| 4 | Soil | 77-SB-A | 5/24/2013 | B13052121 | B13052121-004 |
| 5 | Soil | 77-SB-B | 5/24/2013 | B13052121 | B13052121-005 |
| 6 | Soil | 88-SB-A | 5/24/2013 | B13052121 | B13052121-006 |
| 7 | Soil | 88-SB-AD | 5/24/2013 | B13052121 | B13052121-007 |
| 8 | Soil | 88-SB-B | 5/24/2013 | B13052121 | B13052121-008 |
| 9 | Soil | 90-SB-A | 5/24/2013 | B13052121 | B13052121-009 |
| 10 | Soil | 90-SB-B | 5/24/2013 | B13052121 | B13052121-010 |
| 11 | Soil | 90-SB-C | 5/24/2013 | B13052121 | B13052121-011 |
| 12 | Soil | 78-SB-A | 5/24/2013 | B13052121 | B13052121-012 |
| 13 | Soil | 78-SB-B | 5/24/2013 | B13052121 | B13052121-013 |
| 14 | Water-Trip Blank | TB050213BTSSHP0262 | 5/24/2013 | B13052119 | B13052119-001 |
| 15 | Water-Rinsate Blank | YOSD-1305-108 | 5/24/2013 | B13052119 | B13052119-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13052121 and B13052119*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD outside of advisory limits. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with temperatures of 0.5°C and 2.0°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B) was detected in Method Blank MB-71682. A validation qualifier was not necessary because the raw soil samples had values >10x the reporting limit for Barium. Water: Chromium (Method E200.8) was detected in Method Blank MB-71618. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Benzo(k)fluoranthene, Benzo(a)anthracene, Naphthalene, Pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, and Fluoranthene (Method SW8270C) were detected in Rinsate Blank YOSD-1305-108. A validation qualifier "U" was placed on the Rinsate Blank, as well as the associated raw soil samples with values <5x the reporting limit for the Method SW8270C. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All surrogate recoveries were within control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS_052913 was flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chloroethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: The QC for Method SW8270C involving raw sample B13052121-004 had issues with staying within control limits for the majority of the analytes. Matrix interference was the cause of this. However, the LCS was within limits. Water: QC matrix spike B13052119-001D_MS and matrix spike duplicate B13052119-001D_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample 88-SB-A and its duplicate 88-SB-AD had RPDs within control limits. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(k)fluoranthene | 0.43 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(a)anthracene | 0.50 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Naphthalene | 0.29 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Pyrene | 0.55 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(b)fluoranthene | 0.32 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(g,h,i)perylene | 0.47 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Benzo(a)pyrene | 0.24 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Chrysene | 0.48 | ug/L | U | |
| YOSD-1305-108 | Water | B13052119-001 | SW8270C | Fluoranthene | 0.53 | ug/L | U | |
| 77-SB-A | Soil | B13052121-004 | SW8270C | Fluoranthene | 15 | mg/kg | U | |
| 77-SB-A | Soil | B13052121-004 | SW8270C | Benzo(b)fluoranthene | 5.6 | mg/kg | U | |
| 77-SB-A | Soil | B13052121-004 | SW8270C | Benzo(a)pyrene | 5.9 | mg/kg | U | |
| 77-SB-A | Soil | B13052121-004 | SW8270C | Benzo(a)anthracene | 5.5 | mg/kg | U | |
| 77-SB-A | Soil | B13052121-004 | SW8270C | Chrysene | 6.3 | mg/kg | U | |
| 77-SB-A | Soil | B13052121-004 | SW8270C | Pyrene | 14 | mg/kg | U | |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/28/2013** |
| **Verified By/Date Verified: Angela Roddy 08/1/2013** | **Sample End Date: 05/30/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 87-SB-A | 5/28/2013 | B13052331 | B13052331-001 |
| 2 | Soil | 87-SB-B | 5/28/2013 | B13052331 | B13052331-002 |
| 3 | Soil | 87-SB-C | 5/28/2013 | B13052331 | B13052331-003 |
| 4 | Soil | 103-SB-A | 5/28/2013 | B13052331 | B13052331-004 |
| 5 | Soil | 102-SB-A | 5/28/2013 | B13052331 | B13052331-005 |
| 6 | Soil | 65-SB-A | 5/28/2013 | B13052331 | B13052331-006 |
| 7 | Soil | 59-SB-B | 5/28/2013 | B13052331 | B13052331-007 |
| 8 | Soil | 59-SB-C | 5/28/2013 | B13052331 | B13052331-008 |
| 9 | Soil | 60-SB-B | 5/28/2013 | B13052331 | B13052331-009 |
| 10 | Soil | 63-SB-C | 5/28/2013 | B13052331 | B13052331-010 |
| 11 | Soil | 72-SB-A | 5/29/2013 | B13052331 | B13052331-011 |
| 12 | Soil | 72-SB-B | 5/29/2013 | B13052331 | B13052331-012 |
| 13 | Soil | 72-SB-C | 5/29/2013 | B13052331 | B13052331-013 |
| 14 | Water-Trip Blank | TB040213BTSSHP0262 | 5/30/2013 | B13060065 | B13060065-001 |
| 15 | Water-Rinsate Blank | YOSD-1305-109 | 5/30/2013 | B13060065 | B13060065-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13052331 and B13060065*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD outside of advisory limits. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

N/A

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1, 2, and 3 arrived with temperatures of 2.2°C, 0.7°C, and 0.8°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium and Cadmium (Method SW6020) were detected in Method Blank MB-71758. A validation qualifier was not necessary because the raw soil samples had values >10x the reporting limit for Barium and non-detect values for Cadmium. Water: Chromium (Method E200.8) was detected in Method Blank MB-71773. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Methylene chloride (SW8260B) was detected in Rinsate Blank YOSD-1305-109 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Sample 103-SB-A was flagged with laboratory qualifier "S" for the % recovery of VPH Aromatics Surrogate (Method MA-VPH) being outside of control limits. A validation qualifier was not necessary because it was just below control limits with another surrogate within limits. Samples 59-SB-B and 63-SB-C were flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) being outside of control limits. A validation qualifier was not necessary because other surrogates were within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments. Water: QC matrix spike B13060112-002E_MS and matrix spike duplicate B13060112-002E_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chloroethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not submitted with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |
| | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 05/30/2013** |
| **Verified By/Date Verified: Angela Roddy 08/2/2013** | **Sample End Date: 05/30/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 66-SB-A | 5/30/2013 | B13060066 | B13060066-001 |
| 2 | Soil | 66-SB-B | 5/30/2013 | B13060066 | B13060066-002 |
| 3 | Soil | 66-SB-C | 5/30/2013 | B13060066 | B13060066-003 |
| 4 | Soil | 67-SB-A | 5/30/2013 | B13060066 | B13060066-004 |
| 5 | Soil | 67-SB-AD | 5/30/2013 | B13060066 | B13060066-005 |
| 6 | Soil | 67-SB-B | 5/30/2013 | B13060066 | B13060066-006 |
| 7 | Soil | 67-SB-BD | 5/30/2013 | B13060066 | B13060066-007 |
| 8 | Soil | 68-SB-A | 5/30/2013 | B13060066 | B13060066-008 |
| 9 | Soil | 69-SB-A | 5/30/2013 | B13060066 | B13060066-009 |
| 10 | Soil | 70-SB-A | 5/30/2013 | B13060066 | B13060066-010 |
| 11 | Soil | 71-SB-A | 5/30/2013 | B13060066 | B13060066-011 |
| 12 | Soil | 71-SB-AD | 5/30/2013 | B13060066 | B13060066-012 |
| 13 | Water-Trip Blank | TB040213BTSSHP0262 | 5/30/2013 | B13060065 | B13060065-001 |
| 14 | Water-Rinsate Blank | YOSD-1305-109 | 5/30/2013 | B13060065 | B13060065-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13060066 and B13060065*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD outside of advisory limits. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with temperatures of 0.7°C and 0.8°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B) was detected in Method Blank MB-71820. A validation qualifier was not necessary because the raw soil samples had values >10x the reporting limit for Barium. Water: Chromium (Method E200.8) was detected in Method Blank MB-71773. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Methylene chloride (SW8260B) was detected in Rinsate Blank YOSD-1305-109 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: Surrogate recoveries were within control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B13060066-012AMSD3 was flagged with laboratory qualifier "S" for the % recovery of Barium (Method SW6010B) and Selenium (Method SW6020) being outside of control limits. A validation qualifier was not necessary because the post distillation spike was within limits for these methods. QC Sample B13051957-001 was flagged with numerous laboratory qualifiers including "S" and "R" for the Method SW8270C. A new MS/MSD was rerun without any issues. Water: QC matrix spike B13060112-002E_MS and matrix spike duplicate B13060112-002E_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chloroethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Three blind field duplicates were run with batch: 67-SB-A and its duplicate 67-SB-AD; 67-SB-B and its duplicate 67-SB-BD; and 71-SB-A and its duplicate 71-SB-AD. RPDs were outside of control limits for many analytes. Arsenic (SW6020) 71%; Benzo(a)anthracene 61%, Benzo(b)fluoranthene 56%, Benzo(k)fluoranthene 59%, Chrysene 62%, Fluoranthene 96%, Phenanthrene 108%, and Pyrene 78% (Method SW8270C); Total Extractable Hydrocarbons 100% (Method MA-EPH). A validation qualifier "J" was placed on all samples for these analytes. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |
| | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of "A" was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| 66-SB-A | Soil | B13060066-001 | SW6020 | Arsenic | 6 | mg/kg | J | RPD |
| 66-SB-B | Soil | B13060066-002 | SW8270C | Phenanthrene | 0.11 | mg/kg | J | RPD |
| 66-SB-B | Soil | B13060066-002 | SW8270C | Chrysene | 0.22 | mg/kg | J | RPD |
| 66-SB-B | Soil | B13060066-002 | SW8270C | Pyrene | 0.32 | mg/kg | J | RPD |
| 66-SB-B | Soil | B13060066-002 | SW8270C | Benzo(a)anthracene | 0.19 | mg/kg | J | RPD |
| 66-SB-B | Soil | B13060066-002 | SW8270C | Fluoranthene | 0.23 | mg/kg | J | RPD |
| 66-SB-B | Soil | B13060066-002 | SW8270C | Benzo(a)pyrene | 0.33 | mg/kg | J | RPD |
| 66-SB-B | Soil | B13060066-002 | SW8270C | Benzo(k)fluoranthene | 0.099 | mg/kg | J | RPD |
| 66-SB-B | Soil | B13060066-002 | MA-EPH | Total Extractable Hydrocarbons | 263 | mg/kg | J | RPD |
| 66-SB-B | Soil | B13060066-002 | SW6020 | Arsenic | 11 | mg/kg | J | RPD |
| 66-SB-C | Soil | B13060066-003 | SW8270C | Phenanthrene | 0.54 | mg/kg | J | RPD |
| 66-SB-C | Soil | B13060066-003 | SW8270C | Fluoranthene | 1.8 | mg/kg | J | RPD |
| 66-SB-C | Soil | B13060066-003 | SW6020 | Arsenic | 13 | mg/kg | J | RPD |
| 66-SB-C | Soil | B13060066-003 | SW8270C | Benzo(k)fluoranthene | 0.41 | mg/kg | J | RPD |
| 66-SB-C | Soil | B13060066-003 | MA-EPH | Total Extractable Hydrocarbons | 883 | mg/kg | J | RPD |
| 66-SB-C | Soil | B13060066-003 | SW8270C | Pyrene | 2.5 | mg/kg | J | RPD |
| 66-SB-C | Soil | B13060066-003 | SW8270C | Benzo(a)anthracene | 1.2 | mg/kg | J | RPD |
| 66-SB-C | Soil | B13060066-003 | SW8270C | Chrysene | 1.3 | mg/kg | J | RPD |
| 66-SB-C | Soil | B13060066-003 | SW8270C | Benzo(a)pyrene | 0.91 | mg/kg | J | RPD |
| 67-SB-A | Soil | B13060066-004 | SW6020 | Arsenic | 19 | mg/kg | J | RPD |
| 67-SB-A | Soil | B13060066-004 | SW8270C | Benzo(a)anthracene | 0.044 | mg/kg | J | RPD |
| 67-SB-A | Soil | B13060066-004 | SW8270C | Benzo(a)pyrene | 0.081 | mg/kg | J | RPD |
| 67-SB-A | Soil | B13060066-004 | SW8270C | Benzo(k)fluoranthene | 0.032 | mg/kg | J | RPD |
| 67-SB-A | Soil | B13060066-004 | SW8270C | Chrysene | 0.051 | mg/kg | J | RPD |
| 67-SB-A | Soil | B13060066-004 | SW8270C | Fluoranthene | 0.074 | mg/kg | J | RPD |
| 67-SB-A | Soil | B13060066-004 | SW8270C | Phenanthrene | 0.036 | mg/kg | J | RPD |
| 67-SB-AD | Soil | B13060066-005 | SW6020 | Arsenic | 9 | mg/kg | J | RPD |
| 67-SB-AD | Soil | B13060066-005 | SW8270C | Benzo(a)anthracene | 0.083 | mg/kg | J | RPD |
| 67-SB-AD | Soil | B13060066-005 | SW8270C | Benzo(a)pyrene | 0.13 | mg/kg | J | RPD |
| 67-SB-AD | Soil | B13060066-005 | SW8270C | Benzo(k)fluoranthene | 0.059 | mg/kg | J | RPD |
| 67-SB-AD | Soil | B13060066-005 | SW8270C | Chrysene | 0.097 | mg/kg | J | RPD |
| 67-SB-AD | Soil | B13060066-005 | SW8270C | Fluoranthene | 0.21 | mg/kg | J | RPD |
| 67-SB-AD | Soil | B13060066-005 | SW8270C | Phenanthrene | 0.12 | mg/kg | J | RPD |
| 67-SB-B | Soil | B13060066-006 | SW6020 | Arsenic | 7 | mg/kg | J | RPD |
| 67-SB-B | Soil | B13060066-006 | SW8270C | Benzo(a)anthracene | 0.10 | mg/kg | J | RPD |
| 67-SB-B | Soil | B13060066-006 | SW8270C | Benzo(a)pyrene | 0.16 | mg/kg | J | RPD |
| 67-SB-B | Soil | B13060066-006 | SW8270C | Benzo(k)fluoranthene | 0.054 | mg/kg | J | RPD |
| 67-SB-B | Soil | B13060066-006 | SW8270C | Chrysene | 0.11 | mg/kg | J | RPD |
| 67-SB-B | Soil | B13060066-006 | SW8270C | Fluoranthene | 0.18 | mg/kg | J | RPD |
| 67-SB-B | Soil | B13060066-006 | SW8270C | Phenanthrene | 0.068 | mg/kg | J | RPD |
| 67-SB-BD | Soil | B13060066-007 | SW6020 | Arsenic | 7 | mg/kg | J | RPD |
| 67-SB-BD | Soil | B13060066-007 | SW8270C | Benzo(a)anthracene | 0.079 | mg/kg | J | RPD |
| 67-SB-BD | Soil | B13060066-007 | SW8270C | Benzo(a)pyrene | 0.18 | mg/kg | J | RPD |
| 67-SB-BD | Soil | B13060066-007 | SW8270C | Benzo(k)fluoranthene | 0.067 | mg/kg | J | RPD |
| 67-SB-BD | Soil | B13060066-007 | SW8270C | Chrysene | 0.087 | mg/kg | J | RPD |
| 67-SB-BD | Soil | B13060066-007 | SW8270C | Fluoranthene | 0.14 | mg/kg | J | RPD |
| 67-SB-BD | Soil | B13060066-007 | SW8270C | Phenanthrene | 0.051 | mg/kg | J | RPD |
| 68-SB-A | Soil | B13060066-008 | SW6020 | Arsenic | 2 | mg/kg | J | RPD |
| 69-SB-A | Soil | B13060066-009 | SW8270C | Benzo(a)pyrene | 0.023 | mg/kg | J | RPD |
| 69-SB-A | Soil | B13060066-009 | SW8270C | Benzo(a)anthracene | 0.017 | mg/kg | J | RPD |
| 69-SB-A | Soil | B13060066-009 | MA-EPH | Total Extractable Hydrocarbons | 12 | mg/kg | J | RPD |
| 69-SB-A | Soil | B13060066-009 | SW8270C | Benzo(k)fluoranthene | 0.0091 | mg/kg | J | RPD |
| 69-SB-A | Soil | B13060066-009 | SW8270C | Pyrene | 0.027 | mg/kg | J | RPD |
| 71-SB-A | Soil | B13060066-011 | SW6020 | Arsenic | 6 | mg/kg | J | RPD |
| 71-SB-AD | Soil | B13060066-012 | SW6020 | Arsenic | 6 | mg/kg | J | RPD |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 67-SB-A | Soil | B13060066-004 | SW8270C | Pyrene | 0.092 | mg/kg | J | RPD |
| 67-SB-A | Soil | B13060066-004 | MA-EPH | Total Extractable Hydrocarbons | 70 | mg/kg | J | RPD |
| 67-SB-AD | Soil | B13060066-005 | SW8270C | Pyrene | 0.21 | mg/kg | J | RPD |
| 67-SB-AD | Soil | B13060066-005 | MA-EPH | Total Extractable Hydrocarbons | 56 | mg/kg | J | RPD |
| 67-SB-B | Soil | B13060066-006 | SW8270C | Pyrene | 0.21 | mg/kg | J | RPD |
| 67-SB-B | Soil | B13060066-006 | MA-EPH | Total Extractable Hydrocarbons | 103 | mg/kg | J | RPD |
| 67-SB-BD | Soil | B13060066-007 | SW8270C | Pyrene | 0.17 | mg/kg | J | RPD |
| 67-SB-BD | Soil | B13060066-007 | MA-EPH | Total Extractable Hydrocarbons | 310 | mg/kg | J | RPD |
| 69-SB-A | Soil | B13060066-009 | SW8270C | Phenanthrene | 0.012 | mg/kg | J | RPD |
| 69-SB-A | Soil | B13060066-009 | SW8270C | Chrysene | 0.016 | mg/kg | J | RPD |
| 69-SB-A | Soil | B13060066-009 | SW8270C | Fluoranthene | 0.019 | mg/kg | J | RPD |
| 69-SB-A | Soil | B13060066-009 | SW6020 | Arsenic | 7 | mg/kg | J | RPD |
| 70-SB-A | Soil | B13060066-010 | SW6020 | Arsenic | 6 | mg/kg | J | RPD |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 06/3/2013** |
| **Verified By/Date Verified: Angela Roddy 08/8/2013** | **Sample End Date: 06/11/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 71-SB-B | 6/3/2013 | B13060441 | B13060441-001 |
| 2 | Soil | 91-SB-B | 6/4/2013 | B13060441 | B13060441-002 |
| 3 | Soil | 92-SB-B | 6/4/2013 | B13060441 | B13060441-003 |
| 4 | Soil | 78-SB-C | 6/5/2013 | B13060441 | B13060441-004 |
| 5 | Soil | 96-SB-B | 6/5/2013 | B13060441 | B13060441-005 |
| 6 | Soil | 96-SB-C | 6/5/2013 | B13060441 | B13060441-006 |
| 7 | Soil | 94-SB-B | 6/5/2013 | B13060441 | B13060441-007 |
| 8 | Soil | 94-SB-C | 6/5/2013 | B13060441 | B13060441-008 |
| 9 | Soil | 93-SB-B | 6/5/2013 | B13060441 | B13060441-009 |
| 10 | Soil | 93-SB-C | 6/5/2013 | B13060441 | B13060441-010 |
| 11 | Soil | 104-SB-B | 6/5/2013 | B13060441 | B13060441-011 |
| 12 | Soil | 104-SB-C | 6/5/2013 | B13060441 | B13060441-012 |
| 13 | Soil | 105-SB-B | 6/5/2013 | B13060441 | B13060441-013 |
| 14 | Soil | 53-SB-C | 6/5/2013 | B13060441 | B13060441-014 |
| 15 | Soil | 54-SB-C | 6/5/2013 | B13060441 | B13060441-015 |
| 16 | Soil | 55-SB-C | 6/5/2013 | B13060441 | B13060441-016 |
| 17 | Soil | 56-SB-C | 6/5/2013 | B13060441 | B13060441-017 |
| 18 | Water-Rinsate Blank | YOSD-1306-110 | 6/10/2013 | B13061235 | B13061235-001 |
| 19 | Water-Rinsate Blank | YOSD-1306-111 | 6/11/2013 | B13061235 | B13061235-002 |
| 20 | Water-Rinsate Blank | YOSD-1306-112 | 6/11/2013 | B13061235 | B13061235-003 |
| 21 | Water-Trip Blank | TB052213BTSSHP0262 | 6/10/2013 | B13061235 | B13061235-004 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13060441and B13061235*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD outside of advisory limits. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1, 2, and 3 arrived with temperatures of 1.0°C, 1.0°C, and 0.4°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6020) was detected in Method Blank MB-71911. A validation qualifier was not necessary because the raw soil samples had values >10x the reporting limit for Barium. Water: Barium, Cadmium, Chromium, Lead, and Silver (Method E200.8) were detected in Method Blank MB-72052. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Benzo(a)anthracene, Phenanthrene, Benzo(a)pyrene, Benzo(b)fluoranthene, Pyrene, Indeno(1,2,3-cd)pyrene, Chrysene, Fluoranthene (Method SW8270C); Chloroform and Methylene chloride (Method SW8260B) were detected in Rinsate Blank YOSD-1306-111. Chloroform and Methylene chloride (Method SW8260B) were detected in Rinsate Blank YOSD-1306-112. A validation qualifier "U" was placed on the Rinsate Blanks for these analytes, as well as any associated soil values <5X the reporting limit. Toluene (SW8260B) was also detected in Rinsate Blank YOSD-1306-111 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Samples 54-SB-C, 55-SB-C, and 56-SB-C were flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B13060512-001AMS3 was flagged with laboratory qualifier "S" for the % recovery of Barium (Method SW6020) being outside of control limits. A validation qualifier was not necessary because the LFB was within limits for this method. QC Sample B13052121-004 was flagged with numerous laboratory qualifiers including "S" and "R" for Method SW8270C. A new MS/MSD was rerun without any issues. Water: QC matrix spike B13061322-003A_MS and matrix spike duplicate B13061322-003A_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether and 1,1,2,2-Tetrachloroethane (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the LCS was within limits and raw samples were nondetect for this analyte. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |
| | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Benzo(a)anthracene | 0.34 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Phenanthrene | 0.23 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Benzo(a)pyrene | 0.21 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Benzo(b)fluoranthene | 0.21 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Pyrene | 0.84 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.36 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Chrysene | 0.24 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8260B | Chloroform | 1.7 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8260B | Methylene chloride | 2.3 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Fluoranthene | 0.66 | ug/L | U | |
| YOSD-1306-112 | Water | B13061235-003 | SW8260B | Methylene chloride | 3.1 | ug/L | U | |
| YOSD-1306-112 | Water | B13061235-003 | SW8260B | Chloroform | 1.9 | ug/L | U | |
| 53-SB-C | Soil | B13060441-014 | SW8270C | Benzo(b)fluoranthene | 0.011 | mg/kg | U | |
| 53-SB-C | Soil | B13060441-014 | SW8270C | Benzo(g,h,i)perylene | 0.011 | mg/kg | U | |
| 53-SB-C | Soil | B13060441-014 | SW8270C | Pyrene | 0.019 | mg/kg | U | |
| 53-SB-C | Soil | B13060441-014 | SW8270C | Fluoranthene | 0.016 | mg/kg | U | |
| 53-SB-C | Soil | B13060441-014 | SW8270C | Chrysene | 0.014 | mg/kg | U | |
| 54-SB-C | Soil | B13060441-015 | SW8270C | Fluoranthene | 0.057 | mg/kg | U | |
| 54-SB-C | Soil | B13060441-015 | SW8270C | Pyrene | 0.060 | mg/kg | U | |
| 54-SB-C | Soil | B13060441-015 | SW8270C | Benzo(a)anthracene | 0.038 | mg/kg | U | |
| 54-SB-C | Soil | B13060441-015 | SW8270C | 2-Methylnaphthalene | 7.5 | mg/kg | U | |
| 55-SB-C | Soil | B13060441-016 | SW8270C | Fluoranthene | 0.057 | mg/kg | U | |
| 55-SB-C | Soil | B13060441-016 | SW8270C | Benzo(a)anthracene | 0.047 | mg/kg | U | |
| 55-SB-C | Soil | B13060441-016 | SW8270C | Pyrene | 0.052 | mg/kg | U | |
| 56-SB-C | Soil | B13060441-017 | SW8270C | Benzo(k)fluoranthene | 0.064 | mg/kg | U | |
| 56-SB-C | Soil | B13060441-017 | SW8270C | Benzo(a)anthracene | 0.14 | mg/kg | U | |
| 56-SB-C | Soil | B13060441-017 | SW8270C | Chrysene | 0.14 | mg/kg | U | |
| 56-SB-C | Soil | B13060441-017 | SW8270C | Benzo(g,h,i)perylene | 0.036 | mg/kg | U | |
| 56-SB-C | Soil | B13060441-017 | SW8270C | Benzo(a)pyrene | 0.064 | mg/kg | U | |
| 56-SB-C | Soil | B13060441-017 | SW8270C | Benzo(b)fluoranthene | 0.094 | mg/kg | U | |
| 56-SB-C | Soil | B13060441-017 | SW8270C | Naphthalene | 5.8 | mg/kg | U | |
| 91-SB-B | Soil | B13060441-002 | SW8270C | Benzo(a)anthracene | 0.014 | mg/kg | U | |
| 91-SB-B | Soil | B13060441-002 | SW8270C | Benzo(k)fluoranthene | 0.013 | mg/kg | U | |
| 91-SB-B | Soil | B13060441-002 | SW8270C | Benzo(g,h,i)perylene | 0.015 | mg/kg | U | |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 06/6/2013** |
| **Verified By/Date Verified: Angela Roddy 08/12/2013** | **Sample End Date: 06/11/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 4-SB-B | 6/6/2013 | B13060674 | B13060674-001 |
| 2 | Soil | 5-SB-B | 6/6/2013 | B13060674 | B13060674-002 |
| 3 | Soil | 5-SB-C | 6/6/2013 | B13060674 | B13060674-003 |
| 4 | Soil | 7-SB-C | 6/6/2013 | B13060674 | B13060674-004 |
| 5 | Soil | 14-SB-B | 6/6/2013 | B13060674 | B13060674-005 |
| 6 | Soil | 14-SB-C | 6/6/2013 | B13060674 | B13060674-006 |
| 7 | Soil | 32-SB-B | 6/6/2013 | B13060674 | B13060674-007 |
| 8 | Soil | 32-SB-BD | 6/6/2013 | B13060674 | B13060674-008 |
| 9 | Soil | 32-SB-C | 6/6/2013 | B13060674 | B13060674-009 |
| 10 | Soil | 33-SB-C | 6/6/2013 | B13060674 | B13060674-010 |
| 11 | Soil | 68-SB-B | 6/6/2013 | B13060674 | B13060674-011 |
| 12 | Soil | 68-SB-C | 6/6/2013 | B13060674 | B13060674-012 |
| 13 | Soil | 69-SB-B | 6/6/2013 | B13060674 | B13060674-013 |
| 14 | Soil | 70-SB-B | 6/6/2013 | B13060674 | B13060674-014 |
| 15 | Soil | 70-SB-C | 6/6/2013 | B13060674 | B13060674-015 |
| 16 | Soil | 35-SB-B | 6/7/2013 | B13060674 | B13060674-016 |
| 17 | Soil | 35-SB-C | 6/7/2013 | B13060674 | B13060674-017 |
| 18 | Soil | 38-SB-B | 6/7/2013 | B13060674 | B13060674-018 |
| 19 | Soil | 51-SB-B | 6/7/2013 | B13060674 | B13060674-019 |
| 20 | Soil | 51-SB-C | 6/7/2013 | B13060674 | B13060674-020 |
| 21 | Water-Rinsate Blank | YOSD-1306-110 | 6/10/2013 | B13061235 | B13061235-001 |
| 22 | Water-Rinsate Blank | YOSD-1306-111 | 6/11/2013 | B13061235 | B13061235-002 |
| 23 | Water-Rinsate Blank | YOSD-1306-112 | 6/11/2013 | B13061235 | B13061235-003 |
| 24 | Water-Trip Blank | TB052213BTSSHP0262 | 6/10/2013 | B13061235 | B13061235-004 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13060674 and B13061235*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD outside of advisory limits. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1, 2, and 3 arrived with temperatures of 0.6°C, 1.2°C, and 0.4°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Cadmium (Method SW6010B) was detected in Method Blank MB-71948. A validation qualifier was not necessary because the raw soil samples had non-detect values for Cadmium. Barium, Cadmium, and Silver (Method SW6020) were detected in Method Blank MB-71912. A validation qualifier was not necessary because the raw soil samples either had non-detect values or >10x the reporting limit for these analytes. Water: Barium, Cadmium, Chromium, Lead, and Silver (Method E200.8) were detected in Method Blank MB-72052. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Benzo(a)anthracene, Phenanthrene, Benzo(a)pyrene, Benzo(b)fluoranthene, Pyrene, Indeno(1,2,3-cd)pyrene, Chrysene, Fluoranthene (Method SW8270C); Chloroform and Methylene chloride (Method SW8260B) were detected in Rinsate Blank YOSD-1306-111. Chloroform and Methylene chloride (Method SW8260B) were detected in Rinsate Blank YOSD-1306-112. A validation qualifier "U" was placed on the Rinsate Blanks for these analytes, as well as any associated soil values <5X the reporting limit. Toluene (SW8260B) was also detected in Rinsate Blank YOSD-1306-111 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Samples 7-SB-C, 14-SB-B, and 4-SB-B were flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) and o-Terphenyl (Method MA-EPH) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for these methods. Sample 5-SB-C was flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for this method. Sample 5-SB-B was flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatics (Method MA-VPH), o-Terphenyl (Method MA-EPH), and Nitrobenzene-d5 (Method SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for these methods. Also, the VPH surrogate was just above control limits. Sample 14-SB-C was flagged with laboratory qualifier "S" for the % recovery of o-Terphenyl (Method MA-EPH), Nitrobenzene-d5 and Terphenyl-d14 (Method SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for these methods. Also, Terphenyl-d14 was just above control limits. Sample 35-SB-B was flagged with laboratory qualifier "S" for the % recovery of o-Terphenyl (Method SW8015M) being above control limits. A validation qualifier was not necessary because this is a screening method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Soil: QC sample B13060674-010AMS3 was flagged with laboratory qualifier "S" for the % recovery of Barium and Selenium (Method SW6020) being outside of control limits. A validation qualifier was not necessary because the post-distillation spike was within limits for this method. QC sample B13060674-010AMSD3 was flagged with laboratory qualifier "S" for the % recovery of Selenium (Method SW6020) being outside of control limits. A validation qualifier was not necessary because the post-distillation spike was within limits for this method. QC Sample B13060674-005 was flagged with numerous laboratory qualifiers including "S" and "R" due to positive matrix interference. A new MS/MSD was rerun without any issues. QC sample B13060674-001AMS and B13060674-001AMSD were flagged with laboratory qualifier "S" for the % recovery of Total Extractable Hydrocarbons (Method SW8015M); n-Nonane, n-Decane, and Acenaphthylene, surrogate o-Terphenyl (Method MA-EPH) being outside of control limits. Because of sample matrix interference, these QC samples were run as duplicates. No validation qualifier was necessary. This sample was flagged with numerous laboratory qualifiers indicating sample matrix interferences and was rerun with values within control limits. QC sample B13060674-0018AMSD was flagged with laboratory qualifier "S" for the % recovery of n-Nonane and n-Decane (Method MA-EPH) being outside of control limits. Because of sample matrix interference, these QC samples were run as duplicates. No validation qualifier was necessary. Water: QC matrix spike B13061322-003A_MS and matrix spike duplicate B13061322-003A_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chloroethyl vinyl ether and 1,1,2,2-Tetrachloroethane (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the LCS was within limits and raw samples were nondetect for this analyte. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample 32-SB-B and its duplicate 32-SB-BD had an RPD outside of control limits for Total Purgeable Hydrocarbons (Method MA-VPH) and PRDL exceedances for C9-C10 Aromatics and C9-C12 Aliphatics (Method MA-VPH). The associated raw samples, as well as the duplicate are flagged with validation qualifier "J". | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Benzo(a)anthracene | 0.34 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Phenanthrene | 0.23 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Benzo(a)pyrene | 0.21 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Benzo(b)fluoranthene | 0.21 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Pyrene | 0.84 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.36 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Chrysene | 0.24 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8260B | Chloroform | 1.7 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8260B | Methylene chloride | 2.3 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Fluoranthene | 0.66 | ug/L | U | |
| YOSD-1306-112 | Water | B13061235-003 | SW8260B | Methylene chloride | 3.1 | ug/L | U | |
| YOSD-1306-112 | Water | B13061235-003 | SW8260B | Chloroform | 1.9 | ug/L | U | |
| 14-SB-B | Soil | B13060674-005 | SW8270C | Fluoranthene | 0.087 | mg/kg | U | |
| 14-SB-B | Soil | B13060674-005 | SW8270C | Pyrene | 0.17 | mg/kg | U | |
| 14-SB-B | Soil | B13060674-005 | SW8270C | Chrysene | 0.070 | mg/kg | U | |
| 14-SB-C | Soil | B13060674-006 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.13 | mg/kg | U | |
| 14-SB-C | Soil | B13060674-006 | SW8270C | Benzo(b)fluoranthene | 0.10 | mg/kg | U | |
| 14-SB-C | Soil | B13060674-006 | SW8270C | Benzo(a)pyrene | 0.074 | mg/kg | U | |
| 14-SB-C | Soil | B13060674-006 | SW8270C | Benzo(a)anthracene | 0.11 | mg/kg | U | |
| 32-SB-BD | Soil | B13060674-008 | SW8270C | Phenanthrene | 0.039 | mg/kg | U | |
| 33-SB-C | Soil | B13060674-010 | SW8270C | Benzo(a)anthracene | 0.020 | mg/kg | U | |
| 33-SB-C | Soil | B13060674-010 | SW8270C | Chrysene | 0.054 | mg/kg | U | |
| 35-SB-B | Soil | B13060674-016 | SW8270C | Benzo(b)fluoranthene | 0.091 | mg/kg | U | |
| 35-SB-B | Soil | B13060674-016 | SW8270C | Benzo(a)pyrene | 0.098 | mg/kg | U | |
| 35-SB-B | Soil | B13060674-016 | SW8270C | Benzo(a)anthracene | 0.069 | mg/kg | U | |
| 35-SB-B | Soil | B13060674-016 | SW8270C | Chrysene | 0.085 | mg/kg | U | |
| 35-SB-B | Soil | B13060674-016 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.052 | mg/kg | U | |
| 4-SB-B | Soil | B13060674-001 | SW8270C | Benzo(b)fluoranthene | 0.15 | mg/kg | U | |
| 4-SB-B | Soil | B13060674-001 | SW8270C | Benzo(a)pyrene | 0.086 | mg/kg | U | |
| 4-SB-B | Soil | B13060674-001 | SW8270C | Benzo(a)anthracene | 0.16 | mg/kg | U | |
| 4-SB-B | Soil | B13060674-001 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.076 | mg/kg | U | |
| 4-SB-B | Soil | B13060674-001 | SW8270C | Phenanthrene | 5.7 | mg/kg | U | |
| 5-SB-B | Soil | B13060674-002 | SW8270C | Fluoranthene | 0.11 | mg/kg | U | |
| 5-SB-B | Soil | B13060674-002 | SW8270C | Phenanthrene | 3.8 | mg/kg | U | |
| 5-SB-B | Soil | B13060674-002 | SW8270C | Chrysene | 0.088 | mg/kg | U | |
| 5-SB-C | Soil | B13060674-003 | SW8270C | Pyrene | 0.080 | mg/kg | U | |
| 5-SB-C | Soil | B13060674-003 | SW8270C | Chrysene | 0.048 | mg/kg | U | |
| 7-SB-C | Soil | B13060674-004 | SW8270C | Chrysene | 0.11 | mg/kg | U | |
| 7-SB-C | Soil | B13060674-004 | SW8270C | Fluoranthene | 0.092 | mg/kg | U | |
| 14-SB-B | Soil | B13060674-005 | MA-VPH | C9-C12 ALIPHATICS | 624 | mg/kg | J | PRDL |
| 14-SB-B | Soil | B13060674-005 | MA-VPH | C9-C10 AROMATICS | 731 | mg/kg | J | PRDL |
| 14-SB-B | Soil | B13060674-005 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 2150 | mg/kg | J | RPD |
| 14-SB-C | Soil | B13060674-006 | MA-VPH | C9-C12 ALIPHATICS | 340 | mg/kg | J | PRDL |
| 14-SB-C | Soil | B13060674-006 | MA-VPH | C9-C10 AROMATICS | 336 | mg/kg | J | PRDL |
| 14-SB-C | Soil | B13060674-006 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 1060 | mg/kg | J | RPD |
| 32-SB-B | Soil | B13060674-007 | MA-VPH | C9-C10 AROMATICS | 96 | mg/kg | J | PRDL |
| 32-SB-BD | Soil | B13060674-008 | MA-VPH | C9-C10 AROMATICS | 12 | mg/kg | J | PRDL |
| 32-SB-B | Soil | B13060674-007 | MA-VPH | C9-C12 ALIPHATICS | 139 | mg/kg | J | PRDL |
| 32-SB-BD | Soil | B13060674-008 | MA-VPH | C9-C12 ALIPHATICS | 9.1 | mg/kg | J | PRDL |
| 32-SB-B | Soil | B13060674-007 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 308 | mg/kg | J | RPD |
| 32-SB-BD | Soil | B13060674-008 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 32 | mg/kg | J | RPD |
| 32-SB-C | Soil | B13060674-009 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 6.6 | mg/kg | J | RPD |
| 32-SB-C | Soil | B13060674-009 | MA-VPH | C9-C10 AROMATICS | 2.5 | mg/kg | J | PRDL |
| 32-SB-C | Soil | B13060674-009 | MA-VPH | C9-C12 ALIPHATICS | 0.76 | mg/kg | J | PRDL |
| 33-SB-C | Soil | B13060674-010 | MA-VPH | TOTAL PURGEABLE HYDROCARBONS | 459 | mg/kg | J | RPD |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 33-SB-C | Soil | B13060674-010 | MA-VPH | C9-C12 ALIPHATICS | 132 | mg/kg | J | PRDL |
| 33-SB-C | Soil | B13060674-010 | MA-VPH | C9-C10 AROMATICS | 131 | mg/kg | J | PRDL |
| 35-SB-B | Soil | B13060674-016 | MA-VPH | C9-C10 AROMATICS | 866 | mg/kg | J | PRDL |
| 35-SB-B | Soil | B13060674-016 | MA-VPH | PURGEABLE HYDROCARBONS | 2690 | mg/kg | J | RPD |
| 35-SB-B | Soil | B13060674-016 | MA-VPH | C9-C12 ALIPHATICS | 1060 | mg/kg | J | PRDL |
| 35-SB-C | Soil | B13060674-017 | MA-VPH | C9-C12 ALIPHATICS | 7.6 | mg/kg | J | PRDL |
| 35-SB-C | Soil | B13060674-017 | MA-VPH | PURGEABLE HYDROCARBONS | 19 | mg/kg | J | RPD |
| 35-SB-C | Soil | B13060674-017 | MA-VPH | C9-C10 AROMATICS | 6.7 | mg/kg | J | PRDL |
| 38-SB-B | Soil | B13060674-018 | MA-VPH | PURGEABLE HYDROCARBONS | 6.8 | mg/kg | J | RPD |
| 38-SB-B | Soil | B13060674-018 | MA-VPH | C9-C10 AROMATICS | <2.3 | mg/kg | J | PRDL |
| 38-SB-B | Soil | B13060674-018 | MA-VPH | C9-C12 ALIPHATICS | <2.3 | mg/kg | J | PRDL |
| 4-SB-B | Soil | B13060674-001 | MA-VPH | C9-C12 ALIPHATICS | 1610 | mg/kg | J | PRDL |
| 4-SB-B | Soil | B13060674-001 | MA-VPH | C9-C10 AROMATICS | 1420 | mg/kg | J | PRDL |
| 4-SB-B | Soil | B13060674-001 | MA-VPH | PURGEABLE HYDROCARBONS | 4330 | mg/kg | J | RPD |
| 51-SB-B | Soil | B13060674-019 | MA-VPH | C9-C12 ALIPHATICS | 460 | mg/kg | J | PRDL |
| 51-SB-B | Soil | B13060674-019 | MA-VPH | PURGEABLE HYDROCARBONS | 1260 | mg/kg | J | RPD |
| 51-SB-B | Soil | B13060674-019 | MA-VPH | C9-C10 AROMATICS | 442 | mg/kg | J | PRDL |
| 51-SB-C | Soil | B13060674-020 | MA-VPH | C9-C12 ALIPHATICS | 96 | mg/kg | J | PRDL |
| 51-SB-C | Soil | B13060674-020 | MA-VPH | PURGEABLE HYDROCARBONS | 221 | mg/kg | J | RPD |
| 51-SB-C | Soil | B13060674-020 | MA-VPH | C9-C10 AROMATICS | 69 | mg/kg | J | PRDL |
| 5-SB-B | Soil | B13060674-002 | MA-VPH | PURGEABLE HYDROCARBONS | 3410 | mg/kg | J | RPD |
| 5-SB-B | Soil | B13060674-002 | MA-VPH | C9-C12 ALIPHATICS | 1050 | mg/kg | J | PRDL |
| 5-SB-B | Soil | B13060674-002 | MA-VPH | C9-C10 AROMATICS | 1210 | mg/kg | J | PRDL |
| 5-SB-C | Soil | B13060674-003 | MA-VPH | TOTALPURGEABLE HYDROCARBONS | 1730 | mg/kg | J | RPD |
| 5-SB-C | Soil | B13060674-003 | MA-VPH | C9-C10 AROMATICS | 541 | mg/kg | J | PRDL |
| 5-SB-C | Soil | B13060674-003 | MA-VPH | C9-C12 ALIPHATICS | 565 | mg/kg | J | PRDL |
| 68-SB-B | Soil | B13060674-011 | MA-VPH | C9-C12 ALIPHATICS | <2.4 | mg/kg | J | PRDL |
| 68-SB-B | Soil | B13060674-011 | MA-VPH | TOTALPURGEABLE HYDROCARBONS | <2.4 | mg/kg | J | RPD |
| 68-SB-B | Soil | B13060674-011 | MA-VPH | C9-C10 AROMATICS | <2.4 | mg/kg | J | PRDL |
| 68-SB-C | Soil | B13060674-012 | MA-VPH | TOTALPURGEABLE HYDROCARBONS | <2.4 | mg/kg | J | RPD |
| 68-SB-C | Soil | B13060674-012 | MA-VPH | C9-C10 AROMATICS | <2.4 | mg/kg | J | PRDL |
| 68-SB-C | Soil | B13060674-012 | MA-VPH | C9-C12 ALIPHATICS | <2.4 | mg/kg | J | PRDL |
| 69-SB-B | Soil | B13060674-013 | MA-VPH | C9-C10 AROMATICS | <2.3 | mg/kg | J | PRDL |
| 69-SB-B | Soil | B13060674-013 | MA-VPH | C9-C12 ALIPHATICS | <2.3 | mg/kg | J | PRDL |
| 69-SB-B | Soil | B13060674-013 | MA-VPH | TOTALPURGEABLE HYDROCARBONS | <2.3 | mg/kg | J | RPD |
| 70-SB-B | Soil | B13060674-014 | MA-VPH | TOTALPURGEABLE HYDROCARBONS | <2.6 | mg/kg | J | RPD |
| 70-SB-B | Soil | B13060674-014 | MA-VPH | C9-C12 ALIPHATICS | <2.6 | mg/kg | J | PRDL |
| 70-SB-B | Soil | B13060674-014 | MA-VPH | C9-C10 AROMATICS | <2.6 | mg/kg | J | PRDL |
| 70-SB-C | Soil | B13060674-015 | MA-VPH | C9-C10 AROMATICS | <2.5 | mg/kg | J | PRDL |
| 70-SB-C | Soil | B13060674-015 | MA-VPH | C9-C12 ALIPHATICS | <2.5 | mg/kg | J | PRDL |
| 70-SB-C | Soil | B13060674-015 | MA-VPH | TOTALPURGEABLE HYDROCARBONS | <2.5 | mg/kg | J | RPD |
| 7-SB-C | Soil | B13060674-004 | MA-VPH | TOTALPURGEABLE HYDROCARBONS | 1530 | mg/kg | J | RPD |
| 7-SB-C | Soil | B13060674-004 | MA-VPH | C9-C12 ALIPHATICS | 526 | mg/kg | J | PRDL |
| 7-SB-C | Soil | B13060674-004 | MA-VPH | C9-C10 AROMATICS | 468 | mg/kg | J | PRDL |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid** |
| **Project No.: 11108/002** | **Sample Start Date: 06/05/2013** |
| **Verified By/Date Verified: Angela Roddy 07/02/2013** | **Sample End Date: 06/12/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 1-ST-A | 6/5/2013 | B13060677 | B13060677-001 |
| 2 | Soil | 2-ST-A | 6/7/2013 | B13060677 | B13060677-002 |
| 3 | Soil | 3-ST-A | 6/12/2013 | B13061242 | B13061242-001 |
| 4 | Soil | 3-ST-B | 6/12/2013 | B13061242 | B13061242-002 |
| 5 | Soil | 4-ST-A | 6/12/2013 | B13061242 | B13061242-003 |
| 6 | Soil | 5-ST-A | 6/12/2013 | B13061242 | B13061242-004 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A; VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C*

