Five-Year Review Report

Third Five-Year Review Report
For the Montana Pole and Treating Plant Site

Butte,

Silver Bow County, Montana

June, 2011

PREPARED BY:

Montana Department of Environmental Quality
Helena, Montana

For U. S. Environmental Protection Agency
Region 8
Denver, Colorado

Approved by:

Sandra Olsen — 7-8-2011

Sandra Olsen
Remediation Division Administrator
Department of Environmental Quality
Date

Carol L Campbell — 6/24/11

Carol L. Campbell
Assistant Regional Administrator
Office of Ecosystem Protection and Remediation
U. S Environmental Protection Agency
Region 8
Date

Third Five-Year Review Report – 2011

Montana Pole and Treating Plant Site

Table of Contents

Tables

Figures

Attachments

List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirements
AOC	Administrative Order on Consent
ARCO	Atlantic Richfield Company
B2PAHs	PAHs that are probable carcinogens
bgs	Below ground surface
BPSOU	Butte Priority Soils Operable Unit
BRW	Butte Reduction Works
BSB	Butte-Silver Bow
CDM	Camp Dresser & McKee
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	CERCLA Information System
CFR	Code of Federal Regulations
CL	Confidence Level
COC	Contaminant of Concern
CTEC	Citizens Technical Environmental Committee
D PAHs	PAHs that are not classifiable with respect to cancer impacts
DEQ	Montana Department of Environmental Quality, including its contractors
EPA	United States Environmental Protection Agency
FS	Feasibility Study
ft MSL	Feet above mean sea level
gpm	Gallons per minute
HASP	Health and Safety Plan
HCC	Hydraulic Control Channel
I-90	Interstate 90
IC	Institutional Control
LAO	Lower Area One
LNAPL	Light non-aqueous phase liquid
LTU	Land treatment unit
MBMG	Montana Bureau of Mines and Geology
MDHES	Montana Department of Health and Environmental Services (now DEQ)
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
NAPL	Non-aqueous phase liquid
MBMG	Montana Bureau of Mines and Geology
MDT	Montana Department of Transportation
MPTP	Montana Pole and Treating Plant
NCP	National Contingency Plan
NCRT	Near Creek Recovery Trench
NHRT	Near Highway Recovery Trench
NPL	National Priorities List

O&M	Operation and Maintenance
OU	Operable Unit
PAHs	Polynuclear aromatic hydrocarbons
PA/SI	Preliminary Assessment/Site Inspection
PCP	Pentachlorophenol
ppb	Parts per billion
ppm	Parts per million
ppt	Parts per trillion
P&T	Pump and treat
PRG	Preliminary Remediation Goal
PRP	Potentially Responsible Party
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Responsible Party
SSP	soil storage pile
TAG	Technical Assistance Grant
TCDD	2,3,7,8-tetrachlorophenol dibenzo-p-dioxin
TCDD-TEQ	Sum of toxicity equivalents for individual polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), expressed as concentration of 2,3,7,8-tetrachlorophenol dibenzo-p-dioxin (TCDD)
TEFs	Toxicity equivalency factors
TEQ	Toxicity Equivalent
µg/L	Micrograms per liter
USGS	United States Geological Survey
WWTP	Butte-Silver Bow wastewater treatment plant

Executive Summary

The Montana Department of Environmental Quality (DEQ), with the assistance of the U.S. Environmental Protection Agency (EPA) Region 8, has conducted a five-year review of the response actions implemented at the Montana Pole and Treating Plant (MPTP) site, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Information System (CERCLIS) ID MTD986073583 in Silver Bow County, Montana. DEQ is the lead agency for this site and is therefore responsible for conducting the review. This Five-Year Review covers the period from June 2006 through June 2011. This represents the third Five-Year Review of the remedial actions implemented at the MPTP site (referred to herein as "the Site" or "MPTP"). The 1993 Record of Decision (ROD) addresses Operable Unit 1 (OU-1), which is the only operable unit for the Site and includes all known sources and contaminated media at the Site. The primary contaminant of concern (COC) at the Site is Pentachlorophenol (PCP) associated with wood treating operations at the former plant. Other COCs with cleanup standards established in the Record of Decision (ROD) for soil, surface water and groundwater include chlorinated phenols, polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzofurans (furans), and polychlorinated dibenzo-p-dioxins (dioxins).

The purpose of this review is to determine whether the remedy at the Site, as selected and implemented subsequent to the ROD, is protective of human health and the environment, and to identify if there are any issues that keep the remedy from being protective in the long term. The methods, findings, and conclusions of the review are documented in this Five-Year Review report. The triggering action for this review is the second Five-Year Review report dated June 2006. Due to the fact that hazardous substances, pollutants, or contaminants will be left onsite above levels that allow for unlimited use and unrestricted exposure, this third Five-Year Review is statutorily required under CERCLA.

The remedy is progressing as expected. Impacted groundwater is effectively contained by remedy extraction under typical conditions, and treatment of the extracted groundwater is effective in removing contaminants of concern. PCP and PAHs in soils are being effectively degraded through treatment in the Land Treatment Unit, and it is expected that soil treatment will be completed within the next five-year review period. Treated soils are expected to contain dioxins above the ROD cleanup levels, and appropriate management of these soils will be evaluated once EPA has finalized the revised interim preliminary remediation goals (PRGs) for dioxin and dioxin-like compounds.