- *Laboratory Project Ids: B13060677 and B13061242*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Cooler 1 arrived with a temperature of 4.2°C. Cooler 2 arrived with a temperature of 0.6°C. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium, Lead, and Silver (Method SW6010B) were detected in Method Blank MB-71983. The associated soil samples do not require a qualification because these analyte detections were either >10x the method blank reporting limit or non-detect. Barium, Silver (Method SW6010B) and Selenium (Method SW6020) were detected in Method Blank MB-72160. The associated soil samples do not require a qualification because these analyte detections were either >10x the method blank reporting limit or non-detect. 2-Methylnapthalene and Naphthalene (SW8270C) were detected in Method Blanks MB-72309-72183-71948 and MB-72310-72202-71939. The associated soil samples do not require a qualification because these analyte detections were either >5x the method blank reporting limit or non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | NA | AR | Initials |
| Comments: Field blank samples were not submitted with these batches of data. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | | Yes | **X** | NA | AR | Initials |
| Comments: Field blank samples were not submitted with these batches of data. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 3-ST-B was flagged with laboratory qualifier "S" for the surrogates VPH-Aliphatics (Method MA-VPH), Nitrobenzene-d5 (Method SW8270C), and o-Terphenyl (Method MA-EPH) % percent recovery being above control limits. A validation qualifier was only necessary for VPH-Aliphatics because only one other surrogate was within limits for this method. A validation qualifier "J" to indicate high bias was placed on the detected analytes for Method MA-VPH. The other methods had two other surrogates that were within control limits. Sample 4-ST-A was flagged with laboratory qualifier "S" for the surrogates Nitrobenzene-d5 (Method SW8270C) and o-Terphenyl (Method MA-EPH) % percent recovery being above control limits. No validation qualifier was necessary because each method had two other surrogates within control limits. Sample 5-ST-A was flagged with laboratory qualifier "S" for the surrogate Nitrobenzene-d5 (Method SW8270C) % percent recovery being above control limits. No validation qualifier was necessary because two other surrogates within control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: QC sample B13060674-018AMSD was flagged with laboratory qualifier "S" for the analytes n-Nonane and n-Decane (Method MA-EPH) % percent recovery being below control limits. No validation qualifier was necessary because the LCS was within limits for these analytes and method. QC sample B13061277-004AMSD3 was flagged with laboratory qualifier "S" for the analytes Barium (Method SW6010B) and Selenium (Method SW6020) % percent recovery being outside of control limits. No validation qualifier was necessary because the post-distillation spikes were within control limits for these analytes. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits as required by the QAAP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

**Refer to the table of Validator Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| 3-ST-B | Soil | B13061242-002 | MA-VPH | Benzene | 4.4 | mg/kg-dry | J | High Bias |
| 3-ST-B | Soil | B13061242-002 | MA-VPH | Toluene | 1.5 | mg/kg-dry | J | High Bias |
| 3-ST-B | Soil | B13061242-002 | MA-VPH | Ethylbenzene | 34 | mg/kg-dry | J | High Bias |
| 3-ST-B | Soil | B13061242-002 | MA-VPH | m+p-Xylenes | 12 | mg/kg-dry | J | High Bias |
| 3-ST-B | Soil | B13061242-002 | MA-VPH | o-Xylene | 4.7 | mg/kg-dry | J | High Bias |
| 3-ST-B | Soil | B13061242-002 | MA-VPH | Xylenes, Total | 17 | mg/kg-dry | J | High Bias |
| 3-ST-B | Soil | B13061242-002 | MA-VPH | Naphthalene | 24 | mg/kg-dry | J | High Bias |
| 3-ST-B | Soil | B13061242-002 | MA-VPH | C9 to C10 Aromatics | 665 | mg/kg-dry | J | High Bias |
| 3-ST-B | Soil | B13061242-002 | MA-VPH | C5 to C8 Aliphatics | 640 | mg/kg-dry | J | High Bias |
| 3-ST-B | Soil | B13061242-002 | MA-VPH | C9 to C12 Aliphatics | 797 | mg/kg-dry | J | High Bias |
| 3-ST-B | Soil | B13061242-002 | MA-VPH | Total Purgeable Hydrocarbons | 2290 | mg/kg-dry | J | High Bias |
| Validation Qualifer Definitions: | | | | | | | | |
| J | QC Exceedance | | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 06/11/2013** |
| **Verified By/Date Verified: Angela Roddy 08/15/2013** | **Sample End Date: 06/12/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 21-SB-B | 6/11/2013 | B13061196 | B13061196-001 |
| 2 | Soil | 83-SB-B | 6/11/2013 | B13061196 | B13061196-002 |
| 3 | Soil | 83-SB-C | 6/11/2013 | B13061196 | B13061196-003 |
| 4 | Soil | 82-SB-B | 6/11/2013 | B13061196 | B13061196-004 |
| 5 | Soil | 82-SB-C | 6/11/2013 | B13061196 | B13061196-005 |
| 6 | Soil | 81-SB-B | 6/11/2013 | B13061196 | B13061196-006 |
| 7 | Soil | 81-SB-C | 6/11/2013 | B13061196 | B13061196-007 |
| 8 | Soil | 99-SB-B | 6/11/2013 | B13061196 | B13061196-008 |
| 9 | Soil | 99-SB-C | 6/11/2013 | B13061196 | B13061196-009 |
| 10 | Soil | 98-SB-B | 6/11/2013 | B13061196 | B13061196-010 |
| 11 | Soil | 109-SB-B | 6/10/2013 | B13061196 | B13061196-011 |
| 12 | Soil | 109-SB-C | 6/11/2013 | B13061196 | B13061196-012 |
| 13 | Soil | 34-SB-A | 6/10/2013 | B13061196 | B13061196-013 |
| 14 | Soil | 34-SB-AD | 6/10/2013 | B13061196 | B13061196-014 |
| 15 | Soil | 108-SB-B | 6/10/2013 | B13061196 | B13061196-015 |
| 16 | Soil | 108-SB-C | 6/10/2013 | B13061196 | B13061196-016 |
| 17 | Soil | 97-SB-B | 6/10/2013 | B13061196 | B13061196-017 |
| 18 | Soil | 97-SB-BD | 6/10/2013 | B13061196 | B13061196-018 |
| 19 | Soil | 97-SB-C | 6/10/2013 | B13061196 | B13061196-019 |
| 20 | Soil | 29-SB-B | 6/11/2013 | B13061196 | B13061196-020 |
| 21 | Soil | 98-SB-C | 6/11/2013 | B13061196 | B13061196-021 |
| 22 | Soil | 101-SB-B | 6/12/2013 | B13061196 | B13061196-022 |
| 23 | Soil | 101-SB-C | 6/12/2013 | B13061196 | B13061196-023 |
| 24 | Soil | 85-SB-B | 6/12/2013 | B13061196 | B13061196-024 |
| 25 | Soil | 85-SB-C | 6/12/2013 | B13061196 | B13061196-025 |
| 26 | Soil | 84-SB-B | 6/12/2013 | B13061196 | B13061196-026 |
| 27 | Soil | 100-SB-B | 6/12/2013 | B13061196 | B13061196-027 |
| 28 | Soil | 100-SB-C | 6/12/2013 | B13061196 | B13061196-028 |
| 29 | Soil | 100-SB-CD | 6/12/2013 | B13061196 | B13061196-029 |
| 30 | Soil | 86-SB-B | 6/12/2013 | B13061196 | B13061196-030 |
| 31 | Soil | 86-SB-C | 6/12/2013 | B13061196 | B13061196-031 |
| 32 | Water-Rinsate Blank | YOSD-1306-110 | 6/10/2013 | B13061235 | B13061235-001 |
| 33 | Water-Rinsate Blank | YOSD-1306-111 | 6/11/2013 | B13061235 | B13061235-002 |
| 34 | Water-Rinsate Blank | YOSD-1306-112 | 6/11/2013 | B13061235 | B13061235-003 |
| 35 | Water-Trip Blank | TB052213BTSSHP0262 | 6/10/2013 | B13061235 | B13061235-004 |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C, including Tetraethyl Lead; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13061196 and B13061235*

| **PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT** | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| COMPLIANCE ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1, 2, 3, and 4 arrived with temperatures of 0.6°C, 1.2°C, 0.6°C, and 0.4°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium, Cadmium, and Silver Cadmium (Method SW6010B) were detected in Method Blank MB-72124. A validation qualifier was not necessary because the raw soil samples had non-detect values or >10x the reporting limit for these analytes. Selenium (Method SW6020) was detected in Method Blank MB-72160. A validation qualifier was not necessary because the raw soil samples had non-detect values for Selenium. Mercury (Method SW7471A) was detected in Method Blank MB-72163. A validation qualifier was not necessary because the raw soil samples had non-detect values for Mercury. 2-Methylnaphthalene and Naphthalene (Method SW8270C) were detected in Method Blank MB-72841-72253-72102. A validation qualifier "U" was placed on raw soil samples meeting criteria of values <5x the reporting limit. Water: Barium, Cadmium, Chromium, Lead, and Silver (Method E200.8) were detected in Method Blank MB-72052. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Benzo(a)anthracene, Phenanthrene, Benzo(a)pyrene, Benzo(b)fluoranthene, Pyrene, Indeno(1,2,3-cd)pyrene, Chrysene, Fluoranthene (Method SW8270C); Chloroform and Methylene chloride (Method SW8260B) were detected in Rinsate Blank YOSD-1306-111. Chloroform and Methylene chloride (Method SW8260B) were detected in Rinsate Blank YOSD-1306-112. A validation qualifier "U" was placed on the Rinsate Blanks for these analytes, as well as any associated soil values <5X the reporting limit. Toluene (SW8260B) was also detected in Rinsate Blank YOSD-1306-111 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Samples 29-SB-B and 85-SB-C were flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for this method. Sample 81-SB-B was flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatics (Method MA-VPH) and Nitrobenzene-d5 (Method SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for these methods. Also, the VPH surrogate was just above control limits. Sample 34-SB-A was flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatics (Method MA-VPH) being above control limits. A validation qualifier was not necessary because another surrogate was within limits for these methods. Also, the VPH surrogate was just above control limits with positive matrix interference. Samples 83-SB-B, 97-SB-B, and 85-SB-B were flagged with laboratory qualifier "S" for the % recovery of VPH Aromatics (Method MA-VPH) being above control limits. A validation qualifier was not necessary because another surrogate was within limits for these methods. Also, the VPH surrogate was just above control limits with positive matrix interference. Also, a note from the laboratory indicated the % recovery is calculated from a value that was over the upper calibration range. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Soil: QC sample B13061277-004AMSD3 was flagged with laboratory qualifier "S" for the % recovery of Selenium (Method SW6020) being outside of control limits. A validation qualifier was not necessary because the post-distillation spike was within limits for this method. QC Sample B13061196-010AMS and B13061196-010AMSD were flagged laboratory qualifier "S" for the % recovery of 2-Methylnaphthalene and surrogate Nitrobenzene-d5 (Method SW8270C) being outside of control limits. A validation qualifier was not necessary because the LCS was within limits. Water: QC matrix spike B13061322-003A_MS and matrix spike duplicate B13061322-003A_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether and 1,1,2,2-Tetrachloroethane (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the LCS was within limits and raw samples were nondetect for this analyte. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: All blind field duplicate RPDs were within control limits. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Benzo(a)anthracene | 0.34 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Phenanthrene | 0.23 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Benzo(a)pyrene | 0.21 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Benzo(b)fluoranthene | 0.21 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Pyrene | 0.84 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.36 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Chrysene | 0.24 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8260B | Chloroform | 1.7 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8260B | Methylene chloride | 2.3 | ug/L | U | |
| YOSD-1306-111 | Water | B13061235-002 | SW8270C | Fluoranthene | 0.66 | ug/L | U | |
| YOSD-1306-112 | Water | B13061235-003 | SW8260B | Methylene chloride | 3.1 | ug/L | U | |
| YOSD-1306-112 | Water | B13061235-003 | SW8260B | Chloroform | 1.9 | ug/L | U | |
| 29-SB-B | Soil | B13061196-020 | SW8270C | Pyrene | 0.019 | mg/kg | U | |
| 34-SB-A | Soil | B13061196-013 | SW8270C | Pyrene | 0.032 | mg/kg | U | |
| 34-SB-AD | Soil | B13061196-014 | SW8270C | Pyrene | 0.028 | mg/kg | U | |
| 81-SB-C | Soil | B13061196-007 | SW8270C | Chrysene | 0.010 | mg/kg | U | |
| 81-SB-C | Soil | B13061196-007 | SW8270C | Benzo(a)anthracene | 0.0064 | mg/kg | U | |
| 81-SB-C | Soil | B13061196-007 | SW8270C | Pyrene | 0.020 | mg/kg | U | |
| 82-SB-B | Soil | B13061196-004 | SW8270C | Pyrene | 0.0039 | mg/kg | U | |
| 82-SB-B | Soil | B13061196-004 | SW8270C | Phenanthrene | 0.017 | mg/kg | U | |
| 82-SB-C | Soil | B13061196-005 | SW8270C | Pyrene | 0.016 | mg/kg | U | |
| 83-SB-B | Soil | B13061196-002 | SW8270C | Pyrene | 0.014 | mg/kg | U | |
| 83-SB-B | Soil | B13061196-002 | SW8270C | Phenanthrene | 0.011 | mg/kg | U | |
| 83-SB-C | Soil | B13061196-003 | SW8270C | Phenanthrene | 0.73 | mg/kg | U | |
| 85-SB-B | Soil | B13061196-024 | SW8270C | Benzo(a)anthracene | 0.0041 | mg/kg | U | |
| 85-SB-B | Soil | B13061196-024 | SW8270C | Fluoranthene | 0.013 | mg/kg | U | |
| 85-SB-B | Soil | B13061196-024 | SW8270C | Chrysene | 0.0071 | mg/kg | U | |
| 85-SB-C | Soil | B13061196-025 | SW8270C | Fluoranthene | 0.018 | mg/kg | U | |
| 85-SB-C | Soil | B13061196-025 | SW8270C | Chrysene | 0.0090 | mg/kg | U | |
| 85-SB-C | Soil | B13061196-025 | SW8270C | Phenanthrene | 0.42 | mg/kg | U | |
| 99-SB-B | Soil | B13061196-008 | SW8270C | Phenanthrene | 0.016 | mg/kg | U | |
| 99-SB-C | Soil | B13061196-009 | SW8270C | Phenanthrene | 0.0064 | mg/kg | U | |
| 100-SB-C | Soil | B13061196-028 | SW8270C | 2-Methylnaphthalene | 0.017 | mg/kg | U | |
| 100-SB-CD | Soil | B13061196-029 | SW8270C | 2-Methylnaphthalene | 0.0095 | mg/kg | U | |
| 34-SB-A | Soil | B13061196-013 | SW8270C | 2-Methylnaphthalene | 1.8 | mg/kg | U | |
| 34-SB-AD | Soil | B13061196-014 | SW8270C | 2-Methylnaphthalene | 1.7 | mg/kg | U | |
| 81-SB-B | Soil | B13061196-006 | SW8270C | Naphthalene | 0.49 | mg/kg | U | |
| 81-SB-C | Soil | B13061196-007 | SW8270C | 2-Methylnaphthalene | 1.6 | mg/kg | U | |
| 85-SB-C | Soil | B13061196-025 | SW8270C | Naphthalene | 0.50 | mg/kg | U | |
| 86-SB-B | Soil | B13061196-030 | SW8270C | 2-Methylnaphthalene | 0.0096 | mg/kg | U | |
| 86-SB-C | Soil | B13061196-031 | SW8270C | 2-Methylnaphthalene | 0.013 | mg/kg | U | |
| 99-SB-C | Soil | B13061196-009 | SW8270C | Naphthalene | 0.011 | mg/kg | U | |
| 99-SB-C | Soil | B13061196-009 | SW8270C | 2-Methylnaphthalene | 0.015 | mg/kg | U | |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 06/27/2013** |
| **Verified By/Date Verified: Angela Roddy 08/16/2013** | **Sample End Date: 06/28/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 11-SB-B | 6/27/2013 | B13062654 | B13062654-001 |
| 2 | Soil | 21-SB-C | 6/27/2013 | B13062654 | B13062654-002 |
| 3 | Soil | 37-SB-B | 6/27/2013 | B13062654 | B13062654-003 |
| 4 | Soil | 37-SB-C | 6/27/2013 | B13062654 | B13062654-004 |
| 5 | Soil | 37-SB-CD | 6/27/2013 | B13062654 | B13062654-005 |
| 6 | Soil | 38-SB-C | 6/27/2013 | B13062654 | B13062654-006 |
| 7 | Soil | 39-SB-B | 6/27/2013 | B13062654 | B13062654-007 |
| 8 | Soil | 39-SB-C | 6/27/2013 | B13062654 | B13062654-008 |
| 9 | Soil | 47-SB-C | 6/27/2013 | B13062654 | B13062654-009 |
| 10 | Soil | 49-SB-B | 6/27/2013 | B13062654 | B13062654-010 |
| 11 | Soil | 49-SB-C | 6/27/2013 | B13062654 | B13062654-011 |
| 12 | Water-Rinsate Blank | YOSD-1306-113 | 6/28/2013 | B13070069 | B13070069-001 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13062654 and B13070069*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| L | Lowest available reporting limit for the analytical method used. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| R | RPD exceeds control limits. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |
| J | QC Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1, 2, and 3 arrived with temperatures of 0.9°C, 5.2°C, and 5.2°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B) was detected in Method Blank MB-72551. A validation qualifier was not necessary because the raw soil samples had values >10x the reporting limit for Barium. Water: Cadmium, Chromium, and Lead (Method E200.8) were detected in Method Blank MB-72513. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnapthalene and Naphthalene (Method SW8270C) were detected in Rinsate Blank YOSD-1306-113. A validation qualifier "U" was placed on the Rinsate Blanks for these analytes, as well as any associated soil samples with values <5X the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Samples 11-SB-B, 38-SB-C, and 37-SB-B were flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for this method. Sample 37-SB-C was flagged with laboratory qualifier "S" for the % recovery of VPH Aromatics (Method MA-VPH) being just above control limits. A validation qualifier was not necessary because another surrogate was within limits for this method. Also, the VPH surrogate was just above control limits. Sample 39-SB-B was flagged with laboratory qualifier "S" for the % recovery of VPH Aliphatics (Method MA-VPH), o-Terphenyl (Method MA-EPH), and Nitrobenzene-d5 (Method SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for these methods. Also, the VPH surrogate was just above control limits with positive matrix interference. Sample 39-SB-C was flagged with laboratory qualifier "S" for the % recovery of o-Terphenyl (Method MA-EPH) being above control limits. A validation qualifier was not necessary because another surrogate was within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: Water: LCS_070213 was flagged with laboratory qualifier "S" for the % recovery of the analyte 1,1,2,2-Tetrachloroethane (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because raw samples were nondetect for this analyte. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B13062654-011AMSD3 was flagged with laboratory qualifiers "S" and "R" for the % recovery and RPD of the analyte Lead (Method SW6010B) being outside of control limits. A validation qualifier was not necessary because the post-distillation spike was within limits for this method. QC Sample B13062415-002AMSD was flagged laboratory qualifier "S" for the % recovery of Naphthalene (Method MA-VPH) being outside of control limits. A validation qualifier was not necessary because the LCS was within limits. Water: QC matrix spike B13070094-004C_MS and matrix spike duplicate B13070094-004C_MSD were flagged with laboratory qualifier "S" for the % recovery of the analytes 2-Chlorethyl vinyl ether and 1,1,2,2-Tetrachloroethane (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because raw samples were nondetect for this analyte. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: 37-SB-C and its duplicate 37-SB-CD had RPDs outside of control limits for Chromium (35%) and Barium (51%), Method SW6010B; and also a PRDL outside of control limits for C5-C8 Aliphatics, Method MA-VPH. A validation qualifier "J" was placed on all raw soil samples for these analytes indicating RPD or PRDL QC exceedances. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of "A" was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1306-113 | Water | B13070069-001 | SW8270C | 2-Methylnaphthalene | 0.64 | ug/L | U | |
| YOSD-1306-113 | Water | B13070069-001 | SW8270C | Naphthalene | 0.45 | ug/L | U | |
| 39-SB-C | Soil | B13062654-008 | SW8270C | Naphthalene | 8.6 | mg/kg | U | |
| 49-SB-B | Soil | B13062654-010 | SW8270C | Naphthalene | 0.033 | mg/kg | U | |
| 11-SB-B | Soil | B13062654-001 | MA-VPH | C5-C8 ALIPHATICS | 141 | mg/kg | J | PRDL |
| 11-SB-B | Soil | B13062654-001 | SW6010B | Barium | 79 | mg/kg | J | RPD |
| 11-SB-B | Soil | B13062654-001 | SW6010B | Chromium | 18 | mg/kg | J | RPD |
| 21-SB-C | Soil | B13062654-002 | SW6010B | Barium | 104 | mg/kg | J | RPD |
| 21-SB-C | Soil | B13062654-002 | SW6010B | Chromium | 12 | mg/kg | J | RPD |
| 21-SB-C | Soil | B13062654-002 | MA-VPH | C5-C8 ALIPHATICS | 166 | mg/kg | J | PRDL |
| 37-SB-B | Soil | B13062654-003 | SW6010B | Barium | 110 | mg/kg | J | RPD |
| 37-SB-B | Soil | B13062654-003 | MA-VPH | C5-C8 ALIPHATICS | 467 | mg/kg | J | PRDL |
| 37-SB-B | Soil | B13062654-003 | SW6010B | Chromium | 10 | mg/kg | J | RPD |
| 37-SB-C | Soil | B13062654-004 | SW6010B | Barium | 55 | mg/kg | J | RPD |
| 37-SB-C | Soil | B13062654-004 | SW6010B | Chromium | 20 | mg/kg | J | RPD |
| 37-SB-C | Soil | B13062654-004 | MA-VPH | C5-C8 ALIPHATICS | 71 | mg/kg | J | PRDL |
| 37-SB-CD | Soil | B13062654-005 | SW6010B | Chromium | 14 | mg/kg | J | RPD |
| 37-SB-CD | Soil | B13062654-005 | SW6010B | Barium | 93 | mg/kg | J | RPD |
| 37-SB-CD | Soil | B13062654-005 | MA-VPH | C5-C8 ALIPHATICS | 41 | mg/kg | J | PRDL |
| 38-SB-C | Soil | B13062654-006 | MA-VPH | C5-C8 ALIPHATICS | 342 | mg/kg | J | PRDL |
| 38-SB-C | Soil | B13062654-006 | SW6010B | Chromium | 30 | mg/kg | J | RPD |
| 38-SB-C | Soil | B13062654-006 | SW6010B | Barium | 96 | mg/kg | J | RPD |
| 39-SB-B | Soil | B13062654-007 | SW6010B | Barium | 589 | mg/kg | J | RPD |
| 39-SB-B | Soil | B13062654-007 | MA-VPH | C5-C8 ALIPHATICS | 3830 | mg/kg | J | PRDL |
| 39-SB-B | Soil | B13062654-007 | SW6010B | Chromium | 40 | mg/kg | J | RPD |
| 39-SB-C | Soil | B13062654-008 | MA-VPH | C5-C8 ALIPHATICS | 667 | mg/kg | J | PRDL |
| 39-SB-C | Soil | B13062654-008 | SW6010B | Barium | 101 | mg/kg | J | RPD |
| 39-SB-C | Soil | B13062654-008 | SW6010B | Chromium | 11 | mg/kg | J | RPD |
| 47-SB-C | Soil | B13062654-009 | SW6010B | Chromium | 17 | mg/kg | J | RPD |
| 47-SB-C | Soil | B13062654-009 | MA-VPH | C5-C8 ALIPHATICS | <4.6 | mg/kg | J | PRDL |
| 47-SB-C | Soil | B13062654-009 | SW6010B | Barium | 110 | mg/kg | J | RPD |
| 49-SB-B | Soil | B13062654-010 | SW6010B | Chromium | 17 | mg/kg | J | RPD |
| 49-SB-B | Soil | B13062654-010 | MA-VPH | C5-C8 ALIPHATICS | 14 | mg/kg | J | PRDL |
| 49-SB-B | Soil | B13062654-010 | SW6010B | Barium | 208 | mg/kg | J | RPD |
| 49-SB-C | Soil | B13062654-011 | MA-VPH | C5-C8 ALIPHATICS | <4.4 | mg/kg | J | PRDL |
| 49-SB-C | Soil | B13062654-011 | SW6010B | Barium | 65 | mg/kg | J | RPD |
| 49-SB-C | Soil | B13062654-011 | SW6010B | Chromium | 19 | mg/kg | J | RPD |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |
| J | QC Exceedance | | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Water** |
| **Project No.: 11108/002** | **Sample Start Date: 06/03/2013** |
| **Verified By/Date Verified: Angela Roddy 08/5/2013** | **Sample End Date: 06/07/2013** |

| Samples Analyzed | | | | | | |
|---|---|---|---|---|---|---|
| | Matrix | Site Code | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Groundwater | YMW-11 | YOSD-1306-300 | 6/3/2013 | B13060112 | B13060112-001 |
| 2 | Groundwater | YMW-10 | YOSD-1306-301 | 6/3/2013 | B13060112 | B13060112-002 |
| 3 | Groundwater | YMW-19 | YOSD-1306-302 | 6/3/2013 | B13060112 | B13060112-003 |
| 4 | Water-Trip Blank | NA | TB1051713BTSSHP0262 | 6/3/2013 | B13060112 | B13060112-004 |
| 5 | Water-Trip Blank | NA | TB2051713BTSSHP0262 | 6/3/2013 | B13060112 | B13060112-005 |
| 6 | Water-Trip Blank | NA | TB3051713BTSSHP0262 | 6/3/2013 | B13060112 | B13060112-006 |
| 7 | Water-Trip Blank | MW-01 | YOSD-1306-303 | 6/4/2013 | B13060247 | B13060247-001 |
| 8 | Groundwater | MW-02 | YOSD-1306-304 | 6/4/2013 | B13060247 | B13060247-002 |
| 9 | Groundwater | MW-6 | YOSD-1306-305 | 6/4/2013 | B13060247 | B13060247-003 |
| 10 | Groundwater | MW-6 | YOSD-1306-306 | 6/4/2013 | B13060247 | B13060247-004 |
| 11 | Groundwater | MW-4 | YOSD-1306-307 | 6/4/2013 | B13060247 | B13060247-005 |
| 12 | Water-Trip Blank | NA | TB1051713BTSSHP0262A | 6/4/2013 | B13060247 | B13060247-006 |
| 13 | Water-Trip Blank | NA | TB2051713BTSSHP0262A | 6/4/2013 | B13060247 | B13060247-007 |
| 14 | Water-Trip Blank | NA | TB3051713BTSSHP0262A | 6/4/2013 | B13060247 | B13060247-008 |
| 15 | Water-Trip Blank | NA | TB4051713BTSSHP0262A | 6/4/2013 | B13060247 | B13060247-009 |
| 16 | Water-Trip Blank | NA | TB5051713BTSSHP0262A | 6/4/2013 | B13060247 | B13060247-010 |
| 17 | Groundwater | MW-03 | YOSD-1306-308 | 6/5/2013 | B13060378 | B13060378-001 |
| 18 | Groundwater | YMW-15 | YOSD-1306-309 | 6/5/2013 | B13060378 | B13060378-002 |
| 19 | Groundwater | YMW-16 | YOSD-1306-310 | 6/5/2013 | B13060378 | B13060378-003 |
| 20 | Water-DI Blank | NA | YOSD-1306-311 | 6/5/2013 | B13060378 | B13060378-004 |
| 21 | Water-Trip Blank | NA | TB1051713BTSSHP0262C | 6/5/2013 | B13060378 | B13060378-005 |
| 22 | Water-Trip Blank | NA | TB2051713BTSSHP0262C | 6/5/2013 | B13060378 | B13060378-006 |
| 23 | Water-Trip Blank | NA | TB3051713BTSSHP0262C | 6/5/2013 | B13060378 | B13060378-007 |
| 24 | Water-Trip Blank | NA | TB4051713BTSSHP0262C | 6/5/2013 | B13060378 | B13060378-008 |
| 25 | Groundwater | YMW-21 | YOSD-1306-312 | 6/6/2013 | B13060547 | B13060547-001 |
| 26 | Groundwater | YMW-17 | YOSD-1306-313 | 6/6/2013 | B13060547 | B13060547-002 |
| 27 | Groundwater | YMW-22 | YOSD-1306-314 | 6/6/2013 | B13060547 | B13060547-003 |
| 28 | Water-Rinsate Blank | NA | YOSD-1306-315 | 6/6/2013 | B13060547 | B13060547-004 |
| 29 | Water-Trip Blank | NA | TB1051713BTSSHP0262B | 6/6/2013 | B13060547 | B13060547-005 |
| 30 | Water-Trip Blank | NA | TB2051713BTSSHP0262B | 6/6/2013 | B13060547 | B13060547-006 |
| 31 | Water-Trip Blank | NA | TB3051713BTSSHP0262B | 6/6/2013 | B13060547 | B13060547-007 |
| 32 | Water-Trip Blank | NA | TB4051713BTSSHP0262B | 6/6/2013 | B13060547 | B13060547-008 |
| 33 | Groundwater | YMW-20 | YOSD-1306-316 | 6/7/2013 | B13060658 | B13060658-001 |
| 34 | Groundwater | YMW-23 | YOSD-1306-317 | 6/7/2013 | B13060658 | B13060658-002 |
| 35 | Water-Trip Blank | NA | TB1052213BTSSHP0262 | 6/7/2013 | B13060658 | B13060658-003 |
| 36 | Water-Trip Blank | NA | TB2051713BTSSHP0262D | 6/7/2013 | B13060658 | B13060658-004 |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

- *Methods and Parameter Groups Verified: pH-A4500-H B; Conductivity-A2510 B; Turbidity-A2130B; Solids, Total Dissolved-A2540 C; Alkalinity and Bicarbonate-A2320 B; Chloride and Sulfate-E300.0; Nutrients-E353.2; Metals, Dissolved-E200.8; VPH-MA-VPH; Methane-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C (including Tetraethyl Lead); Volatile Organic Compounds-SW8260B*

- *Laboratory Project Ids: B13060112, B13060247, B13060378, B13060547, and B13060658*

| **PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT** | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| COMPLIANCE ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| B | The analyte was detected in the method blank. |
| D | RL increased due to sample matrix. |
| E | Estimated value. Result exceeds the instrument upper quantitation limit. |
| H | Analysis performed past recommended holding time. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| L | Lowest available reporting limit for the analytical method used. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. Per request from Kris Adler, Project Engineer, Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver, and Ferrous Iron were added to Groundwater samples and a DI Blank for Batches B13060112, B13060247, and B13060378. For Batch B13060378, per call with John Bergin, Project Engineer, the nitric preserved samples that the lab received were marked as filtered but they did not filter them in the field. Filter off of the unpreserved sample containers for dissolved metals per client request. Samples for Dissolved Metals/Hardness were subsampled, filtered and preserved to pH<2 with 2 mL of nitric acid per 250 mL in the lab. According to 40CFR136, samples for Dissolved Metals should be filtered and preserved within 15 minutes of collection | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. The COC from Batch B13060247 was filled out with wrong sampling date, but correct date was reported, as the field notes indicated. A note from COC from Batch B13060378 indicated for YOSD-1306-309 the collection time is listed as 11:58 on the COC and as 12:10 on the container labels. They used the time provided on the COC for sample analysis. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: All samples were received in good condition and at the appropriate temperature. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | | Yes | **X** | No | AR | Initials |
| Comments: Sample holding times for pH were outside of advisory limits and were flagged with laboratory qualifier "H". However, validation qualifiers are not necessary because the holding times for pH are difficult to reach due to the transportation time from the field. The pH values are taken as soon as possible in the laboratory setting. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Calcium (Method E200.7) was detected in Method Blanks MB-IRISDIS130605A and MB-IRISDIS130606A. A validation qualifier was not necessary because the raw samples had either values >10x the reporting limit for Calcium or were non-detect. Mercury (Method E200.8) was detected in Method Blank MB-71836. A validation qualifier was not necessary because the raw samples were non-detect for Mercury. Naphthalene (Method SW8270C) was detected in Method Blank MB-72141-72112-71974. A validation qualifier "U" was placed on associated raw samples with values <5x the reporting limit for Naphthalene. Chloride (Method E300.0) was detected in the ICS for this method. No validation qualifier was necessary because raw sample values were >10x the reporting limit for Chloride. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Methane (Method SW8015M) was detected in Rinsate Blank YOSD-1306-315 and DI Blank YOSD-1306-311. A validation qualifier "U" was placed on all associated raw samples with values <5x the reporting limit for Methane, as well as the DI blank and Rinsate blank. Methylene chloride (SW8260B) was also detected in YOSD-1306-311 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Samples YOSD-1306-312 and YOSD-1306-313 were flagged with laboratory qualifier "S" for the % recovery of 1-Chloro-octadecane (Method MA-EPH) being outside of control limits. A validation qualifier was not necessary because other surrogates were within limits for this method. Samples YOSD-1306-303, YOSD-1306-305, and YOSD-1306-306 were flagged with laboratory qualifier "S" for the % recovery of 2-Fluorobiphenyl (SW8270C). A validation qualifier was not necessary because the associated analyte was non-detect. Sample YOSD-1306-308 was flagged with laboratory qualifier "S" for the % recovery of 1-Chloro-octadecane, o-Terphenyl (MA-EPH) and o-Terphenyl (SW8270C). A validation qualifier was not necessary because other surrogates were within limits for these methods. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: QC samples B13060112-001BMS and B13060112-001BMSD were flagged with laboratory qualifier "S" for the % recovery of Mercury and Silver (Method E200.8) being outside of control limits. A validation qualifier was not necessary because the Laboratory Fortified Blank was within limits for this method. QC sample B13060378-001BMS was flagged with laboratory qualifier "S" for the percent recovery of Selenium (Method E200.8) being outside of control limits. A validation qualifier was not necessary because the Laboratory Fortified Blank was within limits for this method. QC sample B13060547-003BMS and B13060547-003BMSD was flagged with laboratory qualifier "S" for the % recovery of Mercury, Selenium, and Silver (Method E200.8) being outside of control limits. A validation qualifier was not necessary because the Laboratory Fortified Blank was within limits for this method. QC samples B13060644-008-MS, B13060644-008-MSD, B13060247-005F_MS, B13060247-005F_MSD, B13060590-003B_MS, B13060590-003B_MSD, B13060708-003A_MS, B13060708-003A_MSD, B13060112-002E_MS, and B13060112-002E_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte. B13060547-002EMS was flagged with laboratory qualifier "S" for the % recovery of Ethylbenzene (Method MA-VPH) being outside of control limits. A validation qualifier was not necessary because the LCS was within limits for this method. QC sample B13060466-001AMS was flagged with laboratory qualifier "S" for the % recovery of Sulfate (Method E300.0) being outside of control limits. This QC sample was rerun and within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample YOSD-1306-305 and is duplicate YOSD-1306-306 had RPDs within control limits. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event an analyte was detected in a Method Blank and also detected in a raw sample, a laboratory qualifier "B" was placed on the data.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte value exceeded the limit of an instrument, a laboratory qualifier "E" was placed on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.
- Specific Conductivity (Field) values were significantly lower than lab values for YMW-10, YMW-11, and YMW-19. This could be related to calibration.

**Validator Qualified Analytical Results**

| Site Code | Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag |
|---|---|---|---|---|---|---|---|---|
| MW-03 | YOSD-1306-308 | Groundwater | B13060378-001 | SW8270C | Naphthalene | 0.46 | ug/L | U |
| MW-02 | YOSD-1306-304 | Groundwater | B13060247-002 | SW8270C | Naphthalene | 0.36 | ug/L | U |
| YMW-20 | YOSD-1306-316 | Groundwater | B13060658-001 | SW8270C | Naphthalene | 0.89 | ug/L | U |
| YMW-22 | YOSD-1306-314 | Groundwater | B13060547-003 | SW8270C | Naphthalene | 0.33 | ug/L | U |
| YMW-22 | YOSD-1306-314 | Groundwater | B13060547-003 | SW8015M | Methane | 0.0029 | mg/L | U |
| NA | YOSD-1306-315 | Water-Rinsate Blank | B13060547-004 | SW8015M | Methane | 0.0014 | mg/L | U |
| NA | YOSD-1306-311 | Water-DI Blank | B13060378-004 | SW8015M | Methane | 0.0015 | mg/L | U |
| MW-01 | YOSD-1306-303 | Groundwater | B13060247-001 | SW8015M | Methane | 0.0016 | mg/L | U |
| MW-4 | YOSD-1306-307 | Groundwater | B13060247-005 | SW8015M | Methane | 0.0011 | mg/L | U |
| YMW-11 | YOSD-1306-300 | Groundwater | B13060112-001 | SW8015M | Methane | 0.0030 | mg/L | U |
| | Validation Qualifer Definitions: | | | | | | | |
| | U | Blank Exceedance | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 06/28/2013** |
| **Verified By/Date Verified: Angela Roddy 08/22/2013** | **Sample End Date: 06/28/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 29-SB-C | 6/28/2013 | B13070072 | B13070072-001 |
| 2 | Soil | 31-SB-C | 6/28/2013 | B13070072 | B13070072-002 |
| 3 | Soil | 34-SB-B | 6/28/2013 | B13070072 | B13070072-003 |
| 4 | Soil | 34-SB-C | 6/28/2013 | B13070072 | B13070072-004 |
| 5 | Soil | 40-SB-B | 6/28/2013 | B13070072 | B13070072-005 |
| 6 | Soil | 40-SB-C | 6/28/2013 | B13070072 | B13070072-006 |
| 7 | Soil | 46-SB-C | 6/28/2013 | B13070072 | B13070072-007 |
| 8 | Soil | 71-SB-C | 6/28/2013 | B13070072 | B13070072-008 |
| 9 | Soil | 73-SB-C | 6/28/2013 | B13070072 | B13070072-009 |
| 10 | Water-Rinsate Blank | YOSD-1306-113 | 6/28/2013 | B13070069 | B13070069-001 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13070072 and B13070069*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| L | Lowest available reporting limit for the analytical method used. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with temperatures of 5.2°C and 5.2°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B) was detected in Method Blank MB-72643. A validation qualifier was not necessary because the raw soil samples had values >10x the reporting limit for Barium. Water: Cadmium, Chromium, and Lead (Method E200.8) were detected in Method Blank MB-72513. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnapthalene and Naphthalene (Method SW8270C) were detected in Rinsate Blank YOSD-1306-113. A validation qualifier "U" was placed on the Rinsate Blanks for these analytes, as well as any associated soil samples with values <5X the reporting limit. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Sample 40-SB-B was flagged with laboratory qualifier "S" for the % recovery of o-Terphenyl (Method MA-EPH), and Nitrobenzene-d5 (Method SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for these methods. Sample 40-SB-C was flagged with laboratory qualifier "S" for the % recovery of VPH Aromatics (Method MA-VPH) being just above control limits. A validation qualifier was not necessary because another surrogate was within limits for this method. Also, the VPH surrogate was just below control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC Samples B13070072-009AMS3 and B13070072-009AMS3D were flagged laboratory qualifier "S" for the % recovery of Barium (Method SW6010B) being outside of control limits. A validation qualifier was not necessary because the post-distillation spike was within limits for this method. Water: QC matrix spike B13070094-004C_MS and matrix spike duplicate B13070094-004C_MSD were flagged with laboratory qualifier "S" for the % recovery of the analytes 2-Chlorethyl vinyl ether and 1,1,2,2-Tetrachloroethane (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because raw samples were nondetect for this analyte. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not submitted with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1306-113 | Water | B13070069-001 | SW8270C | 2-Methylnaphthalene | 0.64 | ug/L | U | |
| YOSD-1306-113 | Water | B13070069-001 | SW8270C | Naphthalene | 0.45 | ug/L | U | |
| 29-SB-C | Soil | B13070072-001 | SW8270C | Naphthalene | 0.011 | mg/kg | U | |
| 31-SB-C | Soil | B13070072-002 | SW8270C | 2-Methylnaphthalene | 0.48 | mg/kg | U | |
| 40-SB-B | Soil | B13070072-005 | SW8270C | Naphthalene | 3.4 | mg/kg | U | |
| 40-SB-C | Soil | B13070072-006 | SW8270C | Naphthalene | 0.014 | mg/kg | U | |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 07/01/2013** |
| **Verified By/Date Verified: Angela Roddy 08/23/2013** | **Sample End Date: 07/02/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 60-SB-C | 7/1/2013 | B13070307 | B13070307-001 |
| 2 | Soil | 75-SB-C | 7/1/2013 | B13070307 | B13070307-002 |
| 3 | Soil | 77-SB-C | 7/1/2013 | B13070307 | B13070307-003 |
| 4 | Soil | 89-SB-C | 7/1/2013 | B13070307 | B13070307-004 |
| 5 | Soil | 91-SB-C | 7/1/2013 | B13070307 | B13070307-005 |
| 6 | Soil | 92-SB-C | 7/1/2013 | B13070307 | B13070307-006 |
| 7 | Soil | 95-SB-C | 7/1/2013 | B13070307 | B13070307-007 |
| 8 | Soil | 105-SB-C | 7/1/2013 | B13070307 | B13070307-008 |
| 9 | Soil | 57-SB-C | 7/2/2013 | B13070307 | B13070307-009 |
| 10 | Soil | 64-SB-C | 7/2/2013 | B13070307 | B13070307-010 |
| 11 | Soil | 67-SB-C | 7/2/2013 | B13070307 | B13070307-011 |
| 12 | Soil | 69-SB-C | 7/2/2013 | B13070307 | B13070307-012 |
| 13 | Soil | 88-SB-C | 7/2/2013 | B13070307 | B13070307-013 |
| 14 | Water-Rinsate Blank | YOSD-1307-100 | 7/1/2013 | B13070325 | B13070325-001 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13070307 and B13070325*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| D | RL increased due to sample matrix. |
| L | Lowest available reporting limit for the analytical method used. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |
| R | RPD exceeds advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with temperatures of 0.5°C and 0.4°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B) was detected in Method Blank MB-72642. A validation qualifier was not necessary because the raw soil samples had values >10x the reporting limit for Barium. Water: Cadmium, Chromium, Lead, and Silver (Method E200.8) were detected in Method Blank MB-72586. The associated raw samples do not require a qualification because the analytes were non-detect. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Chloroform and Methylene Chloride (Method SW8260B) were detected in Rinsate Blank YOSD-1307-100. A validation qualifier "U" was placed on the Rinsate Blank only for these analytes, as the raw soil samples were not tested for these analytes. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Sample 57-SB-C was flagged with laboratory qualifier "S" for the % recovery of Nitrobenzene-d5 (Method SW8270C) being above control limits. A validation qualifier was not necessary because other surrogates were within limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC Samples B13070445-001AMSD3 was flagged laboratory qualifiers "S" for the % recovery of Lead (Method SW6010B) being outside of control limits, as well as laboratory qualifier "R" for RPD exceedance. A validation qualifier was not necessary because the post-distillation spike was within limits for this method. QC sample B13070307-012AMS was flagged with laboratory qualifier "S" for % recovery being outside of control limits for the following analytes: Benzo(a)pyrene, Dibenzo(a,h)anthracene, and Indeno(1,2,3-cd)pyrene (Method SW8270C). A validation qualifier was not necessary because the LCS was within limits for this method. QC sample B13070307-012AMSD was flagged with laboratory qualifier "S" for % recovery being outside of control limits for the following analytes: Benzo(a)pyrene and Dibenzo(a,h)anthracene (Method SW8270C). A validation qualifier was not necessary because the LCS was within limits for this method. Water: QC matrix spike B13070287-008BMS3 and matrix spike duplicate B13070287-008BMSD3 were flagged with laboratory qualifier "S" for the % recovery of the analyte Selenium (Method E200.8) A validation qualifier was not necessary because these QC samples were rerun, and the recoveries were within limits for this method. QC matrix spike B13070325-001C_MS and matrix spike duplicate B13070325-001C_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because raw samples were nondetect for this analyte, as well as the LCS being within limits for this method. QC sample B13062515-002AMS was flagged with laboratory qualifier "S" for the % recovery of the analyte Benzene (Method MA-VPH) being outside of control limits. A validation qualifier was not necessary because the LCS was within limits for this method. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not submitted with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1307-100 | Water | B13070325-001 | SW8260B | Chloroform | 1.9 | ug/L | U | |
| YOSD-1307-100 | Water | B13070325-001 | SW8260B | Methylene chloride | 3.3 | ug/L | U | |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 07/09/2013** |
| **Verified By/Date Verified: Angela Roddy 08/26/2013** | **Sample End Date: 07/17/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 15-SB-B | 7/12/2013 | B13071122 | B13071122-001 |
| 2 | Soil | 18-SB-B | 7/12/2013 | B13071122 | B13071122-002 |
| 3 | Soil | 9-SB-B | 7/11/2013 | B13071122 | B13071122-003 |
| 4 | Soil | 12-SB-B | 7/11/2013 | B13071122 | B13071122-004 |
| 5 | Soil | 8-SB-B | 7/11/2013 | B13071122 | B13071122-005 |
| 6 | Soil | 41-SB-B | 7/10/2013 | B13071122 | B13071122-006 |
| 7 | Soil | 27-SB-B | 7/9/2013 | B13071122 | B13071122-007 |
| 8 | Soil | 28-SB-B | 7/9/2013 | B13071122 | B13071122-008 |
| 9 | Soil | 43-SB-B | 7/10/2013 | B13071122 | B13071122-009 |
| 10 | Soil | 42-SB-B | 7/10/2013 | B13071122 | B13071122-010 |
| 11 | Water-Rinsate Blank | YOSD-1307-608 | 7/17/2013 | B13071494 | B13071494-001 |
| 12 | Water-Trip Blank | TB070513BTSSHP0262 | 7/17/2013 | B13071494 | B13071494-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C, including Tetraethyl Lead; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13071122 and B13071494*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |

| COMPLIANCE ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| B | Analyte detected in Method Blank. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. A note from the laboratory indicated samples 8-SB-B and 15-SB-B were matched by sample time from COC due to both sample container sets were labeled as 8-SB-B. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. However, two values for 2-Methylnapthalene were reported for sample B13071122-009, and the report was re-issued with the correct value reported. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Coolers 1 and 2 arrived with temperatures of 9.4°C and 5.2°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B) was detected in Method Blanks MB-72816 and MB-72847. A validation qualifier was not necessary because the raw soil samples had values >10x the reporting limit for Barium. Water: Arsenic, Cadmium, and Silver (Method E200.8) were detected in Method Blank MB-72898. The associated raw samples do not require a qualification because the analytes were non-detect. Naphthalene (Method SW8270C) was detected in Method Blank 73162-73133-72989. A laboratory qualifier "B" was placed on the associated sample with detection of this analyte, which happens to be the Rinsate Blank. See comment below. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C); Chloroform and Methylene chloride (Method SW8260B) were detected in Rinsate Blank YOSD-1307-608. A validation qualifier "U" was placed on the Rinsate Blanks for these analytes, as well as any associated soil values <5X the reporting limit. Naphthalene (Method SW8270C) was also detected in the Method Blank and this analyte was flagged with laboratory qualifier "B" for the Rinsate Blank YOSD-1307-608. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Sample 42-SB-B was flagged with laboratory qualifier "S" for the % recovery of the surrogates 2-Fluorobiphenyl, Terphenyl-d14 (Method SW8270C); as well as laboratory qualifier "O" for the analyte Nitrobenzene-d5 (Method SW8270C). These surrogates were either diluted out or outside of recovery limits for Tetraethyl Lead. A validation qualifier was not necessary because this analyte was non-detect. Terphenyl-d14 and Nitrobenzene-d5 (Method SW8270C) were also flagged with laboratory qualifier "S" for SW8270C, SVOC method. A validation qualifier was not necessary because Terphenyl-d14 was just above control limits, with another surrogate being within limits. Sample 18-SB-B was flagged with laboratory qualifier "S" for the % recovery of the surrogates o-Terphenyl (Method MA-EPH); VPH Aliphatics and Aromatics (Method MA-VPH). and Nitrobenzene-d5 (Method SW8270C). A validation qualifier "J", indicating high bias, was only necessary for the Method MA-VPH because other surrogates were within limits for the other methods. Sample 27-SB-B was flagged with laboratory qualifier "S" for the % recovery of the surrogate o-Terphenyl (Method MA-EPH). A validation qualifier was not necessary because other surrogates were within limits for this method. Sample 43-SB-B was flagged with laboratory qualifier "S" for the % recovery of the surrogate Nitrobenzene-d5 (Method SW8270C). A validation qualifier was not necessary because other surrogates were within limits for this method. Sample 12-SB-B was flagged with laboratory qualifier "S" for the % recovery of the surrogate VPH Aliphatics (Method MA-VPH). A validation qualifier "J" was placed on this sample for all detected analytes for this method indicating high bias. Water: Method Blank MBLK_0723PE108r was flagged with laboratory qualifier "S" for the % recovery of VPH Aromatics and VPH Aliphatics (Method MA-VPH) being above control limits. A validation qualifier was not necessary because the LCS was within control limits for these surrogates. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Soil: QC sample B13071122-007AMS3 was flagged with laboratory qualifier "S" for the % recovery of the analyte Barium (Method SW6010B) being outside of control limits. A validation qualifier was not necessary because the post-distillation spike was within limits for this analyte. QC sample B13071122-007AMSD3 was flagged with laboratory qualifier "S" for the % recovery of the analytes Barium and Lead (Method SW6010B) and Selenium (Method SW6020) being outside of control limits. A validation qualifier was not necessary because the post-distillation spike was within limits for these analytes. QC sample B13071122-010AMSD3 was flagged with laboratory qualifier "S" for the % recovery of the analyte Barium and Selenium (Methods SW6010B/6020) being outside of control limits. A validation qualifier was not necessary because the post-distillation spike was within limits for these analytes. QC sample B13071122-003AMS3 was flagged with laboratory qualifier "S" for the % recovery of the surrogate Nitrobenzene-d5 (Method SW8270C) being outside of control limits. A validation qualifier was not necessary because the LCS was within limits for this surrogate. Water: QC matrix spike B13071452-001C_MS and matrix spike duplicate B13071452-001C_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the LCS was within limits and raw samples were nondetect for this analyte. Also, the lab noted this analyte cannot be recovered from acid-preserved samples. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: A blind field duplicate was not submitted with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of "A" was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

**Validator Qualified Analytical Results**

| Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag | Comments |
|---|---|---|---|---|---|---|---|---|
| YOSD-1307-608 | Water-Rinsate Blank | B13071494-001 | SW8260B | Methylene chloride | 3.6 | ug/L | U | |
| YOSD-1307-608 | Water-Rinsate Blank | B13071494-001 | SW8270C | Naphthalene | 0.26 | ug/L | U | |
| YOSD-1307-608 | Water-Rinsate Blank | B13071494-001 | SW8260B | Chloroform | 1.9 | ug/L | U | |
| 12-SB-B | Soil | B13071122-004 | SW8270C | Naphthalene | 2.4 | mg/kg | U | |
| 18-SB-B | Soil | B13071122-002 | SW8270C | Naphthalene | 2.9 | mg/kg | U | |
| 27-SB-B | Soil | B13071122-007 | SW8270C | Naphthalene | 3.4 | mg/kg | U | |
| 28-SB-B | Soil | B13071122-008 | SW8270C | Naphthalene | 0.78 | mg/kg | U | |
| 41-SB-B | Soil | B13071122-006 | SW8270C | Naphthalene | 2.2 | mg/kg | U | |
| 43-SB-B | Soil | B13071122-009 | SW8270C | Naphthalene | 0.54 | mg/kg | U | |
| 8-SB-B | Soil | B13071122-005 | SW8270C | Naphthalene | 0.48 | mg/kg | U | |
| 18-SB-B | Soil | B13071122-002 | MA-VPH | Total Purgeable Hydrocarbons | 5110 | mg/kg | J | High Bias |
| 18-SB-B | Soil | B13071122-002 | MA-VPH | C9-C12 ALIPHATICS | 2070 | mg/kg | J | High Bias |
| 18-SB-B | Soil | B13071122-002 | MA-VPH | C9-C10 AROMATICS | 1520 | mg/kg | J | High Bias |
| 18-SB-B | Soil | B13071122-002 | MA-VPH | o-Xylene | 17 | mg/kg | J | High Bias |
| 18-SB-B | Soil | B13071122-002 | MA-VPH | C5-C8 ALIPHATICS | 2040 | mg/kg | J | High Bias |
| 18-SB-B | Soil | B13071122-002 | MA-VPH | M-P XYLENE | 30 | mg/kg | J | High Bias |
| 18-SB-B | Soil | B13071122-002 | MA-VPH | BENZENE | 5.7 | mg/kg | J | High Bias |
| 18-SB-B | Soil | B13071122-002 | MA-VPH | TOTAL XYLENE | 48 | mg/kg | J | High Bias |
| 12-SB-B | Soil | B13071122-004 | MA-VPH | Total Purgeable Hydrocarbons | 3220 | mg/kg | J | High Bias |
| 12-SB-B | Soil | B13071122-004 | MA-VPH | C5-C8 ALIPHATICS | 923 | mg/kg | J | High Bias |
| 12-SB-B | Soil | B13071122-004 | MA-VPH | C9-C10 AROMATICS | 869 | mg/kg | J | High Bias |
| 12-SB-B | Soil | B13071122-004 | MA-VPH | C9-C12 ALIPHATICS | 1560 | mg/kg | J | High Bias |
| 12-SB-B | Soil | B13071122-004 | MA-VPH | Naphthalene | 7.7 | mg/kg | J | High Bias |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |
| J | QC Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Water** |
| **Project No.: 11108/002** | **Sample Start Date: 07/16/2013** |
| **Verified By/Date Verified: Angela Roddy 08/13/2013** | **Sample End Date: 07/16/2013** |

| Samples Analyzed | | | | | | |
|---|---|---|---|---|---|---|
| | Matrix | Site Code | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Surfacewater | YD-1 | YOSD-1307-601 | 7/16/2013 | B13071377 | B13071377-001 |
| 2 | Surfacewater | YD-3 | YOSD-1307-603 | 7/16/2013 | B13071377 | B13071377-002 |
| 3 | Surfacewater | YD-4 | YOSD-1307-604 | 7/16/2013 | B13071377 | B13071377-003 |
| 4 | Surfacewater | YD-5 | YOSD-1307-605 | 7/16/2013 | B13071377 | B13071377-004 |
| 5 | Water-DI Blank | NA | YOSD-1307-606 | 7/16/2013 | B13071377 | B13071377-005 |
| 6 | Surfacewater | YD-5 | YOSD-1307-607 | 7/16/2013 | B13071377 | B13071377-006 |
| 7 | Water-Trip Blank | NA | TB1071512BTSSHP0262 | 7/16/2013 | B13071377 | B13071377-007 |
| 8 | Water-Trip Blank | NA | TB2070512BTSSHP0262 | 7/16/2013 | B13071377 | B13071377-008 |
| 9 | Water-Trip Blank | NA | TB3070512BTSSHP0262 | 7/16/2013 | B13071377 | B13071377-009 |

- *Methods and Parameter Groups Verified: pH-A4500-H B; Conductivity-A2510 B; Solids, Total Suspended-A2540 D; Solids, Total Dissolved-A2540 C; Alkalinity and Bicarbonate-A2320 B; Chloride and Sulfate-E300.0; Metals, Total Recoverable-E200.8; VPH-MA-VPH; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C (including Tetraethyl Lead); Volatile Organic Compounds-SW8260B*

- *Laboratory Project ID: B13071377*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

H Analysis performed past recommended holding time.

J Estimated value. The analyte was present but less than the reporting limit.

L Lowest available reporting limit for the analytical method used.

S Spike recovery outside of advisory limits.

**Validation qualifiers used in this review:**

U Blank Exceedance

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Comments from the laboratory indicated the analysis requested on COC does not match the analysis requested on the attached parameter list. No methane vials were received and no sulfuric preserved containers were received. Samples for Nitrate+Nitrite were subsampled and preserved upon receipt with 2 mL sulfuric acid per 250mL to pH<2. Per Energy Laboratory project manager Shari Endy's call with John Bergin, project engineer, analyze samples per attached parameter list using the detection limits in the quote not per the COC. No Methane, Nitrite, or Nitrate+Nitrite analysis is required. Analyze all metals as Total Recoverable. Also, include Tetraethyl Lead analysis per project engineer, John Bergin. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. See comment above. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | | Yes | **X** | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Temperatures for Coolers 1, 2, 3 and 4 were 10.0°C, 13.2 °C, 5.6 °C, and 22.1 °C, respectively. These temps fall outside of control limits. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | | Yes | **X** | No | AR | Initials |
| Comments: Sample holding times for pH were outside of advisory limits and were flagged with laboratory qualifier "H". However, validation qualifiers are not necessary because the holding times for pH are difficult to reach due to the transportation time from the field. The pH values are taken as soon as possible in the laboratory setting. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Cadmium, Chromium, Lead, and Silver (Method E200.8) were detected in Method Blank MB-72884. A validation qualifier was not necessary because the raw samples had non-detect values for these analytes. Chloride (Method E300.0) was detected in the ICB for this method. No validation qualifier was necessary because raw sample values were >10x the reporting limit for Chloride. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Methylene chloride and Chloroform (Method SW8260B), Purgeable Hydrocarbons and C5-C8 Aliphatics (Method MA-VPH) were detected in DI Blank YOSD-1307-606. A validation qualifier "U" was placed on all associated raw samples with values <5x the reporting limit for these analytes, as well as the blank. Toluene and 2-Butanone (Methyl-ethyl-ketone) (SW8260B) were also detected in DI Blank YOSD-1307-606 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because these are estimated values and are below the reporting limits. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All surrogate recoveries were within control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: QC samples B13071377-001G_MS and B13071377-001G_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample YOSD-1307-605 and is duplicate YOSD-1307-607 had RPDs within control limits. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |
| | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.

**Validator Qualified Analytical Results**

| Site Code | Sample ID | Matrix | Lab Sample ID | Method | Anlayte | Result | Units | Flag |
|---|---|---|---|---|---|---|---|---|
| YD-1 | YOSD-1307-601 | Surfacewater | B13071377-001 | MA-VPH | PURGEABLE HYDROCARBONS | 38 | ug/L | U |
| NA | YOSD-1307-606 | Water-DI Blank | B13071377-005 | SW8260B | Methylene chloride | 2.7 | ug/L | U |
| NA | YOSD-1307-606 | Water-DI Blank | B13071377-005 | MA-VPH | PURGEABLE HYDROCARBONS | 208 | ug/L | U |
| NA | YOSD-1307-606 | Water-DI Blank | B13071377-005 | SW8260B | Chloroform | 1.9 | ug/L | U |
| NA | YOSD-1307-606 | Water-DI Blank | B13071377-005 | MA-VPH | C5-C8 ALIPHATICS | 280 | mg/L | U |
| | Validation Qualifer Definitions: | | | | | | | |
| | U | Blank Exceedance | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 07/17/2013** |
| **Verified By/Date Verified: Angela Roddy 08/14/2013** | **Sample End Date: 07/17/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | YD-1-SS-A | 7/17/2013 | B13071515 | B13071515-001 |
| 2 | Soil | YD-1-SS-B | 7/17/2013 | B13071515 | B13071515-002 |
| 3 | Soil | YD-1-SS-C | 7/17/2013 | B13071515 | B13071515-003 |
| 4 | Soil | YD-3-SS-A | 7/17/2013 | B13071515 | B13071515-004 |
| 5 | Soil | YD-3-SS-B | 7/17/2013 | B13071515 | B13071515-005 |
| 6 | Soil | YD-3-SS-BD | 7/17/2013 | B13071515 | B13071515-006 |
| 7 | Soil | YD-4-SS-A | 7/17/2013 | B13071515 | B13071515-007 |
| 8 | Soil | YD-4-SS-B | 7/17/2013 | B13071515 | B13071515-008 |
| 9 | Soil | YD-5-SS-A | 7/16/2013 | B13071515 | B13071515-009 |
| 10 | Soil | YD-5-SS-B | 7/16/2013 | B13071515 | B13071515-010 |
| 11 | Soil | YD-5-SS-C | 7/16/2013 | B13071515 | B13071515-011 |
| 12 | Water-Rinsate Blank | YOSD-1307-608 | 7/17/2013 | B13071494 | B13071494-001 |
| 13 | Water-Trip Blank | TB070513BTSSHP0262 | 7/17/2013 | B13071494 | B13071494-002 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C, including Tetraethyl Lead; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13071515 and B13071494*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| B | Analyte detected in Method Blank. |
| D | RL increased due to sample matrix. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with temperatures of 5.0°C and 5.2°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B) was detected in Method Blank MB-73010. A validation qualifier was not necessary because the raw soil samples had values >10x the reporting limit for Barium. Naphthalene (Method SW8270C) was detected in Method Blank 73104-72984-72882. A validation qualifier "U" was placed on the associated raw soil samples with detections <5x the reporting limit for Napthalene. Water: Arsenic, Cadmium, and Silver (Method E200.8) were detected in Method Blank MB-72898. The associated raw samples do not require a qualification because the analytes were non-detect. Naphthalene (Method SW8270C) was detected in Method Blank 73162-73133-72989. A laboratory qualifier "B" was placed on the associated sample with detection of this analyte, which happens to be the Rinsate Blank. See comment below. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C); Chloroform and Methylene chloride (Method SW8260B) were detected in Rinsate Blank YOSD-1307-608. A validation qualifier "U" was placed on the Rinsate Blanks for these analytes, as well as any associated soil values <5X the reporting limit. Naphthalene (Method SW8270C) was also detected in the Method Blank and this analyte was flagged with laboratory qualifier "B" for the Rinsate Blank YOSD-1307-608. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Water: Method Blank MBLK_0723PE108r was flagged with laboratory qualifier "S" for the % recovery of VPH Aromatics and VPH Aliphatics (Method MA-VPH) being above control limits. A validation qualifier was not necessary because the LCS was within control limits for these surrogates. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Water: QC matrix spike B13071452-001C_MS and matrix spike duplicate B13071452-001C _MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chloroethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the LCS was within limits and raw samples were nondetect for this analyte. Also, the lab noted this analyte cannot be recovered from acid-preserved samples. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample YD-3-SS-B and its duplicate YD-3-SS-BD had an RPD outside of control limits for Arsenic, Barium, Chromium, and Lead (Methods SW6010B/SW6020); Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Pyrene, Phenanthrene, Fluoranthene, and Indeno(1,2,3-cd)pyrene (Method SW8270C); and Moisture % by Weight (Method SW3550A). The associated raw samples, as well as the duplicate are flagged with validation qualifiers "J" for RPD exceedance. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |
| | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of "A" was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier "J" was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1307-608 | Water-Rinsate Blank | B13071494-001 | SW8260B | Methylene chloride | 3.6 | ug/L | U | |
| YOSD-1307-608 | Water-Rinsate Blank | B13071494-001 | SW8270C | Naphthalene | 0.26 | ug/L | U | |
| YOSD-1307-608 | Water-Rinsate Blank | B13071494-001 | SW8260B | Chloroform | 1.9 | ug/L | U | |
| YD-1-SS-A | Soil | B13071515-001 | SW8270C | Naphthalene | 0.015 | mg/kg-dry | U | |
| YD-1-SS-C | Soil | B13071515-003 | SW8270C | Naphthalene | 0.015 | mg/kg-dry | U | |
| YD-4-SS-A | Soil | B13071515-007 | MA-VPH | Naphthalene | 0.020 | mg/kg-dry | U | |
| YD-1-SS-A | Soil | B13071515-001 | SW6010B | Chromium | 29 | mg/kg-dry | J | RPD |
| YD-1-SS-A | Soil | B13071515-001 | SW8270C | Benzo(k)fluoranthene | 0.28 | mg/kg-dry | J | RPD |
| YD-1-SS-A | Soil | B13071515-001 | SW8270C | Benzo(g,h,i)perylene | 0.26 | mg/kg-dry | J | RPD |
| YD-1-SS-A | Soil | B13071515-001 | SW8270C | Pyrene | 0.67 | mg/kg-dry | J | RPD |
| YD-1-SS-A | Soil | B13071515-001 | SW8270C | Phenanthrene | 0.32 | mg/kg-dry | J | RPD |
| YD-1-SS-A | Soil | B13071515-001 | SW3550A | MOISTURE % BY WT. | 43 | mg/kg-dry | J | RPD |
| YD-1-SS-A | Soil | B13071515-001 | SW8270C | Fluoranthene | 0.85 | mg/kg-dry | J | RPD |
| YD-1-SS-A | Soil | B13071515-001 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.35 | mg/kg-dry | J | RPD |
| YD-1-SS-A | Soil | B13071515-001 | SW6010B | Lead | 63 | mg/kg-dry | J | RPD |
| YD-1-SS-A | Soil | B13071515-001 | SW6010B | Barium | 184 | mg/kg-dry | J | RPD |
| YD-1-SS-A | Soil | B13071515-001 | SW6020 | Arsenic | 8 | mg/kg-dry | J | RPD |
| YD-1-SS-B | Soil | B13071515-002 | SW8270C | Fluoranthene | 0.19 | mg/kg-dry | J | RPD |
| YD-1-SS-B | Soil | B13071515-002 | SW6010B | Barium | 180 | mg/kg-dry | J | RPD |
| YD-1-SS-B | Soil | B13071515-002 | SW8270C | Phenanthrene | 0.086 | mg/kg-dry | J | RPD |
| YD-1-SS-B | Soil | B13071515-002 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.095 | mg/kg-dry | J | RPD |
| YD-1-SS-B | Soil | B13071515-002 | SW6010B | Lead | 48 | mg/kg-dry | J | RPD |
| YD-1-SS-B | Soil | B13071515-002 | SW3550A | MOISTURE % BY WT. | 25 | mg/kg-dry | J | RPD |
| YD-1-SS-B | Soil | B13071515-002 | SW8270C | Benzo(k)fluoranthene | 0.049 | mg/kg-dry | J | RPD |
| YD-1-SS-B | Soil | B13071515-002 | SW8270C | Pyrene | 0.16 | mg/kg-dry | J | RPD |
| YD-1-SS-B | Soil | B13071515-002 | SW6020 | Arsenic | 7 | mg/kg-dry | J | RPD |
| YD-1-SS-B | Soil | B13071515-002 | SW8270C | Benzo(g,h,i)perylene | 0.075 | mg/kg-dry | J | RPD |
| YD-1-SS-B | Soil | B13071515-002 | SW6010B | Chromium | 46 | mg/kg-dry | J | RPD |
| YD-1-SS-C | Soil | B13071515-003 | SW3550A | MOISTURE % BY WT. | 32 | mg/kg-dry | J | RPD |
| YD-1-SS-C | Soil | B13071515-003 | SW6020 | Arsenic | 11 | mg/kg-dry | J | RPD |
| YD-1-SS-C | Soil | B13071515-003 | SW6010B | Chromium | 20 | mg/kg-dry | J | RPD |
| YD-1-SS-C | Soil | B13071515-003 | SW8270C | Benzo(k)fluoranthene | 0.026 | mg/kg-dry | J | RPD |
| YD-1-SS-C | Soil | B13071515-003 | SW8270C | Benzo(g,h,i)perylene | 0.076 | mg/kg-dry | J | RPD |
| YD-1-SS-C | Soil | B13071515-003 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.085 | mg/kg-dry | J | RPD |
| YD-1-SS-C | Soil | B13071515-003 | SW6010B | Barium | 134 | mg/kg-dry | J | RPD |
| YD-1-SS-C | Soil | B13071515-003 | SW6010B | Lead | 28 | mg/kg-dry | J | RPD |
| YD-1-SS-C | Soil | B13071515-003 | SW8270C | Phenanthrene | 0.040 | mg/kg-dry | J | RPD |
| YD-1-SS-C | Soil | B13071515-003 | SW8270C | Fluoranthene | 0.11 | mg/kg-dry | J | RPD |
| YD-1-SS-C | Soil | B13071515-003 | SW8270C | Pyrene | 0.13 | mg/kg-dry | J | RPD |
| YD-3-SS-A | Soil | B13071515-004 | SW8270C | Fluoranthene | 0.16 | mg/kg-dry | J | RPD |
| YD-3-SS-A | Soil | B13071515-004 | SW6010B | Chromium | 32 | mg/kg-dry | J | RPD |
| YD-3-SS-A | Soil | B13071515-004 | SW8270C | Benzo(g,h,i)perylene | 0.078 | mg/kg-dry | J | RPD |
| YD-3-SS-A | Soil | B13071515-004 | SW6010B | Barium | 319 | mg/kg-dry | J | RPD |
| YD-3-SS-A | Soil | B13071515-004 | SW6020 | Arsenic | 15 | mg/kg-dry | J | RPD |
| YD-3-SS-A | Soil | B13071515-004 | SW8270C | Benzo(k)fluoranthene | 0.043 | mg/kg-dry | J | RPD |
| YD-3-SS-A | Soil | B13071515-004 | SW3550A | MOISTURE % BY WT. | 62 | mg/kg-dry | J | RPD |
| YD-3-SS-A | Soil | B13071515-004 | SW8270C | Phenanthrene | 0.075 | mg/kg-dry | J | RPD |
| YD-3-SS-A | Soil | B13071515-004 | SW8270C | Pyrene | 0.19 | mg/kg-dry | J | RPD |
| YD-3-SS-A | Soil | B13071515-004 | SW6010B | Lead | 61 | mg/kg-dry | J | RPD |
| YD-3-SS-A | Soil | B13071515-004 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.11 | mg/kg-dry | J | RPD |
| YD-3-SS-B | Soil | B13071515-005 | SW6010B | Chromium | 12 | mg/kg-dry | J | RPD |
| YD-3-SS-B | Soil | B13071515-005 | SW3550A | MOISTURE % BY WT. | 25 | mg/kg-dry | J | RPD |
| YD-3-SS-B | Soil | B13071515-005 | SW8270C | Benzo(g,h,i)perylene | 0.099 | mg/kg-dry | J | RPD |
| YD-3-SS-B | Soil | B13071515-005 | SW6020 | Arsenic | 9 | mg/kg-dry | J | RPD |
| YD-3-SS-B | Soil | B13071515-005 | SW8270C | Benzo(k)fluoranthene | 0.080 | mg/kg-dry | J | RPD |
| YD-3-SS-B | Soil | B13071515-005 | SW8270C | Fluoranthene | 0.26 | mg/kg-dry | J | RPD |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| YD-3-SS-B | Soil | B13071515-005 | SW8270C | Pyrene | 0.25 | mg/kg-dry | J | RPD |
| YD-3-SS-B | Soil | B13071515-005 | SW8270C | Phenanthrene | 0.095 | mg/kg-dry | J | RPD |
| YD-3-SS-B | Soil | B13071515-005 | SW6010B | Lead | 16 | mg/kg-dry | J | RPD |
| YD-3-SS-B | Soil | B13071515-005 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.12 | mg/kg-dry | J | RPD |
| YD-3-SS-B | Soil | B13071515-005 | SW6010B | Barium | 128 | mg/kg-dry | J | RPD |
| YD-3-SS-BD | Soil | B13071515-006 | SW8270C | Phenanthrene | 0.27 | mg/kg-dry | J | RPD |
| YD-3-SS-BD | Soil | B13071515-006 | SW6020 | Arsenic | 16 | mg/kg-dry | J | RPD |
| YD-3-SS-BD | Soil | B13071515-006 | SW3550A | MOISTURE % BY WT. | 49 | mg/kg-dry | J | RPD |
| YD-3-SS-BD | Soil | B13071515-006 | SW8270C | Benzo(k)fluoranthene | 0.17 | mg/kg-dry | J | RPD |
| YD-3-SS-BD | Soil | B13071515-006 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.23 | mg/kg-dry | J | RPD |
| YD-3-SS-BD | Soil | B13071515-006 | SW8270C | Pyrene | 0.47 | mg/kg-dry | J | RPD |
| YD-3-SS-BD | Soil | B13071515-006 | SW8270C | Benzo(g,h,i)perylene | 0.17 | mg/kg-dry | J | RPD |
| YD-3-SS-BD | Soil | B13071515-006 | SW8270C | Fluoranthene | 0.59 | mg/kg-dry | J | RPD |
| YD-3-SS-BD | Soil | B13071515-006 | SW6010B | Chromium | 26 | mg/kg-dry | J | RPD |
| YD-3-SS-BD | Soil | B13071515-006 | SW6010B | Barium | 261 | mg/kg-dry | J | RPD |
| YD-3-SS-BD | Soil | B13071515-006 | SW6010B | Lead | 24 | mg/kg-dry | J | RPD |
| YD-4-SS-A | Soil | B13071515-007 | SW8270C | Benzo(k)fluoranthene | 0.11 | mg/kg-dry | J | RPD |
| YD-4-SS-A | Soil | B13071515-007 | SW6020 | Arsenic | 9 | mg/kg-dry | J | RPD |
| YD-4-SS-A | Soil | B13071515-007 | SW8270C | Pyrene | 0.30 | mg/kg-dry | J | RPD |
| YD-4-SS-A | Soil | B13071515-007 | SW6010B | Barium | 230 | mg/kg-dry | J | RPD |
| YD-4-SS-A | Soil | B13071515-007 | SW8270C | Phenanthrene | 0.17 | mg/kg-dry | J | RPD |
| YD-4-SS-A | Soil | B13071515-007 | SW8270C | Benzo(g,h,i)perylene | 0.12 | mg/kg-dry | J | RPD |
| YD-4-SS-A | Soil | B13071515-007 | SW3550A | MOISTURE % BY WT. | 50 | mg/kg-dry | J | RPD |
| YD-4-SS-A | Soil | B13071515-007 | SW6010B | Chromium | 23 | mg/kg-dry | J | RPD |
| YD-4-SS-A | Soil | B13071515-007 | SW6010B | Lead | 92 | mg/kg-dry | J | RPD |
| YD-4-SS-A | Soil | B13071515-007 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.18 | mg/kg-dry | J | RPD |
| YD-4-SS-A | Soil | B13071515-007 | SW8270C | Fluoranthene | 0.32 | mg/kg-dry | J | RPD |
| YD-4-SS-B | Soil | B13071515-008 | SW6020 | Arsenic | 12 | mg/kg-dry | J | RPD |
| YD-4-SS-B | Soil | B13071515-008 | SW8270C | Phenanthrene | 0.17 | mg/kg-dry | J | RPD |
| YD-4-SS-B | Soil | B13071515-008 | SW6010B | Lead | 79 | mg/kg-dry | J | RPD |
| YD-4-SS-B | Soil | B13071515-008 | SW3550A | MOISTURE % BY WT. | 36 | mg/kg-dry | J | RPD |
| YD-4-SS-B | Soil | B13071515-008 | SW6010B | Chromium | 32 | mg/kg-dry | J | RPD |
| YD-4-SS-B | Soil | B13071515-008 | SW8270C | Benzo(g,h,i)perylene | 0.18 | mg/kg-dry | J | RPD |
| YD-4-SS-B | Soil | B13071515-008 | SW8270C | Benzo(k)fluoranthene | 0.20 | mg/kg-dry | J | RPD |
| YD-4-SS-B | Soil | B13071515-008 | SW8270C | Pyrene | 0.49 | mg/kg-dry | J | RPD |
| YD-4-SS-B | Soil | B13071515-008 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.23 | mg/kg-dry | J | RPD |
| YD-4-SS-B | Soil | B13071515-008 | SW6010B | Barium | 171 | mg/kg-dry | J | RPD |
| YD-4-SS-B | Soil | B13071515-008 | SW8270C | Fluoranthene | 0.57 | mg/kg-dry | J | RPD |
| YD-5-SS-A | Soil | B13071515-009 | SW8270C | Pyrene | 0.16 | mg/kg-dry | J | RPD |
| YD-5-SS-A | Soil | B13071515-009 | SW6020 | Arsenic | 11 | mg/kg-dry | J | RPD |
| YD-5-SS-A | Soil | B13071515-009 | SW6010B | Lead | 49 | mg/kg-dry | J | RPD |
| YD-5-SS-A | Soil | B13071515-009 | SW6010B | Chromium | 21 | mg/kg-dry | J | RPD |
| YD-5-SS-A | Soil | B13071515-009 | SW6010B | Barium | 203 | mg/kg-dry | J | RPD |
| YD-5-SS-A | Soil | B13071515-009 | SW8270C | Benzo(k)fluoranthene | 0.052 | mg/kg-dry | J | RPD |
| YD-5-SS-A | Soil | B13071515-009 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.061 | mg/kg-dry | J | RPD |
| YD-5-SS-A | Soil | B13071515-009 | SW8270C | Fluoranthene | 0.18 | mg/kg-dry | J | RPD |
| YD-5-SS-A | Soil | B13071515-009 | SW8270C | Phenanthrene | 0.099 | mg/kg-dry | J | RPD |
| YD-5-SS-A | Soil | B13071515-009 | SW8270C | Benzo(g,h,i)perylene | 0.055 | mg/kg-dry | J | RPD |
| YD-5-SS-A | Soil | B13071515-009 | SW3550A | MOISTURE % BY WT. | 36 | mg/kg-dry | J | RPD |
| YD-5-SS-B | Soil | B13071515-010 | SW8270C | Fluoranthene | 0.35 | mg/kg-dry | J | RPD |
| YD-5-SS-B | Soil | B13071515-010 | SW6010B | Lead | 32 | mg/kg-dry | J | RPD |
| YD-5-SS-B | Soil | B13071515-010 | SW8270C | Pyrene | 0.31 | mg/kg-dry | J | RPD |
| YD-5-SS-B | Soil | B13071515-010 | SW6020 | Arsenic | 8 | mg/kg-dry | J | RPD |
| YD-5-SS-B | Soil | B13071515-010 | SW8270C | Phenanthrene | 0.22 | mg/kg-dry | J | RPD |
| YD-5-SS-B | Soil | B13071515-010 | SW6010B | Barium | 129 | mg/kg-dry | J | RPD |
| YD-5-SS-B | Soil | B13071515-010 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.12 | mg/kg-dry | J | RPD |
| YD-5-SS-B | Soil | B13071515-010 | SW3550A | MOISTURE % BY WT. | 31 | mg/kg-dry | J | RPD |
| YD-5-SS-B | Soil | B13071515-010 | SW8270C | Benzo(k)fluoranthene | 0.12 | mg/kg-dry | J | RPD |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| YD-5-SS-B | Soil | B13071515-010 | SW6010B | Chromium | 21 | mg/kg-dry | J | RPD |
| YD-5-SS-B | Soil | B13071515-010 | SW8270C | Benzo(g,h,i)perylene | 0.10 | mg/kg-dry | J | RPD |
| YD-5-SS-C | Soil | B13071515-011 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.31 | mg/kg-dry | J | RPD |
| YD-5-SS-C | Soil | B13071515-011 | SW8270C | Benzo(k)fluoranthene | 0.27 | mg/kg-dry | J | RPD |
| YD-5-SS-C | Soil | B13071515-011 | SW8270C | Benzo(g,h,i)perylene | 0.29 | mg/kg-dry | J | RPD |
| YD-5-SS-C | Soil | B13071515-011 | SW8270C | Fluoranthene | 0.62 | mg/kg-dry | J | RPD |
| YD-5-SS-C | Soil | B13071515-011 | SW8270C | Pyrene | 0.45 | mg/kg-dry | J | RPD |
| YD-5-SS-C | Soil | B13071515-011 | SW8270C | Phenanthrene | 0.28 | mg/kg-dry | J | RPD |
| YD-5-SS-C | Soil | B13071515-011 | SW3550A | MOISTURE % BY WT. | 14 | mg/kg-dry | J | RPD |
| YD-5-SS-C | Soil | B13071515-011 | SW6020 | Arsenic | 7 | mg/kg-dry | J | RPD |
| YD-5-SS-C | Soil | B13071515-011 | SW6010B | Lead | 10 | mg/kg-dry | J | RPD |
| YD-5-SS-C | Soil | B13071515-011 | SW6010B | Barium | 81 | mg/kg-dry | J | RPD |
| YD-5-SS-C | Soil | B13071515-011 | SW6010B | Chromium | 17 | mg/kg-dry | J | RPD |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |
| J | QC Exceedance | | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 07/30/2013** |
| **Verified By/Date Verified: Angela Roddy 09/06/2013** | **Sample End Date: 08/02/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 8-SB-C | 7/31/13 | B13080161 | B13080161-001 |
| 2 | Soil | 10-SB-B | 7/30/13 | B13080161 | B13080161-002 |
| 3 | Soil | 10-SB-C | 7/30/13 | B13080161 | B13080161-003 |
| 4 | Soil | 12-SB-C | 7/31/13 | B13080161 | B13080161-004 |
| 5 | Soil | 13-SB-B | 7/31/13 | B13080161 | B13080161-005 |
| 6 | Soil | 13-SB-C | 7/31/13 | B13080161 | B13080161-006 |
| 7 | Soil | 25-SB-C | 7/31/13 | B13080161 | B13080161-007 |
| 8 | Soil | 26-SB-B | 7/31/13 | B13080161 | B13080161-008 |
| 9 | Soil | 26-SB-C | 7/31/13 | B13080161 | B13080161-009 |
| 10 | Soil | 27-SB-C | 7/31/13 | B13080161 | B13080161-010 |
| 11 | Soil | 28-SB-C | 7/31/13 | B13080161 | B13080161-011 |
| 12 | Soil | 42-SB-C | 7/31/13 | B13080161 | B13080161-012 |
| 13 | Soil | 43-SB-C | 7/31/13 | B13080161 | B13080161-013 |
| 14 | Soil | 50-SB-B | 7/31/13 | B13080161 | B13080161-014 |
| 15 | Soil | 50-SB-C | 7/31/13 | B13080161 | B13080161-015 |
| 16 | Soil | 9-SB-C | 8/1/13 | B13080161 | B13080161-016 |
| 17 | Soil | 30-SB-C | 8/1/13 | B13080161 | B13080161-017 |
| 18 | Soil | 20-SB-C | 8/1/13 | B13080161 | B13080161-018 |
| 19 | Soil | 58-SB-C | 8/1/13 | B13080161 | B13080161-019 |
| 20 | Soil | 74-SB-C | 8/1/13 | B13080161 | B13080161-020 |
| 21 | Soil | 65-SB-B | 8/1/13 | B13080161 | B13080161-021 |
| 22 | Soil | 65-SB-C | 8/1/13 | B13080161 | B13080161-022 |
| 23 | Soil | 41-SB-C | 8/1/13 | B13080161 | B13080161-023 |
| 24 | Soil | 41-SB-CD | 8/1/13 | B13080161 | B13080161-024 |
| 25 | Soil | 62-SB-C | 8/1/13 | B13080161 | B13080161-025 |
| 26 | Water-Rinsate Blank | YOSD-1308-101 | 8/2/2013 | B13080214 | B13080214-001 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13080161 and B13080214*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |

| COMPLIANCE ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| B | Analyte detected in Method Blank. |
| D | RL increased due to sample matrix. |
| H | Hold Time Exceedance. |
| J | Estimated Value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | | Yes | **X** | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Per Project Engineer, Kris Adler, Metals were added to Sample 74-SB-C on 8/27/2013. However, Mercury (Method SW7471B) was out of hold time and flagged with laboratory qualifier "H". | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Coolers 1, 2, and 3 arrived with temperatures of 4.8°C,1.0°C, and 4.6°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Naphthalene (Method SW8270C) was detected in Method Blank 73654-73561-73413. A laboratory qualifier "B" was placed on the associated sample 74-SB-C with detection of this analyte. A validation qualifier "U" was placed on all associated soil samples with values <5x the reporting limit. Water: Barium, Cadmium, Chromium, Lead, and Silver (Method E200.8) were detected in Method Blank MB-73360. The associated raw samples do not require a qualification because the analytes had values that were either >10x the reporting limit or non-detect. Naphthalene (Method SW8270C) was detected in Method Blank 73653-73532-73460. A laboratory qualifier "B" was placed on the associated sample with detection of this analyte, which happens to be the Rinsate Blank. See comment below. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C); Chloroform and Methylene chloride (Method SW8260B) were detected in Rinsate Blank YOSD-1308-101. A validation qualifier "U" was placed on the Rinsate Blanks for these analytes, as well as any associated soil values <5X the reporting limit. Naphthalene (Method SW8270C) was also detected in the Method Blank and this analyte was flagged with laboratory qualifier "B" for the Rinsate Blank YOSD-1308-101. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Soil: Samples 8-SB-C, 13-SB-C, and 41-SB-CD were flagged with laboratory qualifier "S" for the % recovery of the surrogate Nitrobenzene-d5 (Method SW8270C). A validation qualifier was not necessary because other surrogates were within control limits for this method. Sample 12-SB-C was flagged with laboratory qualifier "S" for the % recovery of the surrogates VPH Aromatics and VPH Aliphatics (Method MA-VPH). A validation qualifier "J" was placed on all detected analytes for this method indicating high bias. Sample 13-SB-B was flagged with laboratory qualifier "S" for the % recovery of the surrogates o-Terphenyl (Method MA-EPH); Nitrobenzene-d5 (Method SW8270C); and surrogate VPH Aliphatics (Method MA-VPH). A validation qualifier "J" was only necessary for the Method MA-VPH, indicating high bias. Other surrogates were within limits for the other two methods. Samples 26-SB-B and 28-SB-C were flagged with laboratory qualifier "S" for the % recovery of the surrogates VPH Aromatics and VPH Aliphatics (Method MA-VPH); and o-Terphenyl (Method MA-EPH). A validation qualifier "J" was only necessary for the Method MA-VPH, indicating high bias. Other surrogates were within limits for the other method. Sample 27-SB-C was flagged with laboratory qualifier "S" for the % recovery of the surrogates VPH Aromatics and VPH Aliphatics (Method MA-VPH); o-Terphenyl (Method MA-EPH); and 2-Fluorobiphenyl (Method SW8270C). A validation qualifier "J" was only necessary for the Method MA-VPH, indicating high bias. Other surrogates were within limits for the other methods. Sample 42-SB-C was flagged with laboratory qualifier "S" for the % recovery of the surrogates Toluene-d8 (Method SW8260B); o-Terphenyl (Method MA-EPH); and Nitrobenzene-d5 (Method SW8270C). A validation qualifier was not necessary because other surrogates were within limits for these methods. Sample 43-SB-C was flagged with laboratory qualifier "S" for the % recovery of the surrogate VPH Aliphatics (Method MA-VPH). A validation qualifier was not necessary because it was just outside of control limits with another surrogate within limits. Sample 58-SB-C was flagged with laboratory qualifier "S" for the % recovery of the surrogates o-Terphenyl (Method MA-EPH) and Nitrobenzene-d5 (Method SW8270C). A validation qualifier was not necessary because other surrogates were within limits for these methods. Sample 74-SB-C was flagged with laboratory qualifier "S" for the % recovery of the surrogates VPH Aromatics and VPH Aliphatics (Method MA-VPH). A validation qualifier was not necessary because the recoveries were just below control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS-73454 was flagged with laboratory qualifier "S" for the % recovery of the surrogate Nitrobenzene (Method SW8270C) being just above control limits. A validation qualifier was not necessary because the MS/MSD were within limits for this method, as well as the Method Blank. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC samples B13082437-001AMS3 was flagged with laboratory qualifier "S" for the % recovery of the analytes Arsenic and Barium (Method SW6020) being outside of control limits. QC samples B13082437-001AMSD3 was flagged with laboratory qualifier "S" for the % recovery of the analyte Arsenic (Method SW6020) being outside of control limits. A validation qualifier was not necessary because the post-distillation spike was within limits for these analytes. QC samples B13080217-002AMS and B13080217-002AMSD were flagged with laboratory qualifier "S" for the % recovery of many SVOC analytes. The recoveries are related to positive matrix interference. A validation qualifier was not necessary because the LCS was within limits for this method. Water: QC matrix spike B13080177-004B_MS and matrix spike duplicate B13080177-004B_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the LCS was within limits. QC sample B13072648-001AMSD was flagged with laboratory qualifier "S" for the % recovery of the surrogate VPH Aliphatics (Method MA-VPH). A validation qualifier was not necessary because the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: 41-SB-C and its duplicate 41-SB-CD had RPDs and PRDLs outside of control limits for the following analytes: 2-Methylnaphthalene, 81%; Acenaphthene, 74%; Anthracene, 56%; Benzo(a)anthracene, 93% PRDL; Chrysene, 66%; Fluoranthene, 90%; Fluorene, 97% PRDL; Phenanthrene, 76% PRDL; Pyrene, 87% (Method SW8270C); C5 to C8 Aliphatics, 106% PRDL (Method MA-VPH); and Lead, 149%(Method SW6010B). A validation qualifier "J" was placed on all raw soil samples for these analytes. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1308-101 | Water | B13080214-001 | SW8260B | Chloroform | 1.3 | ug/L | U | |
| YOSD-1308-101 | Water | B13080214-001 | SW8260B | Methylene chloride | 2.2 | ug/L | U | |
| YOSD-1308-101 | Water | B13080214-001 | SW8270C | Naphthalene | 0.22 | ug/L | U | |
| 10-SB-B | Soil | B13080161-002 | SW8270C | Naphthalene | 0.0046 | mg/kg | U | |
| 10-SB-C | Soil | B13080161-003 | SW8270C | Naphthalene | 0.0046 | mg/kg | U | |
| 26-SB-C | Soil | B13080161-009 | SW8270C | Naphthalene | 6.5 | mg/kg | U | |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Naphthalene | 1.3 | mg/kg | U | |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Naphthalene | 3.1 | mg/kg | U | |
| 65-SB-B | Soil | B13080161-021 | SW8270C | Naphthalene | 0.0097 | mg/kg | U | |
| 65-SB-C | Soil | B13080161-022 | SW8270C | Naphthalene | 0.005 | mg/kg | U | |
| 74-SB-C | Soil | B13080161-020 | SW8270C | Naphthalene | 0.02 | mg/kg | U | |
| 8-SB-C | Soil | B13080161-001 | SW8270C | Naphthalene | 0.48 | mg/kg | U | |
| 10-SB-B | Soil | B13080161-002 | SW8270C | 2-Methylnaphthalene | <0.0039 | mg/kg | J | RPD |
| 10-SB-B | Soil | B13080161-002 | SW8270C | Acenaphthene | 0.0059 | mg/kg | J | RPD |
| 10-SB-B | Soil | B13080161-002 | SW8270C | Anthracene | 0.018 | mg/kg | J | RPD |
| 10-SB-B | Soil | B13080161-002 | SW8270C | Benzo(a)anthracene | 0.025 | mg/kg | J | PRDL |
| 10-SB-B | Soil | B13080161-002 | MA-VPH | C5 to C8 Aliphatics | <2.3 | mg/kg | J | PRDL |
| 10-SB-B | Soil | B13080161-002 | SW8270C | Chrysene | 0.022 | mg/kg | J | RPD |
| 10-SB-B | Soil | B13080161-002 | SW8270C | Fluoranthene | 0.068 | mg/kg | J | RPD |
| 10-SB-B | Soil | B13080161-002 | SW8270C | Fluorene | 0.0053 | mg/kg | J | PRDL |
| 10-SB-B | Soil | B13080161-002 | SW6010B | Lead | 9 | mg/kg | J | RPD |
| 10-SB-B | Soil | B13080161-002 | SW8270C | Phenanthrene | 0.053 | mg/kg | J | PRDL |
| 10-SB-B | Soil | B13080161-002 | SW8270C | Pyrene | 0.063 | mg/kg | J | RPD |
| 10-SB-C | Soil | B13080161-003 | SW8270C | 2-Methylnaphthalene | <0.0041 | mg/kg | J | RPD |
| 10-SB-C | Soil | B13080161-003 | SW8270C | Acenaphthene | <0.0041 | mg/kg | J | RPD |
| 10-SB-C | Soil | B13080161-003 | SW8270C | Anthracene | <0.0041 | mg/kg | J | RPD |
| 10-SB-C | Soil | B13080161-003 | SW8270C | Benzo(a)anthracene | 0.009 | mg/kg | J | PRDL |
| 10-SB-C | Soil | B13080161-003 | MA-VPH | C5 to C8 Aliphatics | <2.5 | mg/kg | J | PRDL |
| 10-SB-C | Soil | B13080161-003 | SW8270C | Chrysene | 0.0044 | mg/kg | J | RPD |
| 10-SB-C | Soil | B13080161-003 | SW8270C | Fluoranthene | 0.019 | mg/kg | J | RPD |
| 10-SB-C | Soil | B13080161-003 | SW8270C | Fluorene | <0.0041 | mg/kg | J | PRDL |
| 10-SB-C | Soil | B13080161-003 | SW6010B | Lead | 7 | mg/kg | J | RPD |
| 10-SB-C | Soil | B13080161-003 | SW8270C | Phenanthrene | 0.023 | mg/kg | J | PRDL |
| 10-SB-C | Soil | B13080161-003 | SW8270C | Pyrene | 0.019 | mg/kg | J | RPD |
| 12-SB-C | Soil | B13080161-004 | SW8270C | 2-Methylnaphthalene | 0.68 | mg/kg | J | RPD |
| 12-SB-C | Soil | B13080161-004 | SW8270C | Acenaphthene | 0.038 | mg/kg | J | RPD |
| 12-SB-C | Soil | B13080161-004 | SW8270C | Anthracene | 0.0067 | mg/kg | J | RPD |
| 12-SB-C | Soil | B13080161-004 | SW8270C | Benzo(a)anthracene | <0.0038 | mg/kg | J | PRDL |
| 12-SB-C | Soil | B13080161-004 | MA-VPH | C5 to C8 Aliphatics | 787 | mg/kg | J | PRDL/High Bias |
| 12-SB-C | Soil | B13080161-004 | SW8270C | Chrysene | 0.0079 | mg/kg | J | RPD |
| 12-SB-C | Soil | B13080161-004 | SW8270C | Fluoranthene | <0.0038 | mg/kg | J | RPD |
| 12-SB-C | Soil | B13080161-004 | SW8270C | Fluorene | 0.1 | mg/kg | J | PRDL |
| 12-SB-C | Soil | B13080161-004 | SW6010B | Lead | 6 | mg/kg | J | RPD |
| 12-SB-C | Soil | B13080161-004 | SW8270C | Phenanthrene | 0.097 | mg/kg | J | PRDL |
| 12-SB-C | Soil | B13080161-004 | SW8270C | Pyrene | 0.013 | mg/kg | J | RPD |
| 13-SB-B | Soil | B13080161-005 | SW8270C | 2-Methylnaphthalene | 16 | mg/kg | J | RPD |
| 13-SB-B | Soil | B13080161-005 | SW8270C | Acenaphthene | 0.62 | mg/kg | J | RPD |
| 13-SB-B | Soil | B13080161-005 | SW8270C | Anthracene | 0.11 | mg/kg | J | RPD |
| 13-SB-B | Soil | B13080161-005 | SW8270C | Benzo(a)anthracene | 0.021 | mg/kg | J | PRDL |
| 13-SB-B | Soil | B13080161-005 | MA-VPH | C5 to C8 Aliphatics | 1690 | mg/kg | J | PRDL/High Bias |
| 13-SB-B | Soil | B13080161-005 | SW8270C | Chrysene | 0.047 | mg/kg | J | RPD |
| 13-SB-B | Soil | B13080161-005 | SW8270C | Fluoranthene | <0.0041 | mg/kg | J | RPD |
| 13-SB-B | Soil | B13080161-005 | SW8270C | Fluorene | 1.5 | mg/kg | J | PRDL |
| 13-SB-B | Soil | B13080161-005 | SW6010B | Lead | 10 | mg/kg | J | RPD |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 13-SB-B | Soil | B13080161-005 | SW8270C | Phenanthrene | 2.3 | mg/kg | J | RPD |
| 13-SB-B | Soil | B13080161-005 | SW8270C | Pyrene | 0.12 | mg/kg | J | RPD |
| 13-SB-C | Soil | B13080161-006 | SW8270C | 2-Methylnaphthalene | 16 | mg/kg | J | RPD |
| 13-SB-C | Soil | B13080161-006 | SW8270C | Acenaphthene | 0.61 | mg/kg | J | RPD |
| 13-SB-C | Soil | B13080161-006 | SW8270C | Anthracene | 0.11 | mg/kg | J | RPD |
| 13-SB-C | Soil | B13080161-006 | SW8270C | Benzo(a)anthracene | <0.0041 | mg/kg | J | PRDL |
| 13-SB-C | Soil | B13080161-006 | MA-VPH | C5 to C8 Aliphatics | 821 | mg/kg | J | PRDL |
| 13-SB-C | Soil | B13080161-006 | SW8270C | Chrysene | <0.0041 | mg/kg | J | RPD |
| 13-SB-C | Soil | B13080161-006 | SW8270C | Fluoranthene | <0.0041 | mg/kg | J | RPD |
| 13-SB-C | Soil | B13080161-006 | SW8270C | Fluorene | 1.4 | mg/kg | J | PRDL |
| 13-SB-C | Soil | B13080161-006 | SW6010B | Lead | 8 | mg/kg | J | RPD |
| 13-SB-C | Soil | B13080161-006 | SW8270C | Phenanthrene | 2.2 | mg/kg | J | PRDL |
| 13-SB-C | Soil | B13080161-006 | SW8270C | Pyrene | 0.12 | mg/kg | J | RPD |
| 20-SB-C | Soil | B13080161-018 | SW8270C | 2-Methylnaphthalene | <0.0039 | mg/kg | J | RPD |
| 20-SB-C | Soil | B13080161-018 | SW8270C | Acenaphthene | <0.0039 | mg/kg | J | RPD |
| 20-SB-C | Soil | B13080161-018 | SW8270C | Anthracene | <0.0039 | mg/kg | J | RPD |
| 20-SB-C | Soil | B13080161-018 | SW8270C | Benzo(a)anthracene | <0.0039 | mg/kg | J | PRDL |
| 20-SB-C | Soil | B13080161-018 | MA-VPH | C5 to C8 Aliphatics | <2.4 | mg/kg | J | PRDL |
| 20-SB-C | Soil | B13080161-018 | SW8270C | Chrysene | <0.0039 | mg/kg | J | RPD |
| 20-SB-C | Soil | B13080161-018 | SW8270C | Fluoranthene | <0.0039 | mg/kg | J | RPD |
| 20-SB-C | Soil | B13080161-018 | SW8270C | Fluorene | <0.0039 | mg/kg | J | PRDL |
| 20-SB-C | Soil | B13080161-018 | SW6010B | Lead | 8 | mg/kg | J | RPD |
| 20-SB-C | Soil | B13080161-018 | SW8270C | Phenanthrene | <0.0039 | mg/kg | J | PRDL |
| 20-SB-C | Soil | B13080161-018 | SW8270C | Pyrene | <0.0039 | mg/kg | J | RPD |
| 25-SB-C | Soil | B13080161-007 | SW8270C | 2-Methylnaphthalene | 1.4 | mg/kg | J | RPD |
| 25-SB-C | Soil | B13080161-007 | SW8270C | Acenaphthene | 0.15 | mg/kg | J | RPD |
| 25-SB-C | Soil | B13080161-007 | SW8270C | Anthracene | 0.021 | mg/kg | J | RPD |
| 25-SB-C | Soil | B13080161-007 | SW8270C | Benzo(a)anthracene | 0.0073 | mg/kg | J | PRDL |
| 25-SB-C | Soil | B13080161-007 | MA-VPH | C5 to C8 Aliphatics | 103 | mg/kg | J | PRDL |
| 25-SB-C | Soil | B13080161-007 | SW8270C | Chrysene | 0.01 | mg/kg | J | RPD |
| 25-SB-C | Soil | B13080161-007 | SW8270C | Fluoranthene | 0.011 | mg/kg | J | RPD |
| 25-SB-C | Soil | B13080161-007 | SW8270C | Fluorene | 0.32 | mg/kg | J | PRDL |
| 25-SB-C | Soil | B13080161-007 | SW6010B | Lead | 49 | mg/kg | J | RPD |
| 25-SB-C | Soil | B13080161-007 | SW8270C | Phenanthrene | 0.33 | mg/kg | J | PRDL |
| 25-SB-C | Soil | B13080161-007 | SW8270C | Pyrene | 0.029 | mg/kg | J | RPD |
| 26-SB-B | Soil | B13080161-008 | SW8270C | 2-Methylnaphthalene | 66 | mg/kg | J | RPD |
| 26-SB-B | Soil | B13080161-008 | SW8270C | Acenaphthene | 3.3 | mg/kg | J | RPD |
| 26-SB-B | Soil | B13080161-008 | SW8270C | Anthracene | 0.77 | mg/kg | J | RPD |
| 26-SB-B | Soil | B13080161-008 | SW8270C | Benzo(a)anthracene | 0.3 | mg/kg | J | PRDL |
| 26-SB-B | Soil | B13080161-008 | MA-VPH | C5 to C8 Aliphatics | 2440 | mg/kg | J | PRDL/High Bias |
| 26-SB-B | Soil | B13080161-008 | SW8270C | Chrysene | 0.42 | mg/kg | J | RPD |
| 26-SB-B | Soil | B13080161-008 | SW8270C | Fluoranthene | 0.64 | mg/kg | J | RPD |
| 26-SB-B | Soil | B13080161-008 | SW8270C | Fluorene | 7.7 | mg/kg | J | PRDL |
| 26-SB-B | Soil | B13080161-008 | SW6010B | Lead | 23 | mg/kg | J | RPD |
| 26-SB-B | Soil | B13080161-008 | SW8270C | Phenanthrene | 11 | mg/kg | J | PRDL |
| 26-SB-B | Soil | B13080161-008 | SW8270C | Pyrene | 1.1 | mg/kg | J | RPD |
| 26-SB-C | Soil | B13080161-009 | SW8270C | 2-Methylnaphthalene | 18 | mg/kg | J | RPD |
| 26-SB-C | Soil | B13080161-009 | SW8270C | Acenaphthene | 0.91 | mg/kg | J | RPD |
| 26-SB-C | Soil | B13080161-009 | SW8270C | Anthracene | 0.22 | mg/kg | J | RPD |
| 26-SB-C | Soil | B13080161-009 | SW8270C | Benzo(a)anthracene | 0.03 | mg/kg | J | PRDL |
| 26-SB-C | Soil | B13080161-009 | MA-VPH | C5 to C8 Aliphatics | 793 | mg/kg | J | PRDL |
| 26-SB-C | Soil | B13080161-009 | SW8270C | Chrysene | 0.09 | mg/kg | J | RPD |
| 26-SB-C | Soil | B13080161-009 | SW8270C | Fluoranthene | <0.0039 | mg/kg | J | RPD |
| 26-SB-C | Soil | B13080161-009 | SW8270C | Fluorene | 1.8 | mg/kg | J | PRDL |
| 26-SB-C | Soil | B13080161-009 | SW6010B | Lead | 9 | mg/kg | J | RPD |
| 26-SB-C | Soil | B13080161-009 | SW8270C | Phenanthrene | 2.2 | mg/kg | J | PRDL |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 27-SB-C | Soil | B13080161-010 | SW8270C | Pyrene | 0.19 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | 2-Methylnaphthalene | 13 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Acenaphthene | 0.72 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Anthracene | 0.57 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Benzo(a)anthracene | 0.027 | mg/kg | J | PRDL |
| 27-SB-C | Soil | B13080161-010 | MA-VPH | C5 to C8 Aliphatics | 1670 | mg/kg | J | PRDL/High Bias |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Chrysene | 0.15 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Fluoranthene | <0.0038 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Fluorene | 1.8 | mg/kg | J | PRDL |
| 27-SB-C | Soil | B13080161-010 | SW6010B | Lead | 12 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Phenanthrene | 3.6 | mg/kg | J | PRDL |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Pyrene | 0.29 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | 2-Methylnaphthalene | 5.2 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Acenaphthene | 0.26 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Anthracene | 0.14 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Benzo(a)anthracene | <0.0038 | mg/kg | J | PRDL |
| 28-SB-C | Soil | B13080161-011 | MA-VPH | C5 to C8 Aliphatics | 994 | mg/kg | J | PRDL/High Bias |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Chrysene | <0.0038 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Fluoranthene | <0.0038 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Fluorene | 0.65 | mg/kg | J | PRDL |
| 28-SB-C | Soil | B13080161-011 | SW6010B | Lead | 37 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Phenanthrene | 1.3 | mg/kg | J | PRDL |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Pyrene | 0.13 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | 2-Methylnaphthalene | 0.42 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Acenaphthene | <0.0038 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Anthracene | 0.0064 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Benzo(a)anthracene | 0.0098 | mg/kg | J | PRDL |
| 30-SB-C | Soil | B13080161-017 | MA-VPH | C5 to C8 Aliphatics | 93 | mg/kg | J | PRDL |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Chrysene | 0.0096 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Fluoranthene | 0.017 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Fluorene | 0.037 | mg/kg | J | PRDL |
| 30-SB-C | Soil | B13080161-017 | SW6010B | Lead | 128 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Phenanthrene | 0.074 | mg/kg | J | PRDL |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Pyrene | 0.022 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | 2-Methylnaphthalene | 4.1 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Acenaphthene | 0.17 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Anthracene | 0.13 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Benzo(a)anthracene | 0.03 | mg/kg | J | PRDL |
| 41-SB-C | Soil | B13080161-023 | MA-VPH | C5 to C8 Aliphatics | 98 | mg/kg | J | PRDL |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Chrysene | 0.086 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Fluoranthene | 0.072 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Fluorene | 0.45 | mg/kg | J | PRDL |
| 41-SB-C | Soil | B13080161-023 | SW6010B | Lead | 82 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Phenanthrene | 0.63 | mg/kg | J | PRDL |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Pyrene | 0.11 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | 2-Methylnaphthalene | 9.7 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Acenaphthene | 0.37 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Anthracene | 0.23 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Benzo(a)anthracene | 0.082 | mg/kg | J | PRDL |
| 41-SB-CD | Soil | B13080161-024 | MA-VPH | C5 to C8 Aliphatics | 319 | mg/kg | J | PRDL |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Chrysene | 0.17 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Fluoranthene | 0.19 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Fluorene | 1.3 | mg/kg | J | PRDL |
| 41-SB-CD | Soil | B13080161-024 | SW6010B | Lead | 12 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Phenanthrene | 1.4 | mg/kg | J | PRDL |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Pyrene | 0.28 | mg/kg | J | RPD |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 42-SB-C | Soil | B13080161-012 | SW8270C | 2-Methylnaphthalene | 6.9 | mg/kg | J | RPD |
| 42-SB-C | Soil | B13080161-012 | SW8270C | Acenaphthene | 0.45 | mg/kg | J | RPD |
| 42-SB-C | Soil | B13080161-012 | SW8270C | Anthracene | 0.35 | mg/kg | J | RPD |
| 42-SB-C | Soil | B13080161-012 | SW8270C | Benzo(a)anthracene | 0.12 | mg/kg | J | PRDL |
| 42-SB-C | Soil | B13080161-012 | MA-VPH | C5 to C8 Aliphatics | 211 | mg/kg | J | PRDL |
| 42-SB-C | Soil | B13080161-012 | SW8270C | Chrysene | 0.25 | mg/kg | J | RPD |
| 42-SB-C | Soil | B13080161-012 | SW8270C | Fluoranthene | 0.61 | mg/kg | J | RPD |
| 42-SB-C | Soil | B13080161-012 | SW8270C | Fluorene | 1.2 | mg/kg | J | PRDL |
| 42-SB-C | Soil | B13080161-012 | SW6010B | Lead | 7 | mg/kg | J | RPD |
| 42-SB-C | Soil | B13080161-012 | SW8270C | Phenanthrene | 1.5 | mg/kg | J | PRDL |
| 42-SB-C | Soil | B13080161-012 | SW8270C | Pyrene | 0.65 | mg/kg | J | RPD |
| 43-SB-C | Soil | B13080161-013 | SW8270C | 2-Methylnaphthalene | 0.26 | mg/kg | J | RPD |
| 43-SB-C | Soil | B13080161-013 | SW8270C | Acenaphthene | 0.11 | mg/kg | J | RPD |
| 43-SB-C | Soil | B13080161-013 | SW8270C | Anthracene | 0.078 | mg/kg | J | RPD |
| 43-SB-C | Soil | B13080161-013 | SW8270C | Benzo(a)anthracene | <0.0037 | mg/kg | J | PRDL |
| 43-SB-C | Soil | B13080161-013 | MA-VPH | C5 to C8 Aliphatics | 240 | mg/kg | J | PRDL |
| 43-SB-C | Soil | B13080161-013 | SW8270C | Chrysene | <0.0037 | mg/kg | J | RPD |
| 43-SB-C | Soil | B13080161-013 | SW8270C | Fluoranthene | <0.0037 | mg/kg | J | RPD |
| 43-SB-C | Soil | B13080161-013 | SW8270C | Fluorene | 0.31 | mg/kg | J | PRDL |
| 43-SB-C | Soil | B13080161-013 | SW6010B | Lead | 7 | mg/kg | J | RPD |
| 43-SB-C | Soil | B13080161-013 | SW8270C | Phenanthrene | 0.49 | mg/kg | J | PRDL |
| 43-SB-C | Soil | B13080161-013 | SW8270C | Pyrene | 0.096 | mg/kg | J | RPD |
| 50-SB-B | Soil | B13080161-014 | MA-VPH | C5 to C8 Aliphatics | <2.4 | mg/kg | J | PRDL |
| 50-SB-B | Soil | B13080161-014 | SW6010B | Lead | 20 | mg/kg | J | RPD |
| 50-SB-C | Soil | B13080161-015 | MA-VPH | C5 to C8 Aliphatics | <2.2 | mg/kg | J | PRDL |
| 50-SB-C | Soil | B13080161-015 | SW6010B | Lead | 5 | mg/kg | J | RPD |
| 58-SB-C | Soil | B13080161-019 | SW8270C | 2-Methylnaphthalene | 3.2 | mg/kg | J | RPD |
| 58-SB-C | Soil | B13080161-019 | SW8270C | Acenaphthene | 0.41 | mg/kg | J | RPD |
| 58-SB-C | Soil | B13080161-019 | SW8270C | Anthracene | 0.18 | mg/kg | J | RPD |
| 58-SB-C | Soil | B13080161-019 | SW8270C | Benzo(a)anthracene | 0.13 | mg/kg | J | PRDL |
| 58-SB-C | Soil | B13080161-019 | MA-VPH | C5 to C8 Aliphatics | 2250 | mg/kg | J | PRDL |
| 58-SB-C | Soil | B13080161-019 | SW8270C | Chrysene | 0.11 | mg/kg | J | RPD |
| 58-SB-C | Soil | B13080161-019 | SW8270C | Fluoranthene | 0.4 | mg/kg | J | RPD |
| 58-SB-C | Soil | B13080161-019 | SW8270C | Fluorene | 1.6 | mg/kg | J | PRDL |
| 58-SB-C | Soil | B13080161-019 | SW6010B | Lead | 25 | mg/kg | J | RPD |
| 58-SB-C | Soil | B13080161-019 | SW8270C | Phenanthrene | 1.8 | mg/kg | J | PRDL |
| 58-SB-C | Soil | B13080161-019 | SW8270C | Pyrene | 0.38 | mg/kg | J | RPD |
| 62-SB-C | Soil | B13080161-025 | SW8270C | 2-Methylnaphthalene | 2.3 | mg/kg | J | RPD |
| 62-SB-C | Soil | B13080161-025 | SW8270C | Acenaphthene | 0.089 | mg/kg | J | RPD |
| 62-SB-C | Soil | B13080161-025 | SW8270C | Anthracene | 0.037 | mg/kg | J | RPD |
| 62-SB-C | Soil | B13080161-025 | SW8270C | Benzo(a)anthracene | 0.033 | mg/kg | J | PRDL |
| 62-SB-C | Soil | B13080161-025 | MA-VPH | C5 to C8 Aliphatics | 124 | mg/kg | J | PRDL |
| 62-SB-C | Soil | B13080161-025 | SW8270C | Chrysene | 0.048 | mg/kg | J | RPD |
| 62-SB-C | Soil | B13080161-025 | SW8270C | Fluoranthene | 0.091 | mg/kg | J | RPD |
| 62-SB-C | Soil | B13080161-025 | SW8270C | Fluorene | 0.42 | mg/kg | J | PRDL |
| 62-SB-C | Soil | B13080161-025 | SW6010B | Lead | 8 | mg/kg | J | RPD |
| 62-SB-C | Soil | B13080161-025 | SW8270C | Phenanthrene | 0.32 | mg/kg | J | PRDL |
| 62-SB-C | Soil | B13080161-025 | SW8270C | Pyrene | 0.091 | mg/kg | J | RPD |
| 65-SB-B | Soil | B13080161-021 | SW8270C | 2-Methylnaphthalene | 0.019 | mg/kg | J | RPD |
| 65-SB-B | Soil | B13080161-021 | SW8270C | Acenaphthene | <0.004 | mg/kg | J | RPD |
| 65-SB-B | Soil | B13080161-021 | SW8270C | Anthracene | <0.004 | mg/kg | J | RPD |
| 65-SB-B | Soil | B13080161-021 | SW8270C | Benzo(a)anthracene | 0.013 | mg/kg | J | PRDL |
| 65-SB-B | Soil | B13080161-021 | MA-VPH | C5 to C8 Aliphatics | <2.4 | mg/kg | J | PRDL |
| 65-SB-B | Soil | B13080161-021 | SW8270C | Chrysene | 0.013 | mg/kg | J | RPD |
| 65-SB-B | Soil | B13080161-021 | SW8270C | Fluoranthene | 0.023 | mg/kg | J | RPD |
| 65-SB-B | Soil | B13080161-021 | SW8270C | Fluorene | <0.004 | mg/kg | J | PRDL |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 27-SB-C | Soil | B13080161-010 | SW8270C | Pyrene | 0.19 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | 2-Methylnaphthalene | 13 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Acenaphthene | 0.72 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Anthracene | 0.57 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Benzo(a)anthracene | 0.027 | mg/kg | J | PRDL |
| 27-SB-C | Soil | B13080161-010 | MA-VPH | C5 to C8 Aliphatics | 1670 | mg/kg | J | PRDL |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Chrysene | 0.15 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Fluoranthene | <0.0038 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Fluorene | 1.8 | mg/kg | J | PRDL |
| 27-SB-C | Soil | B13080161-010 | SW6010B | Lead | 12 | mg/kg | J | RPD |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Phenanthrene | 3.6 | mg/kg | J | PRDL |
| 27-SB-C | Soil | B13080161-010 | SW8270C | Pyrene | 0.29 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | 2-Methylnaphthalene | 5.2 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Acenaphthene | 0.26 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Anthracene | 0.14 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Benzo(a)anthracene | <0.0038 | mg/kg | J | PRDL |
| 28-SB-C | Soil | B13080161-011 | MA-VPH | C5 to C8 Aliphatics | 994 | mg/kg | J | PRDL/High Bias |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Chrysene | <0.0038 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Fluoranthene | <0.0038 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Fluorene | 0.65 | mg/kg | J | PRDL |
| 28-SB-C | Soil | B13080161-011 | SW6010B | Lead | 37 | mg/kg | J | RPD |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Phenanthrene | 1.3 | mg/kg | J | PRDL |
| 28-SB-C | Soil | B13080161-011 | SW8270C | Pyrene | 0.13 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | 2-Methylnaphthalene | 0.42 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Acenaphthene | <0.0038 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Anthracene | 0.0064 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Benzo(a)anthracene | 0.0098 | mg/kg | J | PRDL |
| 30-SB-C | Soil | B13080161-017 | MA-VPH | C5 to C8 Aliphatics | 93 | mg/kg | J | PRDL |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Chrysene | 0.0096 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Fluoranthene | 0.017 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Fluorene | 0.037 | mg/kg | J | PRDL |
| 30-SB-C | Soil | B13080161-017 | SW6010B | Lead | 128 | mg/kg | J | RPD |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Phenanthrene | 0.074 | mg/kg | J | PRDL |
| 30-SB-C | Soil | B13080161-017 | SW8270C | Pyrene | 0.022 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | 2-Methylnaphthalene | 4.1 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Acenaphthene | 0.17 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Anthracene | 0.13 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Benzo(a)anthracene | 0.03 | mg/kg | J | PRDL |
| 41-SB-C | Soil | B13080161-023 | MA-VPH | C5 to C8 Aliphatics | 98 | mg/kg | J | PRDL |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Chrysene | 0.086 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Fluoranthene | 0.072 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Fluorene | 0.45 | mg/kg | J | PRDL |
| 41-SB-C | Soil | B13080161-023 | SW6010B | Lead | 82 | mg/kg | J | RPD |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Phenanthrene | 0.63 | mg/kg | J | PRDL |
| 41-SB-C | Soil | B13080161-023 | SW8270C | Pyrene | 0.11 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | 2-Methylnaphthalene | 9.7 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Acenaphthene | 0.37 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Anthracene | 0.23 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Benzo(a)anthracene | 0.082 | mg/kg | J | PRDL |
| 41-SB-CD | Soil | B13080161-024 | MA-VPH | C5 to C8 Aliphatics | 319 | mg/kg | J | PRDL |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Chrysene | 0.17 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Fluoranthene | 0.19 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Fluorene | 1.3 | mg/kg | J | PRDL |
| 41-SB-CD | Soil | B13080161-024 | SW6010B | Lead | 12 | mg/kg | J | RPD |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Phenanthrene | 1.4 | mg/kg | J | PRDL |
| 41-SB-CD | Soil | B13080161-024 | SW8270C | Pyrene | 0.28 | mg/kg | J | RPD |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 13-SB-B | Soil | B13080161-005 | MA-VPH | Ethylbenzene | 63 | mg/kg | J | High Bias |
| 13-SB-B | Soil | B13080161-005 | MA-VPH | Naphthalene | 32 | mg/kg | J | High Bias |
| 13-SB-B | Soil | B13080161-005 | MA-VPH | o-Xylene | 8.8 | mg/kg | J | High Bias |
| 13-SB-B | Soil | B13080161-005 | MA-VPH | m+p-Xylenes | 73 | mg/kg | J | High Bias |
| 13-SB-B | Soil | B13080161-005 | MA-VPH | Toluene | 5.6 | mg/kg | J | High Bias |
| 13-SB-B | Soil | B13080161-005 | MA-VPH | Total Purgeable Hydrocarbons | 5170 | mg/kg | J | High Bias |
| 13-SB-B | Soil | B13080161-005 | MA-VPH | Xylenes, Total | 82 | mg/kg | J | High Bias |
| 26-SB-B | Soil | B13080161-008 | MA-VPH | Benzene | 9.5 | mg/kg | J | High Bias |
| 26-SB-B | Soil | B13080161-008 | MA-VPH | C9 to C10 Aromatics | 2990 | mg/kg | J | High Bias |
| 26-SB-B | Soil | B13080161-008 | MA-VPH | C9 to C12 Aliphatics | 5030 | mg/kg | J | High Bias |
| 26-SB-B | Soil | B13080161-008 | MA-VPH | Ethylbenzene | 83 | mg/kg | J | High Bias |
| 26-SB-B | Soil | B13080161-008 | MA-VPH | m+p-Xylenes | 106 | mg/kg | J | High Bias |
| 26-SB-B | Soil | B13080161-008 | MA-VPH | Naphthalene | 68 | mg/kg | J | High Bias |
| 26-SB-B | Soil | B13080161-008 | MA-VPH | o-Xylene | 15 | mg/kg | J | High Bias |
| 26-SB-B | Soil | B13080161-008 | MA-VPH | Toluene | 5.8 | mg/kg | J | High Bias |
| 26-SB-B | Soil | B13080161-008 | MA-VPH | Total Purgeable Hydrocarbons | 11500 | mg/kg | J | High Bias |
| 26-SB-B | Soil | B13080161-008 | MA-VPH | Xylenes, Total | 121 | mg/kg | J | High Bias |
| 27-SB-C | Soil | B13080161-010 | MA-VPH | Benzene | 7.6 | mg/kg | J | High Bias |
| 27-SB-C | Soil | B13080161-010 | MA-VPH | C9 to C10 Aromatics | 1240 | mg/kg | J | High Bias |
| 27-SB-C | Soil | B13080161-010 | MA-VPH | C9 to C12 Aliphatics | 2170 | mg/kg | J | High Bias |
| 27-SB-C | Soil | B13080161-010 | MA-VPH | Ethylbenzene | 48 | mg/kg | J | High Bias |
| 27-SB-C | Soil | B13080161-010 | MA-VPH | m+p-Xylenes | 9.4 | mg/kg | J | High Bias |
| 27-SB-C | Soil | B13080161-010 | MA-VPH | Naphthalene | 26 | mg/kg | J | High Bias |
| 27-SB-C | Soil | B13080161-010 | MA-VPH | o-Xylene | 8.1 | mg/kg | J | High Bias |
| 27-SB-C | Soil | B13080161-010 | MA-VPH | Total Purgeable Hydrocarbons | 5180 | mg/kg | J | High Bias |
| 27-SB-C | Soil | B13080161-010 | MA-VPH | Xylenes, Total | 17 | mg/kg | J | High Bias |
| 28-SB-C | Soil | B13080161-011 | MA-VPH | Benzene | 1.9 | mg/kg | J | High Bias |
| 28-SB-C | Soil | B13080161-011 | MA-VPH | C9 to C10 Aromatics | 433 | mg/kg | J | High Bias |
| 28-SB-C | Soil | B13080161-011 | MA-VPH | C9 to C12 Aliphatics | 836 | mg/kg | J | High Bias |
| 28-SB-C | Soil | B13080161-011 | MA-VPH | Ethylbenzene | 17 | mg/kg | J | High Bias |
| 28-SB-C | Soil | B13080161-011 | MA-VPH | m+p-Xylenes | 9.1 | mg/kg | J | High Bias |
| 28-SB-C | Soil | B13080161-011 | MA-VPH | Naphthalene | 5.7 | mg/kg | J | High Bias |
| 28-SB-C | Soil | B13080161-011 | MA-VPH | o-Xylene | 6 | mg/kg | J | High Bias |
| 28-SB-C | Soil | B13080161-011 | MA-VPH | Total Purgeable Hydrocarbons | 2010 | mg/kg | J | High Bias |
| 28-SB-C | Soil | B13080161-011 | MA-VPH | Xylenes, Total | 15 | mg/kg | J | High Bias |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |
| J | QC Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 08/02/2013** |
| **Verified By/Date Verified: Angela Roddy 08/27/2013** | **Sample End Date: 08/02/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 6-SB-B | 8/2/2013 | B13080217 | B13080217-001 |
| 2 | Soil | 6-SB-C | 8/2/2013 | B13080217 | B13080217-002 |
| 3 | Soil | 6-SB-CD | 8/2/2013 | B13080217 | B13080217-003 |
| 4 | Soil | 15-SB-C | 8/2/2013 | B13080217 | B13080217-004 |
| 5 | Soil | 16-SB-C | 8/2/2013 | B13080217 | B13080217-005 |
| 6 | Soil | 18-SB-C | 8/2/2013 | B13080217 | B13080217-006 |
| 7 | Soil | 18-SB-CD | 8/2/2013 | B13080217 | B13080217-007 |
| 8 | Soil | 102-SB-B | 8/2/2013 | B13080217 | B13080217-008 |
| 9 | Soil | 102-SB-C | 8/2/2013 | B13080217 | B13080217-009 |
| 10 | Soil | 103-SB-B | 8/2/2013 | B13080217 | B13080217-010 |
| 11 | Soil | 103-SB-C | 8/2/2013 | B13080217 | B13080217-011 |
| 12 | Water-Rinsate Blank | YOSD-1308-101 | 8/2/2013 | B13080214 | B13080214-001 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13080217 and B13080214*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |

| COMPLIANCE ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| B | Analyte detected in Method Blank. |
| D | RL increased due to sample matrix. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. A note from the laboratory indicated samples 8-SB-B and 15-SB-B were matched by sample time from COC due to both sample container sets were labeled as 8-SB-B. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 and 2 arrived with temperatures of 4.8°C and 4.6°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Water: Barium, Cadmium, Chromium, Lead, and Silver (Method E200.8) were detected in Method Blank MB-73360. The associated raw samples do not require a qualification because the analytes had values that were non-detect. Naphthalene (Method SW8270C) was detected in Method Blank 73653-73532-73460. A laboratory qualifier "B" was placed on the associated sample with detection of this analyte, which happens to be the Rinsate Blank. See comment below. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Naphthalene (Method SW8270C); Chloroform and Methylene chloride (Method SW8260B) were detected in Rinsate Blank YOSD-1308-101. A validation qualifier "U" was placed on the Rinsate Blanks for these analytes, as well as any associated soil values <5X the reporting limit. Naphthalene (Method SW8270C) was also detected in the Method Blank and this analyte was flagged with laboratory qualifier "B" for the Rinsate Blank YOSD-1308-101. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Sample 6-SB-B was flagged with laboratory qualifier "S" for the % recovery of the surrogates o-Terphenyl (Method MA-EPH), Terphenyl-d14 and Nitrobenzene-d5 (Method SW8270C). A validation qualifier "J" was placed on all detected analytes for the Method SW8270C indicating high bias. A validation qualifier was not necessary for the Method MA-EPH because other surrogates were within limits. Sample 6-SB-C was flagged with laboratory qualifier "S" for the % recovery of the surrogate VPH Aliphatics (Method MA-VPH). A validation qualifier was not necessary because this surrogate was just above control limits, with another surrogate being within limits. Sample 15-SB-C was flagged with laboratory qualifier "S" for the % recovery of the surrogate VPH Aliphatics (Method MA-VPH), 2-Bromonaphthalene (Method MA-EPH), and Nitrobenzene-d5 (Method SW8270C). A validation qualifier was not necessary because other surrogates were within control limits for these methods. Sample 16-SB-C was flagged with laboratory qualifier "S" for the % recovery of the surrogates o-Terphenyl (Method MA-EPH) and Nitrobenzene-d5 (Method SW8270C). A validation qualifier was not necessary because other surrogates were within control limits for these methods. Sample 18-SB-CD was flagged with laboratory qualifier "S" for the % recovery of the surrogate o-Terphenyl (Method MA-EPH). A validation qualifier was not necessary because other surrogates were within control limits for this method. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: LCS-73454 was flagged with laboratory qualifier "S" for the % recovery of the surrogate Nitrobenzene-d5 (Method SW8270C) being just above control limits. A validation qualifier was not necessary because the MS/MSD were within limits for this method, as well as the Method Blank. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC samples B13080376-001AMS3 and B13080376-001AMSD3 were flagged with laboratory qualifier "S" for the % recovery of the analyte Selenium (Method SW6020) being outside of control limits. A validation qualifier was not necessary because the post-distillation spike was within limits for this analyte. QC samples B13080217-002AMS and B13080217-002AMSD were flagged with laboratory qualifier "S" for the % recovery of many SVOC analytes, Method SW8270C. The recoveries are related to positive matrix interference. A validation qualifier was not necessary because the LCS was within limits for this method. Water: QC matrix spike B13080177-004B_MS and matrix spike duplicate B13080177-004B_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the LCS was within limits. QC sample B13072648-001AMSD was flagged with laboratory qualifier "S" for the % recovery of the surrogate VPH Aliphatics (Method MA-VPH). A validation qualifier was not necessary because the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: 6-SB-C and its duplicate 6-SB-CD had RPDs outside of control limits for the following analytes: Barium, 83% (Method SW6010B); C5-C8 Aliphatics, 62% and C9-C12 Aliphatics, 74% (Method MA-VPH). 18-SB-C and its duplicate 18-SB-CD had RPDs and a PRDL outside of control limits for the following analytes: Anthracene, PRDL 105% and Fluorene, 57% (Method SW8270C); Moisture % by Weight, 33% (Method SW3550A). A validation qualifier "J" was placed on all raw soil samples indicating an RPD or PRDL exceedance. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1308-101 | Water | B13080214-001 | SW8260B | Chloroform | 1.3 | ug/L | U | |
| YOSD-1308-101 | Water | B13080214-001 | SW8260B | Methylene chloride | 2.2 | ug/L | U | |
| YOSD-1308-101 | Water | B13080214-001 | SW8270C | Naphthalene | 0.22 | ug/L | U | |
| 15-SB-C | Soil | B13080217-004 | SW8270C | Naphthalene | 3.1 | mg/kg | U | |
| 6-SB-B | Soil | B13080217-001 | MA-VPH | C9-C12 ALIPHATICS | 7870 | mg/kg | J | RPD |
| 6-SB-B | Soil | B13080217-001 | MA-VPH | C5-C8 ALIPHATICS | 4570 | mg/kg | J | RPD |
| 6-SB-B | Soil | B13080217-001 | SW3550A | MOISTURE % BY WT. | 9.4 | mg/kg | J | RPD |
| 6-SB-B | Soil | B13080217-001 | SW6010B | Barium | 112 | mg/kg | J | RPD |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Fluorene | 5.1 | mg/kg | J | RPD |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Anthracene | 0.71 | mg/kg | J | PRDL |
| 6-SB-C | Soil | B13080217-002 | SW8270C | Anthracene | 0.12 | mg/kg | J | PRDL |
| 6-SB-C | Soil | B13080217-002 | SW6010B | Barium | 238 | mg/kg | J | RPD |
| 6-SB-C | Soil | B13080217-002 | MA-VPH | C5-C8 ALIPHATICS | 971 | mg/kg | J | RPD |
| 6-SB-C | Soil | B13080217-002 | MA-VPH | C9-C12 ALIPHATICS | 1650 | mg/kg | J | RPD |
| 6-SB-C | Soil | B13080217-002 | SW8270C | Fluorene | 0.90 | mg/kg | J | RPD |
| 6-SB-C | Soil | B13080217-002 | SW3550A | MOISTURE % BY WT. | 9.5 | mg/kg | J | RPD |
| 6-SB-CD | Soil | B13080217-003 | SW8270C | Anthracene | 0.10 | mg/kg | J | PRDL |
| 6-SB-CD | Soil | B13080217-003 | SW6010B | Barium | 98 | mg/kg | J | RPD |
| 6-SB-CD | Soil | B13080217-003 | MA-VPH | C5-C8 ALIPHATICS | 513 | mg/kg | J | RPD |
| 6-SB-CD | Soil | B13080217-003 | MA-VPH | C9-C12 ALIPHATICS | 761 | mg/kg | J | RPD |
| 6-SB-CD | Soil | B13080217-003 | SW8270C | Fluorene | 0.68 | mg/kg | J | RPD |
| 6-SB-CD | Soil | B13080217-003 | SW3550A | MOISTURE % BY WT. | 10 | mg/kg | J | RPD |
| 15-SB-C | Soil | B13080217-004 | MA-VPH | C5-C8 ALIPHATICS | 1050 | mg/kg | J | RPD |
| 15-SB-C | Soil | B13080217-004 | MA-VPH | C9-C12 ALIPHATICS | 1410 | mg/kg | J | RPD |
| 15-SB-C | Soil | B13080217-004 | SW3550A | MOISTURE % BY WT. | 21 | mg/kg | J | RPD |
| 15-SB-C | Soil | B13080217-004 | SW6010B | Barium | 108 | mg/kg | J | RPD |
| 15-SB-C | Soil | B13080217-004 | SW8270C | Fluorene | 1.3 | mg/kg | J | RPD |
| 15-SB-C | Soil | B13080217-004 | SW8270C | Anthracene | 0.084 | mg/kg | J | PRDL |
| 16-SB-C | Soil | B13080217-005 | MA-VPH | C5-C8 ALIPHATICS | 4140 | mg/kg | J | RPD |
| 16-SB-C | Soil | B13080217-005 | MA-VPH | C9-C12 ALIPHATICS | 4600 | mg/kg | J | RPD |
| 16-SB-C | Soil | B13080217-005 | SW3550A | MOISTURE % BY WT. | 14 | mg/kg | J | RPD |
| 16-SB-C | Soil | B13080217-005 | SW6010B | Barium | 117 | mg/kg | J | RPD |
| 16-SB-C | Soil | B13080217-005 | SW8270C | Fluorene | 3.9 | mg/kg | J | RPD |
| 16-SB-C | Soil | B13080217-005 | SW8270C | Anthracene | 0.44 | mg/kg | J | PRDL |
| 18-SB-C | Soil | B13080217-006 | SW8270C | Anthracene | 0.18 | mg/kg | J | PRDL |
| 18-SB-C | Soil | B13080217-006 | SW6010B | Barium | 119 | mg/kg | J | RPD |
| 18-SB-C | Soil | B13080217-006 | MA-VPH | C5-C8 ALIPHATICS | 1910 | mg/kg | J | RPD |
| 18-SB-C | Soil | B13080217-006 | MA-VPH | C9-C12 ALIPHATICS | 2140 | mg/kg | J | RPD |
| 18-SB-C | Soil | B13080217-006 | SW8270C | Fluorene | 1.0 | mg/kg | J | RPD |
| 18-SB-C | Soil | B13080217-006 | SW3550A | MOISTURE % BY WT. | 15 | mg/kg | J | RPD |
| 18-SB-CD | Soil | B13080217-007 | SW8270C | Anthracene | 0.58 | mg/kg | J | PRDL |
| 18-SB-CD | Soil | B13080217-007 | SW6010B | Barium | 103 | mg/kg | J | RPD |
| 18-SB-CD | Soil | B13080217-007 | MA-VPH | C5-C8 ALIPHATICS | 2520 | mg/kg | J | RPD |
| 18-SB-CD | Soil | B13080217-007 | MA-VPH | C9-C12 ALIPHATICS | 2700 | mg/kg | J | RPD |
| 18-SB-CD | Soil | B13080217-007 | SW8270C | Fluorene | 1.8 | mg/kg | J | RPD |
| 18-SB-CD | Soil | B13080217-007 | SW3550A | MOISTURE % BY WT. | 21 | mg/kg | J | RPD |
| 102-SB-B | Soil | B13080217-008 | MA-VPH | C5-C8 ALIPHATICS | <2.4 | mg/kg | J | RPD |
| 102-SB-B | Soil | B13080217-008 | MA-VPH | C9-C12 ALIPHATICS | <2.4 | mg/kg | J | RPD |
| 102-SB-B | Soil | B13080217-008 | SW3550A | MOISTURE % BY WT. | 15 | mg/kg | J | RPD |
| 102-SB-C | Soil | B13080217-009 | MA-VPH | C9-C12 ALIPHATICS | <2.5 | mg/kg | J | RPD |
| 102-SB-C | Soil | B13080217-009 | MA-VPH | C5-C8 ALIPHATICS | <2.5 | mg/kg | J | RPD |
| 102-SB-C | Soil | B13080217-009 | SW3550A | MOISTURE % BY WT. | 19 | mg/kg | J | RPD |
| 103-SB-B | Soil | B13080217-010 | MA-VPH | C5-C8 ALIPHATICS | <2.4 | mg/kg | J | RPD |
| 103-SB-B | Soil | B13080217-010 | MA-VPH | C9-C12 ALIPHATICS | <2.4 | mg/kg | J | RPD |
| 103-SB-B | Soil | B13080217-010 | SW3550A | MOISTURE % BY WT. | 15 | mg/kg | J | RPD |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 103-SB-C | Soil | B13080217-011 | MA-VPH | C9-C12 ALIPHATICS | <2.3 | mg/kg | J | RPD |
| 103-SB-C | Soil | B13080217-011 | MA-VPH | C5-C8 ALIPHATICS | <2.3 | mg/kg | J | RPD |
| 103-SB-C | Soil | B13080217-011 | SW3550A | MOISTURE % BY WT. | 12 | mg/kg | J | RPD |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Dibenzo(a,h)anthracene | 0.038 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Indeno(1,2,3-cd)pyrene | 0.10 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Benzo(k)fluoranthene | 0.053 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Benzo(g,h,i)perylene | 0.060 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Fluorene | 5.1 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Benzo(a)pyrene | 0.093 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Benzo(a)anthracene | 0.15 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Fluoranthene | 0.30 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Anthracene | 0.71 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | 2-Methylnaphthalene | 49 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Acenaphthene | 2.1 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Phenanthrene | 7.6 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Naphthalene | 24 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Benzo(b)fluoranthene | 0.11 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Chrysene | 0.20 | mg/kg | J | High Bias |
| 6-SB-B | Soil | B13080217-001 | SW8270C | Pyrene | 0.61 | mg/kg | J | High Bias |
| Validation Qualifer Definitions: | | | | | | | | |
| U | Blank Exceedance | | | | | | | |
| J | QC Exceedance | | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid and Water** |
| **Project No.: 11108/002** | **Sample Start Date: 08/06/2013** |
| **Verified By/Date Verified: Angela Roddy 09/06/2013** | **Sample End Date: 08/12/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | 46-SB-B | 8/6/2013 | B13080949 | B13080949-001 |
| 2 | Soil | 46-SB-BD | 8/6/2013 | B13080949 | B13080949-002 |
| 3 | Soil | 47-SB-B | 8/6/2013 | B13080949 | B13080949-003 |
| 4 | Soil | 47-SB-BD | 8/6/2013 | B13080949 | B13080949-004 |
| 5 | Soil | 31-SB-B | 8/7/2013 | B13080949 | B13080949-005 |
| 6 | Soil | 1-SB-B | 8/8/2013 | B13080949 | B13080949-006 |
| 7 | Soil | 1-SB-C | 8/8/2013 | B13080949 | B13080949-007 |
| 8 | Soil | 2-SB-B | 8/8/2013 | B13080949 | B13080949-008 |
| 9 | Soil | 2-SB-C | 8/8/2013 | B13080949 | B13080949-009 |
| 10 | Soil | 3-SB-B | 8/8/2013 | B13080949 | B13080949-010 |
| 11 | Soil | 3-SB-C | 8/8/2013 | B13080949 | B13080949-011 |
| 12 | Soil | 25-SB-B | 8/8/2013 | B13080949 | B13080949-012 |
| 13 | Soil | 55-SB-B | 8/8/2013 | B13080949 | B13080949-013 |
| 14 | Soil | 19-SB-B | 8/9/2013 | B13080949 | B13080949-014 |
| 15 | Soil | 19-SB-C | 8/9/2013 | B13080949 | B13080949-015 |
| 16 | Soil | 45-SB-C | 8/9/2013 | B13080949 | B13080949-016 |
| 17 | Soil | 84-SB-C | 8/9/2013 | B13080949 | B13080949-017 |
| 18 | Soil | 56-SB-B | 8/12/2013 | B13080949 | B13080949-018 |
| 19 | Soil | 73-SB-B | 8/12/2013 | B13080949 | B13080949-019 |
| 20 | Soil | 74-SB-B | 8/12/2013 | B13080949 | B13080949-020 |
| 22 | Water-Rinsate Blank | YOSD-1308-103 | 8/7/2013 | B13080947 | B13080947-001 |
| 23 | Water-Rinsate Blank | YOSD-1308-104 | 8/8/2013 | B13080947 | B13080947-002 |
| 24 | Water-Rinsate Blank | YOSD-1308-105 | 8/8/2013 | B13080947 | B13080947-003 |
| 25 | Water-Rinsate Blank | YOSD-1308-106 | 8/12/2013 | B13080947 | B13080947-004 |
| 21 | Water-Trip Blank | TB073113BTSSHP0262 | 8/7/2013 | B13080947 | B13080947-005 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; pH-SW9045D; Total Metals-EPA SW846, SW6010B, SW6020, SW7471A, VPH-MA-VPH; Extractable Petroleum Hydrocarbons Screen-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B; Water: Total Metals-E200.8, E245.1.*

- *Laboratory Project Ids: B13080949 and B13080947*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |

| COMPLIANCE ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated. |
| B | Analyte detected in Method Blank. |
| D | RL increased due to sample matrix. |
| J | Estimated Value. The analyte was present but less than the reporting limit. |
| N | The analyte concentration was not sufficiently high to calculate an RPD. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

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|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1, 2, 3, and 4 arrived with temperatures of 4.2°C, 14.6°C, 15.2°C, and 1.4°C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

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| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium and Chromium (Method SW6010B) were detected in Method Blank MB-73638. A validation qualifier was not necessary because raw soil samples had values >10x the reporting limit for these analytes or were non-detect. Water: Cadmium, Chromium, and Silver (Method E200.8) were detected in Method Blank MB-73566. The associated raw water samples do not require a qualification because the analytes had values that were non-detect. 2-Methylnaphthalene, Acenaphthylene, and Naphthalene (Method SW8270C) were detected in Method Blank 73817-73674-73629. A laboratory qualifier "B" was placed on the associated sample with detection of this analyte, which happens to be the Rinsate Blanks. See comment below. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: 2-Methylnaphthalene and Naphthalene (Method SW8270C) were detected in Rinsate Blank YOSD-1308-103. Naphthalene (Method SW8270C) was detected in Rinsate Blanks YOSD-1308-104, YOSD-1308-105, and YOSD-1308-106. A validation qualifier "U" was placed on the Rinsate Blanks for these analytes, as well as any associated soil values <5X the reporting limit. 2-Methylnaphthalene and Naphthalene (Method SW8270C) were also detected in the Method Blank 72817-73674-73629, and these analytes were flagged with laboratory qualifier "B" for the associated Rinsate Blanks. Chloroform (SW8260B) was also detected in blanks YOSD-1308-103, YOSD-1308-104, YOSD-1308-105, and YOSD-1308-106 and flagged with laboratory qualifier "J". A validation qualifier was not necessary because these are estimated values and are below the reporting limits. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

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| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Samples 46-SB-B and 55-SB-B were flagged with laboratory qualifier "S" for the % recovery of the surrogate Nitrobenzene-d5 (Method SW8270C). A validation qualifier was not necessary because other surrogates were within limits for this method. Sample 46-SB-BD was flagged with laboratory qualifier "S" for the % recovery of the surrogates Nitrobenzene-d5 (Method SW8270C), 1-Chloro-octadecane and o-Terphenyl (Method MA-EPH). A validation qualifier was not necessary because other surrogates were within limits for these methods. Sample 47-SB-BD was flagged with laboratory qualifier "S" for the % recovery of the surrogate 2-Fluorobiphenyl (Method SW8270C). A validation qualifier was not necessary because other surrogates were within limits for this method. Samples 19-SB-B, 31-SB-B, and 56-SB-B were flagged with laboratory qualifier "S" for the % recovery of the surrogates Nitrobenzene-d5 (Method SW8270C) and o-Terphenyl (Method MA-EPH). A validation qualifier was not necessary because other surrogates were within limits for these methods. Sample 25-SB-B was flagged with laboratory qualifier "S" for the % recovery of the surrogates 2-Fluorobiphenyl (Method SW8270C), Dibromofluoromethane and Toluene-d8 (Method SW8260B). A validation qualifier was not necessary because other surrogates were within limits for these methods. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: QC sample B13080949-009AMSD3 was flagged with laboratory qualifier "S" for the % recovery of the analyte Selenium (Method SW6020) being outside of control limits. A validation qualifier was not necessary because the MS/MSD were re-run for this analyte. QC sample B13081096-008AMS3 was flagged with laboratory qualifier "S" for the % recovery of the analyte Barium (Method SW6020) being outside of control limits. A validation qualifier was not necessary because the post-distillation spike was within limits. QC sample B13081464-001amsd was flagged with laboratory qualifier "S" for the % recovery of Bromoform and m+p Xylenes; surrogates Dibromofluoromethane and Toluene-d8 (Method SW8260B). A validation qualifier was not necessary because the LCS was within limits for this method. QC sample B13080949-020AMS was flagged with laboratory qualifier "S" for the % recovery of the analyte Total Purgeable Hydrocarbons (Method MA-VPH). A validation qualifier was not necessary because the LCS was within limits for this method. Water: QC matrix spike B13080851-001Bms and matrix spike duplicate B13080851-001Bmsd were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the LCS was within limits. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: 46-SB-B and its duplicate 46-SB-BD had a PRDL outside of control limits for the analyte Acenaphthene, 88%. 47-SB-B and its duplicate 47-SB-BD had RPDs outside of control limits for the following analytes: C9-C10 Aromatics, 120%; C9-C12 Aliphatics, 114%; and Total Purgeable Hydrocarbons, 110% (Method MA-VPH); Lead, 193% (Method SW6010B). A validation qualifier "J" was placed on all raw soil samples for these analytes indicating an RPD or PRDL exceedance. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of "A" was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of "D" was put on the data.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of "N" was put on the data.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YOSD-1308-103 | Water | B13080947-001 | SW8270C | 2-Methylnaphthalene | 0.3 | ug/L | U | |
| YOSD-1308-103 | Water | B13080947-001 | SW8270C | Naphthalene | 0.6 | ug/L | U | |
| YOSD-1308-104 | Water | B13080947-002 | SW8270C | Naphthalene | 0.34 | ug/L | U | |
| YOSD-1308-105 | Water | B13080947-003 | SW8270C | Naphthalene | 0.26 | ug/L | U | |
| YOSD-1308-106 | Water | B13080947-004 | SW8270C | Naphthalene | 0.26 | ug/L | U | |
| 19-SB-B | Soil | B13080949-014 | SW8270C | 2-Methylnaphthalene | 4.9 | mg/kg | U | |
| 19-SB-B | Soil | B13080949-014 | SW8270C | Naphthalene | 2.1 | mg/kg | U | |
| 19-SB-C | Soil | B13080949-015 | SW8270C | Naphthalene | 0.0099 | mg/kg | U | |
| 31-SB-B | Soil | B13080949-005 | SW8270C | 2-Methylnaphthalene | 1.2 | mg/kg | U | |
| 3-SB-C | Soil | B13080949-011 | SW8270C | 2-Methylnaphthalene | 2.3 | mg/kg | U | |
| 45-SB-C | Soil | B13080949-016 | SW8270C | 2-Methylnaphthalene | 0.015 | mg/kg | U | |
| 46-SB-B | Soil | B13080949-001 | SW8270C | 2-Methylnaphthalene | 0.29 | mg/kg | U | |
| 46-SB-BD | Soil | B13080949-002 | SW8270C | 2-Methylnaphthalene | 0.37 | mg/kg | U | |
| 74-SB-B | Soil | B13080949-020 | SW8270C | 2-Methylnaphthalene | 0.014 | mg/kg | U | |
| 74-SB-B | Soil | B13080949-020 | SW8270C | Naphthalene | 0.035 | mg/kg | U | |
| 19-SB-B | Soil | B13080949-014 | SW8270C | Acenaphthene | 0.28 | mg/kg | J | PRDL |
| 19-SB-B | Soil | B13080949-014 | MA-VPH | C9 to C10 Aromatics | 1810 | mg/kg | J | RPD |
| 19-SB-B | Soil | B13080949-014 | MA-VPH | C9 to C12 Aliphatics | 3090 | mg/kg | J | RPD |
| 19-SB-B | Soil | B13080949-014 | SW6020 | Lead | 10 | mg/kg | J | RPD |
| 19-SB-B | Soil | B13080949-014 | MA-VPH | Total Purgeable Hydrocarbons | 7910 | mg/kg | J | RPD |
| 19-SB-C | Soil | B13080949-015 | SW8270C | Acenaphthene | <0.0037 | mg/kg | J | PRDL |
| 19-SB-C | Soil | B13080949-015 | MA-VPH | C9 to C10 Aromatics | 7.2 | mg/kg | J | RPD |
| 19-SB-C | Soil | B13080949-015 | MA-VPH | C9 to C12 Aliphatics | 5.1 | mg/kg | J | RPD |
| 19-SB-C | Soil | B13080949-015 | SW6020 | Lead | 6 | mg/kg | J | RPD |
| 19-SB-C | Soil | B13080949-015 | MA-VPH | Total Purgeable Hydrocarbons | 19 | mg/kg | J | RPD |
| 1-SB-B | Soil | B13080949-006 | SW8270C | Acenaphthene | <0.004 | mg/kg | J | PRDL |
| 1-SB-B | Soil | B13080949-006 | MA-VPH | C9 to C10 Aromatics | 6 | mg/kg | J | RPD |
| 1-SB-B | Soil | B13080949-006 | MA-VPH | C9 to C12 Aliphatics | 4.4 | mg/kg | J | RPD |
| 1-SB-B | Soil | B13080949-006 | SW6010B | Lead | 7 | mg/kg | J | RPD |
| 1-SB-B | Soil | B13080949-006 | MA-VPH | Total Purgeable Hydrocarbons | 22 | mg/kg | J | RPD |
| 1-SB-C | Soil | B13080949-007 | SW8270C | Acenaphthene | <0.0038 | mg/kg | J | PRDL |
| 1-SB-C | Soil | B13080949-007 | MA-VPH | C9 to C10 Aromatics | <2.3 | mg/kg | J | RPD |
| 1-SB-C | Soil | B13080949-007 | MA-VPH | C9 to C12 Aliphatics | <2.3 | mg/kg | J | RPD |
| 1-SB-C | Soil | B13080949-007 | SW6010B | Lead | 7 | mg/kg | J | RPD |
| 1-SB-C | Soil | B13080949-007 | MA-VPH | Total Purgeable Hydrocarbons | <2.3 | mg/kg | J | RPD |
| 25-SB-B | Soil | B13080949-012 | SW8270C | Acenaphthene | 0.25 | mg/kg | J | PRDL |
| 25-SB-B | Soil | B13080949-012 | MA-VPH | C9 to C10 Aromatics | 566 | mg/kg | J | RPD |
| 25-SB-B | Soil | B13080949-012 | MA-VPH | C9 to C12 Aliphatics | 920 | mg/kg | J | RPD |
| 25-SB-B | Soil | B13080949-012 | SW6020 | Lead | 138 | mg/kg | J | RPD |
| 25-SB-B | Soil | B13080949-012 | MA-VPH | Total Purgeable Hydrocarbons | 2190 | mg/kg | J | RPD |
| 2-SB-B | Soil | B13080949-008 | SW8270C | Acenaphthene | <0.0038 | mg/kg | J | PRDL |
| 2-SB-B | Soil | B13080949-008 | MA-VPH | C9 to C10 Aromatics | <2.3 | mg/kg | J | RPD |
| 2-SB-B | Soil | B13080949-008 | MA-VPH | C9 to C12 Aliphatics | <2.3 | mg/kg | J | RPD |
| 2-SB-B | Soil | B13080949-008 | SW6010B | Lead | 4 | mg/kg | J | RPD |
| 2-SB-B | Soil | B13080949-008 | MA-VPH | Total Purgeable Hydrocarbons | <2.3 | mg/kg | J | RPD |
| 2-SB-C | Soil | B13080949-009 | SW8270C | Acenaphthene | <0.0038 | mg/kg | J | PRDL |
| 2-SB-C | Soil | B13080949-009 | MA-VPH | C9 to C10 Aromatics | <2.3 | mg/kg | J | RPD |
| 2-SB-C | Soil | B13080949-009 | MA-VPH | C9 to C12 Aliphatics | <2.3 | mg/kg | J | RPD |
| 2-SB-C | Soil | B13080949-009 | SW6010B | Lead | 5 | mg/kg | J | RPD |
| 2-SB-C | Soil | B13080949-009 | MA-VPH | Total Purgeable Hydrocarbons | <2.3 | mg/kg | J | RPD |
| 31-SB-B | Soil | B13080949-005 | SW8270C | Acenaphthene | 0.25 | mg/kg | J | PRDL |
| 31-SB-B | Soil | B13080949-005 | MA-VPH | C9 to C10 Aromatics | 662 | mg/kg | J | RPD |
| 31-SB-B | Soil | B13080949-005 | MA-VPH | C9 to C12 Aliphatics | 961 | mg/kg | J | RPD |
| 31-SB-B | Soil | B13080949-005 | SW6010B | Lead | 27 | mg/kg | J | RPD |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

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|---|---|---|---|---|---|---|---|---|
| 31-SB-B | Soil | B13080949-005 | MA-VPH | Total Purgeable Hydrocarbons | 1950 | mg/kg | J | RPD |
| 3-SB-B | Soil | B13080949-010 | SW8270C | Acenaphthene | <0.0044 | mg/kg | J | PRDL |
| 3-SB-B | Soil | B13080949-010 | MA-VPH | C9 to C10 Aromatics | <2.6 | mg/kg | J | RPD |
| 3-SB-B | Soil | B13080949-010 | MA-VPH | C9 to C12 Aliphatics | <2.6 | mg/kg | J | RPD |
| 3-SB-B | Soil | B13080949-010 | SW6020 | Lead | 12 | mg/kg | J | RPD |
| 3-SB-B | Soil | B13080949-010 | MA-VPH | Total Purgeable Hydrocarbons | 2.2 | mg/kg | J | RPD |
| 3-SB-C | Soil | B13080949-011 | SW8270C | Acenaphthene | 0.17 | mg/kg | J | PRDL |
| 3-SB-C | Soil | B13080949-011 | MA-VPH | C9 to C10 Aromatics | 349 | mg/kg | J | RPD |
| 3-SB-C | Soil | B13080949-011 | MA-VPH | C9 to C12 Aliphatics | 505 | mg/kg | J | RPD |
| 3-SB-C | Soil | B13080949-011 | SW6020 | Lead | 8 | mg/kg | J | RPD |
| 3-SB-C | Soil | B13080949-011 | MA-VPH | Total Purgeable Hydrocarbons | 1270 | mg/kg | J | RPD |
| 45-SB-C | Soil | B13080949-016 | SW8270C | Acenaphthene | <0.004 | mg/kg | J | PRDL |
| 45-SB-C | Soil | B13080949-016 | MA-VPH | C9 to C10 Aromatics | 41 | mg/kg | J | RPD |
| 45-SB-C | Soil | B13080949-016 | MA-VPH | C9 to C12 Aliphatics | 54 | mg/kg | J | RPD |
| 45-SB-C | Soil | B13080949-016 | SW6020 | Lead | 41 | mg/kg | J | RPD |
| 45-SB-C | Soil | B13080949-016 | MA-VPH | Total Purgeable Hydrocarbons | 143 | mg/kg | J | RPD |
| 46-SB-B | Soil | B13080949-001 | SW8270C | Acenaphthene | 0.12 | mg/kg | J | PRDL |
| 46-SB-B | Soil | B13080949-001 | MA-VPH | C9 to C10 Aromatics | 331 | mg/kg | J | RPD |
| 46-SB-B | Soil | B13080949-001 | MA-VPH | C9 to C12 Aliphatics | 457 | mg/kg | J | RPD |
| 46-SB-B | Soil | B13080949-001 | SW6010B | Lead | 152 | mg/kg | J | RPD |
| 46-SB-B | Soil | B13080949-001 | MA-VPH | Total Purgeable Hydrocarbons | 966 | mg/kg | J | RPD |
| 46-SB-BD | Soil | B13080949-002 | SW8270C | Acenaphthene | 0.31 | mg/kg | J | PRDL |
| 46-SB-BD | Soil | B13080949-002 | MA-VPH | C9 to C10 Aromatics | 422 | mg/kg | J | RPD |
| 46-SB-BD | Soil | B13080949-002 | MA-VPH | C9 to C12 Aliphatics | 529 | mg/kg | J | RPD |
| 46-SB-BD | Soil | B13080949-002 | SW6010B | Lead | 125 | mg/kg | J | RPD |
| 46-SB-BD | Soil | B13080949-002 | MA-VPH | Total Purgeable Hydrocarbons | 1190 | mg/kg | J | RPD |
| 47-SB-B | Soil | B13080949-003 | SW8270C | Acenaphthene | <0.041 | mg/kg | J | PRDL |
| 47-SB-B | Soil | B13080949-003 | MA-VPH | C9 to C10 Aromatics | 88 | mg/kg | J | RPD |
| 47-SB-B | Soil | B13080949-003 | MA-VPH | C9 to C12 Aliphatics | 69 | mg/kg | J | RPD |
| 47-SB-B | Soil | B13080949-003 | SW6010B | Lead | 1840 | mg/kg | J | RPD |
| 47-SB-B | Soil | B13080949-003 | MA-VPH | Total Purgeable Hydrocarbons | 253 | mg/kg | J | RPD |
| 47-SB-BD | Soil | B13080949-004 | SW8270C | Acenaphthene | <0.084 | mg/kg | J | PRDL |
| 47-SB-BD | Soil | B13080949-004 | MA-VPH | C9 to C10 Aromatics | 22 | mg/kg | J | RPD |
| 47-SB-BD | Soil | B13080949-004 | MA-VPH | C9 to C12 Aliphatics | 19 | mg/kg | J | RPD |
| 47-SB-BD | Soil | B13080949-004 | SW6010B | Lead | 35 | mg/kg | J | RPD |
| 47-SB-BD | Soil | B13080949-004 | MA-VPH | Total Purgeable Hydrocarbons | 73 | mg/kg | J | RPD |
| 55-SB-B | Soil | B13080949-013 | SW8270C | Acenaphthene | 0.61 | mg/kg | J | PRDL |
| 55-SB-B | Soil | B13080949-013 | MA-VPH | C9 to C10 Aromatics | 2020 | mg/kg | J | RPD |
| 55-SB-B | Soil | B13080949-013 | MA-VPH | C9 to C12 Aliphatics | 3200 | mg/kg | J | RPD |
| 55-SB-B | Soil | B13080949-013 | SW6020 | Lead | 7 | mg/kg | J | RPD |
| 55-SB-B | Soil | B13080949-013 | MA-VPH | Total Purgeable Hydrocarbons | 6740 | mg/kg | J | RPD |
| 56-SB-B | Soil | B13080949-018 | SW8270C | Acenaphthene | 1.9 | mg/kg | J | PRDL |
| 56-SB-B | Soil | B13080949-018 | MA-VPH | C9 to C10 Aromatics | 3350 | mg/kg | J | RPD |
| 56-SB-B | Soil | B13080949-018 | MA-VPH | C9 to C12 Aliphatics | 4650 | mg/kg | J | RPD |
| 56-SB-B | Soil | B13080949-018 | SW6020 | Lead | 10 | mg/kg | J | RPD |
| 56-SB-B | Soil | B13080949-018 | MA-VPH | Total Purgeable Hydrocarbons | 10600 | mg/kg | J | RPD |
| 73-SB-B | Soil | B13080949-019 | SW8270C | Acenaphthene | 0.035 | mg/kg | J | PRDL |
| 73-SB-B | Soil | B13080949-019 | MA-VPH | C9 to C10 Aromatics | 253 | mg/kg | J | RPD |
| 73-SB-B | Soil | B13080949-019 | MA-VPH | C9 to C12 Aliphatics | 332 | mg/kg | J | RPD |
| 73-SB-B | Soil | B13080949-019 | SW6020 | Lead | 8 | mg/kg | J | RPD |
| 73-SB-B | Soil | B13080949-019 | MA-VPH | Total Purgeable Hydrocarbons | 766 | mg/kg | J | RPD |
| 74-SB-B | Soil | B13080949-020 | SW8270C | Acenaphthene | 0.12 | mg/kg | J | PRDL |
| 74-SB-B | Soil | B13080949-020 | MA-VPH | C9 to C10 Aromatics | 9.6 | mg/kg | J | RPD |
| 74-SB-B | Soil | B13080949-020 | MA-VPH | C9 to C12 Aliphatics | 5 | mg/kg | J | RPD |
| 74-SB-B | Soil | B13080949-020 | SW6020 | Lead | 58 | mg/kg | J | RPD |
| 74-SB-B | Soil | B13080949-020 | MA-VPH | Total Purgeable Hydrocarbons | 22 | mg/kg | J | RPD |
| 84-SB-C | Soil | B13080949-017 | SW8270C | Acenaphthene | <0.0037 | mg/kg | J | PRDL |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 84-SB-C | Soil | B13080949-017 | MA-VPH | C9 to C10 Aromatics | <2.2 | mg/kg | J | RPD |
| 84-SB-C | Soil | B13080949-017 | MA-VPH | C9 to C12 Aliphatics | <2.2 | mg/kg | J | RPD |
| 84-SB-C | Soil | B13080949-017 | SW6020 | Lead | 6 | mg/kg | J | RPD |
| 84-SB-C | Soil | B13080949-017 | MA-VPH | Total Purgeable Hydrocarbons | <2.2 | mg/kg | J | RPD |

| Validation Qualifer Definitions: | |
|---|---|
| U | Blank Exceedance |
| J | QC Exceedance |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Water** |
| **Project No.: 11108/002** | **Sample Start Date: 09/04/2013** |
| **Verified By/Date Verified: Angela Roddy 10/16/2013** | **Sample End Date: 09/04/2013** |

| Samples Analyzed | | | | | | |
|---|---|---|---|---|---|---|
| | Matrix | Site Code | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Water-Trip Blank | NA | TB1082113BTSSHP0262 | 9/4/2013 | B13090210 | B13090210-001 |
| 2 | Water-Trip Blank | NA | TB2082113BTSSHP0262 | 9/4/2013 | B13090210 | B13090210-002 |
| 3 | Water-Trip Blank | NA | TB3082113BTSSHP0262 | 9/4/2013 | B13090210 | B13090210-003 |
| 4 | Water-Trip Blank | NA | TB4082113BTSSHP0262 | 9/4/2013 | B13090210 | B13090210-004 |
| 5 | Surfacewater | YD-1 | YOSD-1309-101 | 9/4/2013 | B13090210 | B13090210-005 |
| 6 | Surfacewater | YD-3 | YOSD-1309-103 | 9/4/2013 | B13090210 | B13090210-006 |
| 7 | Surfacewater | YD-4 | YOSD-1309-104 | 9/4/2013 | B13090210 | B13090210-007 |
| 8 | Surfacewater | YD-5 | YOSD-1309-105 | 9/4/2013 | B13090210 | B13090210-008 |
| 9 | Surfacewater | YD-3 | YOSD-1309-106 | 9/4/2013 | B13090210 | B13090210-009 |
| 10 | Water-DI Blank | NA | YOSD-1309-107 | 9/4/2013 | B13090210 | B13090210-010 |
| 11 | Water-Rinsate Blank | NA | YOSD-1309-108 | 9/4/2013 | B13090210 | B13090210-011 |

- *Methods and Parameter Groups Verified: pH-A4500-H B; Conductivity-A2510 B; Solids, Total Suspended-A2540 D; Solids, Total Dissolved-A2540 C; Alkalinity and Bicarbonate-A2320 B; Chloride and Sulfate-E300.0; Metals, Total Recoverable-E200.8; VPH-MA-VPH; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C; Volatile Organic Compounds-SW8260B*

- *Laboratory Project ID: B13090210*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | The result exceeds the MCL. |
| A | The analyte level was greater than four times the spike level. In accordance with the method, % recovery is not calculated. |
| B | The analyte was detected in the method blank. |
| D | RL increased due to sample matrix |
| H | Analysis performed past recommended holding time. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| L | Lowest available reporting limit for the analytical method used. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Comments from the laboratory indicated the analysis requested on COC does not match the analysis requested on the attached parameter list. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | | Yes | **X** | No | AR | Initials |
| Comments: Per Kris Adler, project manager, Calcium, Magnesium, Potassium, and Sodium-Dissolved were changed to report as Total Recoverable. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: Temperatures for Coolers 1, 2, 3 and 4 were 0.6°C, 0.7 °C, 0.4 °C, and 0.3 °C, respectively. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | | Yes | **X** | No | AR | Initials |
| Comments: Sample holding times for pH were outside of advisory limits and were flagged with laboratory qualifier "H". However, validation qualifiers are not necessary because the holding times for pH are difficult to reach due to the transportation time from the field. The pH values are taken as soon as possible in the laboratory setting. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Cadmium, Chromium, Lead, and Silver (Method E200.8) were detected in Method Blank MB-74145. A validation qualifier "U" was placed on all raw samples with values <10x the reporting limit for these analytes. 2-Methylnaphthalene, Acenaphthene, and Napthalene (Method SW8270C) were detected in Method Blank MB-74443-74416-74328. A validation qualifier "U" was placed on all raw samples with values <10x the reporting limit for these analytes. Chloride (Method E300.0) was detected in the ICB for this method. No validation qualifier was necessary because raw sample values were >10x the reporting limit for Chloride. Potassium (Method E200.7) was detected in Method Blank MB-6500DIS130905A. A validation qualifier was not necessary because raw sample values were >10x the reporting limit for Potassium. Calcium and Sodium (E200.7) were detected in Method Blank MB-74145. A validation qualifier was not necessary because raw sample values were >10x the reporting limit for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: C19-C36 Aliphatics and Total Extractable Hydrocarbons (Method MA-EPH) were detected in DI Blank YOSD-1309-107. A validation qualifier "U" was placed on all associated raw samples with values <5x the reporting limit for these analytes, as well as the DI blank. C11-C12 Aromatics was also detected in DI Blank YOSD-1309-107 and flagged with a laboratory qualifier "J". A validation qualifier was not necessary because this is an estimated value and is below the reporting limit. Naphthalene (Method SW8270C) and Total Extractable Hydrocarbons (Method MA-EPH) were detected in Rinsate Blank YOSD-1309-108. A validation qualifier "U" was placed on all associated raw samples with values <5x the reporting limit for these analytes, as well as the DI blank. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Method Blank MB-74502-74493-74450 was flagged with laboratory qualifier "S" for the surrogate recovery of 2-Fluorobiphenyl (Method SW8270C) being outside of control limits. The limits, however, seem to be a typo, for which the LCS and MS/MSD have different limits. This flag does not affect raw samples, as it only affects the Method Blank itself. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: LCS-090513 was flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte. Also, a note from the lab states 2-Chloroethyl vinyl ether is not recovered from acid preserved samples. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: QC samples B13090210-001E_MS and B13090210-001E _MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte. Also, a note from the lab states 2-Chloroethyl vinyl ether is not recovered from acid preserved samples | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample YOSD-1309-103 and is duplicate YOSD-13097-106 had RPDs within control limits. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Site Code** | **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** |
| YD-1 | YOSD-1309-101 | Surface Water | B13090210-001 | E200.8 | Lead | 0.0013 | mg/L | U |
| YD-1 | YOSD-1309-101 | Surface Water | B13090210-001 | E200.8 | Chromium | 0.002 | mg/L | U |
| YD-3 | YOSD-1309-103 | Surface Water | B13090210-002 | E200.8 | Chromium | 0.002 | mg/L | U |
| YD-3 | YOSD-1309-103 | Surface Water | B13090210-002 | E200.8 | Lead | 0.0023 | mg/L | U |
| YD-4 | YOSD-1309-104 | Surface Water | B13090210-003 | E200.8 | Lead | 0.0014 | mg/L | U |
| YD-4 | YOSD-1309-104 | Surface Water | B13090210-003 | E200.8 | Chromium | 0.001 | mg/L | U |
| YD-5 | YOSD-1309-105 | Surface Water | B13090210-004 | E200.8 | Lead | 0.0017 | mg/L | U |
| YD-5 | YOSD-1309-105 | Surface Water | B13090210-004 | E200.8 | Chromium | 0.002 | mg/L | U |
| YD-3 | YOSD-1309-106 | Surface Water | B13090210-005 | E200.8 | Lead | 0.0023 | mg/L | U |
| YD-3 | YOSD-1309-106 | Surface Water | B13090210-005 | E200.8 | Chromium | 0.002 | mg/L | U |
| YD-1 | YOSD-1309-101 | Surface Water | B13090210-001 | SW8270C | Acenaphthene | 0.23 | ug/L | U |
| YD-1 | YOSD-1309-101 | Surface Water | B13090210-001 | SW8270C | 2-Methylnaphthalene | 0.28 | ug/L | U |
| YD-1 | YOSD-1309-101 | Surface Water | B13090210-001 | SW8270C | Naphthalene | 0.42 | ug/L | U |
| YD-3 | YOSD-1309-106 | Surface Water | B13090210-005 | SW8270C | Naphthalene | 0.29 | ug/L | U |
| NA | YOSD-1309-107 | Water-DI Blank | B13090210-006 | MA-EPH | C19-C36 ALIPHATICS | 349 | ug/L | U |
| NA | YOSD-1309-107 | Water-DI Blank | B13090210-006 | MA-EPH | TOT EXTRACTABLE HYDROCARBON(EPH) | 891 | ug/L | U |
| NA | YOSD-1309-108 | Water-Rinsate Blank | B13090210-007 | SW8270C | Naphthalene | 0.20 | ug/L | U |
| NA | YOSD-1309-108 | Water-Rinsate Blank | B13090210-007 | MA-EPH | TOT EXTRACTABLE HYDROCARBON(EPH) | 785 | mg/L | U |
| | Validation Qualifer Definitions: | | | | | | | |
| | U | Blank Exceedance | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Water** |
| **Project No.: 11108/002** | **Sample Start Date: 09/09/2013** |
| **Verified By/Date Verified: Angela Roddy 10/18/2013** | **Sample End Date: 09/13/2013** |

| Samples Analyzed | | | | | | |
|---|---|---|---|---|---|---|
| | Matrix | Site Code | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Groundwater | YMW-10 | YOSD-1309-110 | 9/11/2013 | B13091122 | B13091102-001 |
| 2 | Groundwater | YMW-11 | YOSD-1309-111 | 9/9/2013 | B13091122 | B13091102-002 |
| 3 | Groundwater | YMW-12 | YOSD-1309-112 | 9/11/2013 | B13091122 | B13091102-003 |
| 4 | Groundwater | YMW-14 | YOSD-1309-114 | 9/12/2013 | B13091122 | B13091102-004 |
| 5 | Groundwater | YMW-18 | YOSD-1309-118 | 9/12/2013 | B13091122 | B13091102-005 |
| 6 | Groundwater | YMW-19 | YOSD-1309-119 | 9/9/2013 | B13091122 | B13091102-006 |
| 7 | Groundwater | YMW-20 | YOSD-1309-120 | 9/10/2013 | B13091122 | B13091102-007 |
| 8 | Groundwater | YMW-21 | YOSD-1309-121 | 9/11/2013 | B13091122 | B13091102-008 |
| 9 | Groundwater | YMW-22 | YOSD-1309-122 | 9/11/2013 | B13091122 | B13091102-009 |
| 10 | Groundwater | YMW-23 | YOSD-1309-123 | 9/10/2013 | B13091122 | B13091102-010 |
| 11 | Groundwater | MW-01 | YOSD-1309-131 | 9/9/2013 | B13091122 | B13091102-011 |
| 12 | Groundwater | MW-03 | YOSD-1309-133 | 9/12/2013 | B13091122 | B13091102-012 |
| 13 | Groundwater | MW-4 | YOSD-1309-134 | 9/10/2013 | B13091122 | B13091102-013 |
| 14 | Groundwater | MW-6 | YOSD-1309-136 | 9/10/2013 | B13091122 | B13091102-014 |
| 15 | Water-DI Blank | NA | YOSD-1309-137 | 9/9/2013 | B13091122 | B13091102-015 |
| 16 | Water-Rinsate Blank | NA | YOSD-1309-138 | 9/11/2013 | B13091122 | B13091102-016 |
| 17 | Groundwater | YMW-23 | YOSD-1309-139 | 9/10/2013 | B13091122 | B13091102-017 |
| 18 | Water-Trip Blank | NA | TB1082113 BTSSHP0262 | 9/9/2013 | B13091122 | B13091102-018 |
| 19 | Water-Trip Blank | NA | TB2082113BTSSHP0262 | 9/10/2013 | B13091122 | B13091102-019 |
| 20 | Water-Trip Blank | NA | TB3082113BTSSHP0262 | 9/10/2013 | B13091122 | B13091102-020 |
| 21 | Water-Trip Blank | NA | TB4111212BTSSHP0259 | 9/9/2013 | B13091122 | B13091102-021 |
| 22 | Water-Trip Blank | NA | TB5082813BTSSHP0262 | 9/12/2013 | B13091122 | B13091102-022 |
| 23 | Water-Trip Blank | NA | TB6082113BTSSHP0262 | 9/10/2013 | B13091122 | B13091102-023 |
| 24 | Groundwater | MW-02 | YOSD-1309-133B | 9/13/2013 | B13091186 | B13091186-001 |
| 25 | Water-Trip Blank | NA | TB091013BTSSHP0262 | 9/13/2013 | B13091186 | B13091186-002 |

- *Methods and Parameter Groups Verified: pH-A4500-H B; Conductivity-A2510 B; Solids, Total Dissolved-A2540 C; Alkalinity and Bicarbonate-A2320 B; Chloride and Sulfate-E300.0; Nutrients-E353.2; Metals, Total Recoverable-E200.8; VPH-MA-VPH; Methane-SW8015M; Extractable Petroleum Hydrocarbons-MA-EPH; Semi-Volatile Organic Compounds-low conc-SW8270C (including Tetraethyl Lead); Volatile Organic Compounds-SW8260B*

- *Laboratory Project Ids: B13091102 and B13091186*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |
| **COMPLIANCE ASSESSMENT** | | | | | | |
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

| | |
|---|---|
| * | MCL Exceedance |
| A | The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated |
| B | The analyte was detected in the method blank. |
| D | RL increased due to sample matrix. |
| E | Estimated value. Result exceeds the instrument upper quantitation limit. |
| H | Analysis performed past recommended holding time. |
| J | Estimated value. The analyte was present but less than the reporting limit. |
| L | Lowest available reporting limit for the analytical method used. |
| S | Spike recovery outside of advisory limits. |

**Validation qualifiers used in this review:**

| | |
|---|---|
| J | QC Exceedance |
| U | Blank Exceedance |

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. A note from the laboratory stated Sample YOSD-1309-118 for Nitrate + Nitrite was received at pH ~ 7. 2 mL of sulfuric acid was added in the laboratory to preserve to pH<2. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: Historically, metals have been reported as Dissolved for groundwater data. For this batch, metals will be reported as Total Recoverable. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. However, sample B13091186-001 was missing the value for Chloride. The lab re-issued a new report which included the value. Per Kris Adler, project engineer, Calcium, Magnesium, Potassium, and Sodium were inadvertently not included on the COC and were run at a later date. The lab re-issued a new report which included the new values. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: All samples were received in good condition and at the appropriate temperature. Custody seals for all coolers were not present. However, the coolers were hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | | Yes | **X** | No | AR | Initials |
| Comments: Sample holding times for pH were outside of advisory limits and were flagged with laboratory qualifier "H". However, validation qualifiers are not necessary because the holding times for pH are difficult to reach due to the transportation time from the field. The pH values are taken as soon as possible in the laboratory setting. A note from the laboratory states samples YOSD-1309-111, YOSD-1309-119, YOSD-1309-123, YOSD-1309-131, YOSD-1309-134, YOSD-1309-136, YOSD-1309-137, and YOSD-1309-139 were received past the EPA holding time for Nitrite. Continue with analysis per Shari Endy, Energy Laboratory Project Manager. She will contact Kris Adler. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Barium, Chromium, and Silver (Method E200.8) were detected in Method Blank MB-74412. A validation qualifier was not necessary because the raw samples had non-detect values for these analytes. Mercury (Method E245.1) was detected in Method Blank MB-74459. A validation qualifier was not necessary because the raw samples were non-detect for Mercury. Chromium (Method E200.8) was detected in Method Blank MB-74381. A validation qualifier was not necessary because the raw samples were non-detect for Chromium. Chloride (Method E300.0) was detected in the ICB for this method. No validation qualifier was necessary because raw sample values were >10x the reporting limit for Chloride. 2-Methylnapthalene and Naphthalene (Method Sw8270C) were detected in Method Blank MB-74687-74664-74562. A laboratory qualifier "B" was placed on any raw samples with detections <5x the reporting limit for Napthalene. The lab did not flag the 2-Methylnapthlaene detections that were <5x the reporting limit. A validation qualifier "U" was placed on all detections that are <5x the reporting limit for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Nitrate + Nitrite as N (Method 353.2) was detected in Rinsate Blank YOSD-1309-138. A validation qualifier "U" was placed on all associated raw samples with values <10x the reporting limit for Nitrate + Nitrite as N, as well as the Rinsate blank. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Field blank samples were analyzed at the proper frequency. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | | Yes | **X** | No | AR | Initials |
| Comments: Samples YOSD-1309-114 and YOSD-1309-119 were flagged with laboratory qualifier "S" for the % recovery of 1-Chloro-octadecane (Method MA-EPH) being outside of control limits. A validation qualifier was not necessary because other surrogates were within limits for this method. Sample YOSD-1309-133 was flagged with laboratory qualifier "S" for the % recovery of 1-Chloro-octadecane, o-Terphenyl (MA-EPH) and o-Terphenyl (SW8270C). A validation qualifier was not necessary because other surrogates were within limits for these method, as well as the QC. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD recoveries were within control limits. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | | Yes | **X** | No | AR | Initials |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Comments: QC samples B13091263-001A_MS, B13091263-001A_MSD, B13091102-001F_MS, and B13091102-001F_MSD were flagged with laboratory qualifier "S" for the % recovery of the analyte 2-Chlorethyl vinyl ether (Method SW8260B) being outside of control limits. A validation qualifier was not necessary because the raw samples were nondetect for this analyte. Also, a not from the lab states this analyte is not recovered from preserved samples. QC sample B13091077-002A MS was flagged with laboratory qualifier "S" for the % recovery of Total Dissolved Solids (Method A2540C) being outside of control limits. This QC sample was rerun and within limits, as well as the LCS was within limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | **X** | Yes | | NA | AR | Initials |
| Comments: Sample YOSD-1309-123 and is duplicate YOSD-1309-139 had an RPD outside of control limits for the analyte Methane (Method SW8015M) at 56%. A validation qualifier "J" was placed on Methane indicating bias for all raw samples, as well as the duplicate. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event an analyte was detected in a Method Blank and also detected in a raw sample, a laboratory qualifier “B” was placed on the data.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte value exceeded the limit of an instrument, a laboratory qualifier “E” was placed on the data.
- In the event an analyte was present but less than the reporting limit, a laboratory qualifier “J” was put on the data. However, these samples are not qualified due to being less than reporting limit.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| Validator Qualified Analytical Results | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Site Code** | **Sample ID** | **Matrix** | **Lab Sample ID** | **Method** | **Anlayte** | **Result** | **Units** | **Flag** | **Comments** |
| YMW-21 | YOSD-1309-121 | Groundwater | B13091102-008 | SW8270C | 2-METHYLNAPHTHALENE | 0.33 | ug/L | U | |
| YMW-19 | YOSD-1309-119 | Groundwater | B13091102-006 | SW8270C | NAPHTHALENE | 0.27 | ug/L | U | |
| YMW-10 | YOSD-1309-110 | Groundwater | B13091102-001 | SW8270C | NAPHTHALENE | 0.20 | ug/L | U | |
| YMW-20 | YOSD-1309-120 | Groundwater | B13091102-007 | SW8270C | NAPHTHALENE | 0.41 | ug/L | U | |
| YMW-21 | YOSD-1309-121 | Groundwater | B13091102-008 | SW8270C | NAPHTHALENE | 0.29 | ug/L | U | |
| NA | YOSD-1309-138 | Water-Rinsate Blank | B13091102-016 | E353.2 | NITRATE + NITRITE AS N | 0.01 | mg/L | U | |
| YMW-12 | YOSD-1309-112 | Groundwater | B13091102-003 | E353.2 | NITRATE + NITRITE AS N | 0.02 | mg/L | U | |
| YMW-18 | YOSD-1309-118 | Groundwater | B13091102-005 | E353.2 | NITRATE + NITRITE AS N | 0.01 | mg/L | U | |
| YMW-20 | YOSD-1309-120 | Groundwater | B13091102-007 | E353.2 | NITRATE + NITRITE AS N | 0.02 | mg/L | U | |
| YMW-21 | YOSD-1309-121 | Groundwater | B13091102-008 | E353.2 | NITRATE + NITRITE AS N | 0.01 | mg/L | U | |
| YMW-22 | YOSD-1309-122 | Groundwater | B13091102-009 | E353.2 | NITRATE + NITRITE AS N | 0.02 | mg/L | U | |
| YMW-23 | YOSD-1309-123 | Groundwater | B13091102-010 | E353.2 | NITRATE + NITRITE AS N | 0.01 | mg/L | U | |
| MW-03 | YOSD-1309-133 | Groundwater | B13091102-012 | E353.2 | NITRATE + NITRITE AS N | 0.01 | mg/L | U | |
| MW-6 | YOSD-1309-136 | Groundwater | B13091102-014 | E353.2 | NITRATE + NITRITE AS N | 0.02 | mg/L | U | |
| MW-02 | YOSD-1309-133B | Groundwater | B13091186-001 | E353.2 | NITRATE + NITRITE AS N | 0.02 | mg/L | U | |
| YMW-10 | YOSD-1309-110 | Groundwater | B13091102-001 | SW8015M | Methane | <0.0010 | mg/L | J | RPD |
| YMW-11 | YOSD-1309-111 | Groundwater | B13091102-002 | SW8015M | Methane | <0.0010 | mg/L | J | RPD |
| YMW-12 | YOSD-1309-112 | Groundwater | B13091102-003 | SW8015M | Methane | 12 | mg/L | J | RPD |
| YMW-14 | YOSD-1309-114 | Groundwater | B13091102-004 | SW8015M | Methane | 23 | mg/L | J | RPD |
| YMW-18 | YOSD-1309-118 | Groundwater | B13091102-005 | SW8015M | Methane | 12 | mg/L | J | RPD |
| YMW-19 | YOSD-1309-119 | Groundwater | B13091102-006 | SW8015M | Methane | 0.0032 | mg/L | J | RPD |
| YMW-20 | YOSD-1309-120 | Groundwater | B13091102-007 | SW8015M | Methane | 0.80 | mg/L | J | RPD |
| YMW-21 | YOSD-1309-121 | Groundwater | B13091102-008 | SW8015M | Methane | 0.040 | mg/L | J | RPD |
| YMW-22 | YOSD-1309-122 | Groundwater | B13091102-009 | SW8015M | Methane | 0.011 | mg/L | J | RPD |
| YMW-23 | YOSD-1309-123 | Groundwater | B13091102-010 | SW8015M | Methane | 0.013 | mg/L | J | RPD |
| MW-01 | YOSD-1309-131 | Groundwater | B13091102-011 | SW8015M | Methane | 0.0014 | mg/L | J | RPD |
| MW-03 | YOSD-1309-133 | Groundwater | B13091102-012 | SW8015M | Methane | 0.0070 | mg/L | J | RPD |
| MW-4 | YOSD-1309-134 | Groundwater | B13091102-013 | SW8015M | Methane | <0.0010 | mg/L | J | RPD |
| MW-6 | YOSD-1309-136 | Groundwater | B13091102-014 | SW8015M | Methane | 0.030 | mg/L | J | RPD |
| NA | YOSD-1309-137 | Water-DI Blank | B13091102-015 | SW8015M | Methane | <0.0010 | mg/L | J | RPD |
| NA | YOSD-1309-138 | Water-Rinsate Blank | B13091102-016 | SW8015M | Methane | <0.0010 | mg/L | J | RPD |
| YMW-23 | YOSD-1309-139 | Groundwater | B13091102-017 | SW8015M | Methane | 0.0073 | mg/L | J | RPD |
| MW-02 | YOSD-1309-133B | Groundwater | B13091186-001 | SW8015M | Methane | 0.0031 | mg/L | J | RPD |
| | Validation Qualifer Definitions: | | | | | | | | |
| | J | QC Exceedance | | | | | | | |
| | U | Blank Exceedance | | | | | | | |

**ANALYTICAL DATA VERIFICATION CHECKLIST**

| | |
|---|---|
| **Project Name: Yale Oil of South Dakota** | **Laboratory: Energy Laboratories** |
| **Project Reference: Remedial Investigation** | **Sample Matrix: Solid** |
| **Project No.: 11108/002** | **Sample Start Date: 12/23/2013** |
| **Verified By/Date Verified: Angela Roddy 01/10/2014** | **Sample End Date: 12/23/2013** |

| Samples Analyzed | | | | | |
|---|---|---|---|---|---|
| | Matrix | Sample ID | Date Sampled | Lab Project No. | Lab Sample ID |
| 1 | Soil | SP-SS-A | 12/23/2013 | B13121829 | B13121829-001 |
| 2 | Soil | SP-SS-A-Sieved | 12/23/2013 | B13121829 | B13121829-002 |
| 3 | Soil | NP-SS-A | 12/23/2013 | B13121829 | B13121829-003 |
| 4 | Soil | NP-SS-A-Sieved | 12/23/2013 | B13121829 | B13121829-004 |
| 5 | Soil | TMP-SS-A | 12/23/2013 | B13121829 | B13121829-005 |
| 6 | Soil | TMP-SS-A-Sieved | 12/23/2013 | B13121829 | B13121829-006 |

- *Methods and Parameter Groups Verified: Moisture-SW3550A; Total Metals-EPA SW6010B, SW6020, SW7471B; Semi-Volatile Organic Compounds-low conc-SW8270C*
- *Laboratory Project Ids: B13121829*

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| PRECISION, ACCURACY, REPRESENTATIVENES, COMPARABILITY, & COMPLETENESS ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Precision: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Precision is the measure of variability of individual sample measurements. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits, laboratory control charted QC limits, or as specified in the Quality Assurance Project Plan (QAPP). Overall the laboratory precision is acceptable. Precision measurements are reviewed in items 16, 17, and 18. | | | | | | |
| Accuracy: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Laboratory accuracy, a measure of the system bias, was measured by evaluating standard reference or laboratory control sample and laboratory control sample duplicate (LCS, LCSD), matrix spike and matrix spike duplicates (MS, MSD), and organic system monitoring compounds (surrogate) percent recoveries (%Rs). Standard reference, LCS, and LCSD %Rs demonstrated the overall performance of the analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. These measurements were compared to data validation and laboratory control charted QC limits. Accuracy measurements are reviewed in items 14, 15, and 16. | | | | | | |
| Representativeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Representativeness is the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter sampling point, or an environmental condition that they are intended to represent. Representative data are achieved through careful selection of sampling locations and frequencies, and proper sampling and analytical procedures. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. Completeness also included 100% review of the laboratory sample data results and QC summary reports. All of the data received by the laboratory are usable with qualification. Completeness is reviewed through items 2, 3, 5, 6, 7, and 9. | | | | | | |
| Comparability: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Comparability is the degree to which two or more data sets from the same location are generated using consistent procedures. Discrete data sets may differ as a result of non-random (bias sampling, variability in sampling techniques and variations in methods of analysis. Comparability is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. | | | | | | |

| COMPLIANCE ASSESSMENT | | | | | | |
|---|---|---|---|---|---|---|
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data required qualification based on holding time limits and overall method compliance is acceptable based on the supplied data. Method compliance measurements are reviewed in items 4, 6, 8, 11, and 13. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

**VERIFICATION CRITERIA CHECK**

**Laboratory qualifiers used in this review:**

A The analyte level was greater than four times the spike level. In accordance with the method, percent recovery is not calculated.

D RL increased due to sample matrix.

N The analyte concentration was not sufficiently high to calculate an RPD.

S Spike recovery outside of advisory limits.

**Validation qualifiers used in this review:**

N/A

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

**Refer to the table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (attached at the end of this checklist).**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: Yes. Any problems with these analyses were noted in the laboratory case narratives. All results for these analyses are considered valid. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: Coolers 1 arrived with a temperature of 3.4°C. Custody seals were not present. However, the cooler was hand-delivered. Samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested on the COC records or the reported methods are comparable and appropriate for the analysis requested and the sample matrix. | | | | | | |

# ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits are achievable by the quoted methods. Some samples required dilution due to high sample concentration. The reporting limits for diluted results were raised appropriately. Some samples exceeded MCL and were flagged with laboratory qualifier "*"; detection limits were not changed. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reports included only those constituents requested to be reported. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Sample holding times were met. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. | | | | | | |
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: Reporting requirements for flagged data were met. | | | | | | |
| 11. Laboratory Blanks | | | | | | |
| Were laboratory blank samples free of target analyte contamination? | | Yes | **X** | No | AR | Initials |
| Comments: Soil: Barium (Method SW6010B), Arsenic, and Selenium (Method SW6020) were detected in Method Blank MB-76750. A validation qualifier was not necessary because the raw soil samples had values of either >10x the reporting limit or non-detect values for these analytes. | | | | | | |
| Were laboratory blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| 12. Field Blanks | | | | | | |
| Were field blank samples free of target analyte contamination? | | Yes | **X** | NA | AR | Initials |
| Comments: Field Blanks were not collected with this batch of data. | | | | | | |
| Were field blank samples analyzed at the proper frequency (minimum 5% or as required by method)? | | Yes | **X** | NA | AR | Initials |
| Comments: Field Blanks were not submitted with this batch of data. | | | | | | |
| 13. Were instrument calibrations within method or data validation control limits? | | Yes | **X** | NA | AR | Initials |
| *Comments: Not applicable for this level of data verification – Instrument calibration data were not supplied in analytical laboratory reports and were therefore not included in this data review.* | | | | | | |
| 14. Were surrogate recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: Surrogate recoveries were within control limits. | | | | | | |
| 15. Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) | | | | | | |
| Were laboratory control samples prepared in the same way as associated samples? | **X** | Yes | | No | AR | Initials |
| Was the reference material of the correct matrix and concentration? | **X** | Yes | | No | AR | Initials |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

| | | | | | | |
|---|---|---|---|---|---|---|
| Were LCS/LCSD recoveries within control limits of 70-130% for VPH, 40-140% for EPH, and 80-120% for inorganics, and were within laboratory control charted QC limits for all target analytes, or within 95% confidence limit of known value? | | Yes | **X** | No | AR | Initials |
| Comments: LCS-76757 was flagged with laboratory qualifier "S" for the % recovery of the surrogate Terphenyl-d14 (SW8270C) being above control limits. A validation qualifier was not necessary because two other surrogates were within limits for this method, as well as the MS/MSD. | | | | | | |
| Were LCS/LCDS RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All LCS/LCSD % RPDs were within control limits. | | | | | | |
| Were LCS/LCSD samples analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: LCS/LCSD samples were analyzed at the proper frequency. | | | | | | |
| 16. Matrix Spikes/Matrix Spike Duplicates (MS/MSD) | | | | | | |
| Were MS/MSD % recoveries within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD % recoveries were within control limits. | | | | | | |
| Were MS/MSD RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All MS/MSD RPDs were within control limits per the QAPP. | | | | | | |
| Were MS/MSD analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: The MS/MSD samples were ran at the proper frequency. | | | | | | |
| 17. Laboratory Duplicates | | | | | | |
| Were laboratory duplicate RPDs within control limits? | **X** | Yes | | No | AR | Initials |
| Comments: All laboratory duplicate RPDs were within control limits as required by the QAAP. | | | | | | |
| Were laboratory duplicates analyzed at the proper frequency (minimum 5% or as required by method)? | **X** | Yes | | No | AR | Initials |
| Comments: Laboratory RPDs for target analytes in LCS/LCSD and laboratory duplicate samples were within control limits or were not applicable due to undetected results in both samples. | | | | | | |
| 18. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results. | | Yes | **X** | NA | AR | Initials |
| Comments: Blind field duplicates were not collected with this batch of data. | | | | | | |
| 19. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **X** | Yes | | NA | AR | Initials |
| *Comments: 100% of the EDD concentrations and reporting limits were the same as hardcopy data reports.* | | | | | | |

## ANALYTICAL DATA VERIFICATION CHECKLIST (Continued)

General Comments: Data were evaluated based on validation criteria set forth in:

- Quality Assurance Project Plan for Environmental Data Collection Activities Yale Oil of South Dakota CECRA Facility, 2012.
- Montana Department of Environmental Quality Data Validation Guidelines for Evaluating Analytical Data (August 5, 2010)
- USEPA Contract Laboratory Program National Functional Guidelines for Organic/Inorganic Data Review, document numbers EPA540/R-08/01 and EPA540/R-10/011 of June 2008 (Organic) and October 2010 (Inorganic), as they applied to the reported methodology.

Additional Comments:

- In the event QC MS/MSD samples contained an analyte level greater than four times the spike level, a laboratory qualifier of “A” was put on the data; in accordance with the method, % recovery is not calculated.
- In the event of samples analyzed at more than one dilution, result was taken from the lowest dilution within instrument calibration range and a laboratory qualifier of “D” was put on the data.
- In the event an analyte concentration was not sufficiently high to calculate an RPD, a laboratory qualifier of “N” was put on the data.

## ANALYTICAL DATA VERIFICATION CHECKLIST

| | |
|---|---|
| **Project Name: Yale Oil Of South Dakota - Interim Actions** | **Laboratory: iATL INTERNATIONAL Asbestos Testing Lab** |
| **Project No.: 11108/002** | **Sample Date: 9-23-2013** |
| **Verified By/Date Verified: Angela Roddy – 10/21/2013** | **Lab Report No: 315510** |

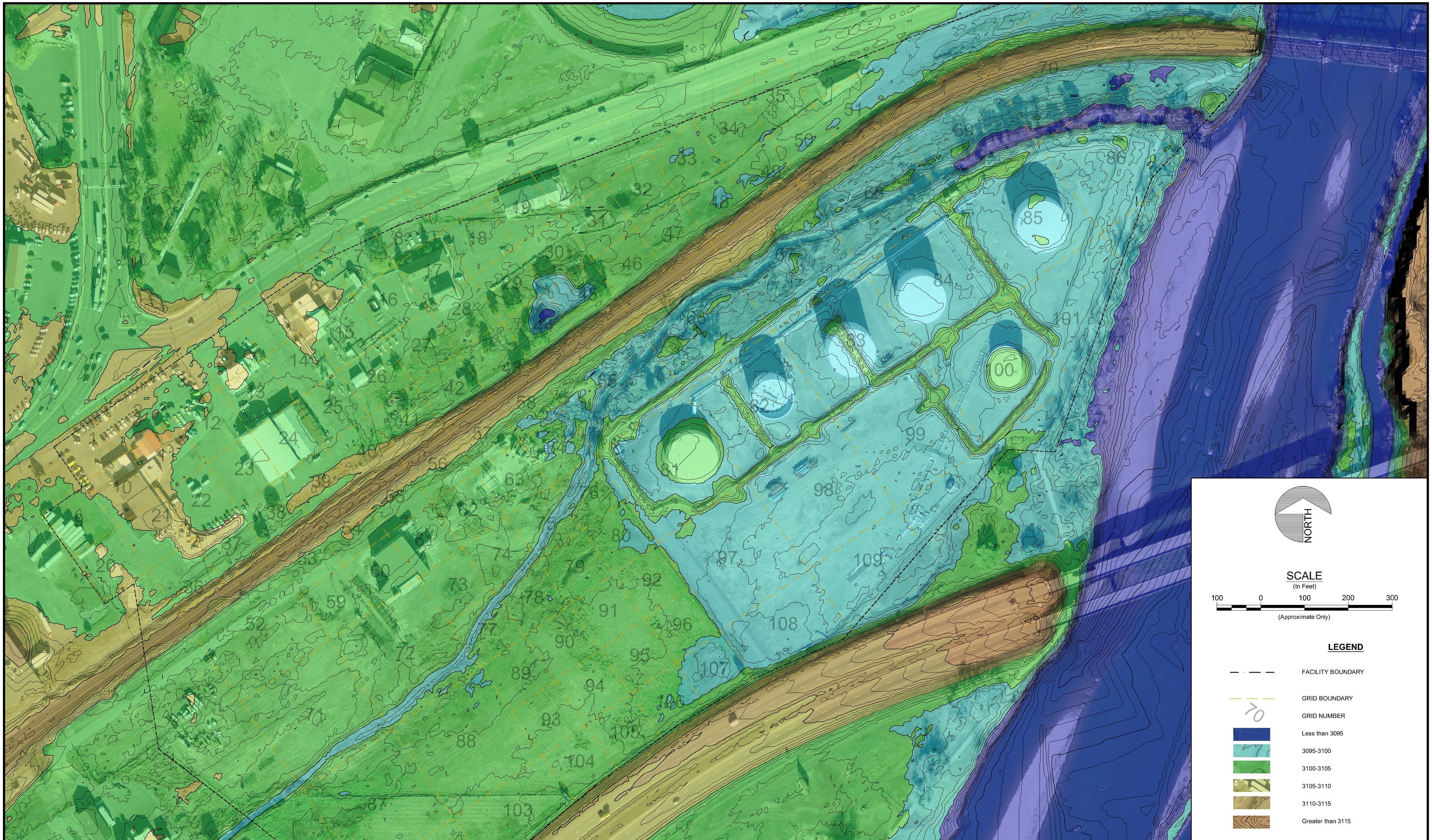
**Samples Analyzed:**

| Matrix "Solids" | Client # | Sample Date | Lab # |
|---|---|---|---|
| Black Tar Paper | M1.1A | 9-23-2013 | 5128967 |
| Black Tar Paper | M1.1B* | 9-23-2013 | 5128968 |
| Black Tar Paper | M1.1C* | 9-23-2013 | 5128969 |
| Black/Silver Roof Material | M2.1A | 9-23-2013 | 5128970 |
| Black/Silver Roof Material | M2.1B* | 9-23-2013 | 5128971 |
| Black/Silver Roof Material | M2.1C* | 9-23-2013 | 5128972 |
| Black Roof Material | M1.2A | 9-23-2013 | 5128973 |
| Black/Brown Roof Material | M1.2B | 9-23-2013 | 5128974 |
| Black Roof Material | M1.2C | 9-23-2013 | 5128975 |
| Grey Transite | M1.3A | 9-23-2013 | 5128976 |
| Tan Firebrick | M1.4A | 9-23-2013 | 5128977 |
| Tan Firebrick | M1.4B | 9-23-2013 | 5128978 |
| Tan Firebrick | M1.4C | 9-23-2013 | 5128979 |
| Black Gasket | M1.5A | 9-23-2013 | 5128980 |
| Black Gasket | M1.5B* | 9-23-2013 | 5128981 |
| Black Gasket | M1.5C* | 9-23-2013 | 5128982 |
| Grey Putty | M1.6A | 9-23-2013 | 5128983 |
| Grey Putty | M1.6B* | 9-23-2013 | 5128984 |
| Grey Putty | M1.6C* | 9-23-2013 | 5128985 |
| Black Wrap | M1.7A | 9-23-2013 | 5128986 |
| Black Wrap | M1.7B | 9-23-2013 | 5128987 |
| Black Wrap | M1.7C | 9-23-2013 | 5128988 |
| Black Wire Insulation | M1.8A | 9-23-2013 | 5128989 |
| Black Wire Insulation | M1.8B | 9-23-2013 | 5128990 |
| Black Wire Insulation | M1.8C | 9-23-2013 | 5128991 |
| Grey Woven Fiber | M1.9A | 9-23-2013 | 5128992 |
| Grey Woven Fiber | M1.9B | 9-23-2013 | 5128993 |
| Grey Woven Fiber | M1.9C | 9-23-2013 | 5128994 |

- *Parameters Verified: % Asbestos, EPA Method 600/R-93/116, Polarized Light Microscopic (PLM) Techniques With Dispersion Staining For Identification Of Mineral Forms Of Asbestos and/or Transmission Electron Microscopy (TEM).*
- *Data were evaluated based on criteria set forth in the Administrative Rules of Montana (ARM 17.74.354), as they applied to the reported methodology.*
- ** indicates sample was not analyzed because the A-sample was positive for Asbestos.*

| | | | | | | |
|---|---|---|---|---|---|---|
| Method Compliance: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Method compliance was determined by evaluating sample integrity, and reporting limits against method specified requirements. The overall method compliance is acceptable based on the supplied data. | | | | | | |
| Completeness: | **X** | Acceptable | | Unacceptable | AR | Initials |
| Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Completeness goals are set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods and detection limits, and laboratory case narratives. All of the data received by the laboratory are usable, and no data were missing or rejected. Completeness of the data is calculated to be 100% and is acceptable. | | | | | | |
| **VERIFICATION CRITERIA CHECK** | | | | | | |
| 1. Did the laboratory identify any non-conformances related to the analytical results? | **X** | Yes | | No | AR | Initials |
| Comments: There were no problems or non-conformances with these analyses. All results for these analyses are considered valid. A note from lab states insufficient material (<100mg) to verify results for sample M1.2C. | | | | | | |
| 2. Were sample Chain-of-Custody forms complete? | **X** | Yes | | No | AR | Initials |
| Comments: COC forms and sample log records from field to laboratory were complete, and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. | | | | | | |
| 3. Were all the analyses requested for the samples on the COCs completed by the laboratory? | **X** | Yes | | No | AR | Initials |
| Comments: All requested analyses as documented on original COCs were completed by the laboratory. | | | | | | |
| 4. Were samples received in good condition and at the appropriate temperature? | **X** | Yes | | No | AR | Initials |
| Comments: All samples were received intact and in good condition. | | | | | | |
| 5. Were the requested analytical methods in compliance with WP/QAPP, permit, or COC? | **X** | Yes | | No | AR | Initials |
| Comments: Reported methods were in compliance with those requested. | | | | | | |
| 6. Were detection limits in accordance with WP/QAPP, permit, or method? | **X** | Yes | | No | AR | Initials |
| Comments: Reported detection limits were in compliance with those requested. | | | | | | |
| 7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method? | **X** | Yes | | No | AR | Initials |
| Comments: The laboratory reported only the constituents requested. | | | | | | |
| 8. Were sample holding times met? | **X** | Yes | | No | AR | Initials |
| Comments: Analytical holding times were met for all samples and analyses. | | | | | | |
| 9. Were correct concentration units reported? | **X** | Yes | | No | AR | Initials |
| Comments: Correct concentration units were reported. Method 600/R-93/116 results were reported as % by volume. | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 10. Were the reporting requirements for flagged data met? | **X** | Yes | | No | AR | Initials |
| Comments: No data were flagged in this data review. | | | | | | |
| 23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? | **NA** | Yes | | No | AR | Initials |
| *Comments: Not applicable – An EDD was not supplied and is therefore not included in this data review.* | | | | | | |
| • **Attached is the analytical report for the asbestos samples collected on 9-23-2013** | | | | | | |




SOURCES:
US Army Corps of Engineers Aerial Photo (2011)
US Army Corps of Engineers Topography (2004), 1 Foot Contour Intervals

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REMEDIAL INVESTIGATION REPORT
YALE OIL OF SOUTH DAKOTA
CECRA FACILITY

**2004 SITE TOPOGRAPHY**

DRAWING FILE NUMBER
1110813B015
AUTOCAD 2000 DRAWING (DWG)
EXHIBIT
**1**

UPDATE TIME: 4:37 PM
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