This Third Five-Year Review has determined that the remedial action at OU 1 currently protects human health and the environment because exposure pathways that could result in unacceptable risk are being controlled by soil containment, hydraulic capture, access controls, and a Controlled Ground Water Area. Several issues are identified for which action needs to be taken to ensure long-term protectiveness. It is expected that all but one of those items will be addressed within the next one to two years.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Montana Pole and Treating Plant Site		
EPA ID *(from WasteLAN)*: MTD986073583		
Region: 8	**State: MT**	**City/County: Butte/Silver Bow County**
SITE STATUS		
NPL status: ☑ Final ☐ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): ☐ Under Construction ☑ Operating ☐ Complete		
Multiple OUs?* ☐ YES ☑ NO	**Construction completion date:** 09/27/2001	
Has site been put into reuse? ☐ YES ☑ NO		
REVIEW STATUS		
Lead agency: ☐ EPA ☑ State ☐ Tribe ☐ Other Federal Agency _____		
Author name: Robert Greenwald		
Author title: Hydrogeologist	**Author affiliation: Tetra Tech GEO**	
Review period: 01/01/2011 to 06/29/2011		
Date(s) of site inspection: 03/15/2011		
Type of review: ☑ Statutory ☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion		
Review number: ☐ 1 (first) ☐ 2 (second) ☑ 3 (third) ☐ Other (specify) _____		
Triggering action: ☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU#____ ☐ Construction Completion ☑ Previous Five-Year Review Report ☐ Other (specify)		
Triggering action date *(from WasteLAN)*: 06/29/2006		
Due date *(five years after triggering action date)*: 06/29/2011		

* ["OU" refers to operable unit.]

Five-Year Review Summary Form, cont'd.

Issues:

- The Controlled Ground Water Area (CGA) implemented in October 2009 does not explicitly address large increases in groundwater extraction from existing infrastructure, such as is used for dewatering at the Butte-Silver Bow wastewater treatment plant (WWTP) to allow for construction at that facility. Such extraction negatively impacts the MPTP capture zone.
- There are potential remaining sources of PCP contamination in the subsurface beneath power poles north of the Near Creek Recovery Trench (NCRT).
- PCP is currently observed in groundwater north of Silver Bow Creek and north of the HCC, likely due in large part to dewatering at the WWTP. The point of compliance for groundwater needs to be clarified to ensure that cleanup levels are met in accordance with the ROD.
- Although current zoning precludes residential uses of the Site, permanent and enforceable Institutional Controls for soil have not yet been established to prevent residential use of the property.
- The hardness-adjusted DEQ-7 Aquatic Life Standard for the chronic standard for cadmium (0.8 ug/l) is below the ROD criterion (1.1 ug/l).

Recommendations and Follow up Actions:

- Modify the existing Controlled Ground Water Area established in October 2009 to address significant increases in groundwater withdrawals from existing infrastructure that are planned in the vicinity of MPTP.
- Remove PCP-contaminated soil beneath power poles.
- Clarify the points of compliance for groundwater to reflect the current configuration of Silver Bow Creek, the current PCP plume distribution, and the updated conceptual site model.
- Develop and implement permanent and enforceable Institutional Controls to prevent future on-site residential use and restrict land use where waste has been left in place above levels that allow for unlimited use/unrestricted exposure.
- Through the appropriate decision document, adopt the August 2010 DEQ-7 chronic value for cadmium as a cleanup standard. The revised chronic standard does not require a change to the selected remedy because it meets the modified chronic value for cadmium, as well as the standard identified in the ROD.

Five-Year Review Summary Form, cont'd.

Protectiveness Statement(s):

The remedy at OU 1 currently protects human health and the environment because exposure pathways that could result in unacceptable risk are being controlled by soil containment, hydraulic capture of impacted groundwater, access controls, and a Controlled Ground Water Area (an institutional control). However, for the remedy to be protective in the long-term, the following actions need to be taken to ensure long-term protectiveness:

- Document that the Controlled Ground Water Area has been improved to address large withdrawals of water from existing infrastructure in the vicinity of the Site.
- Characterize and remove potential sources of PCP beneath power poles north of the NCRT.
- Update site information to account for the current PCP plume distribution and the reconstruction of Silver Bow Creek that occurred after the ROD was completed.
- Implement permanent and enforceable Institutional Controls to prevent future on-site residential use.
- Treated soils are expected to contain dioxins above the current ROD cleanup levels, and appropriate management of these soils will be evaluated and the administrative record/ROD will be updated once EPA has finalized the revised interim preliminary remediation goals (PRGs) for dioxin and dioxin-like compounds. Appropriate cleanup standards for dioxin and dioxin-like compounds in groundwater will be re-evaluated at that time as well.

Montana Pole and Treating Plant Site

Third Five-Year Review Report

I. Introduction

This documents the third Five-Year Review of the remedial actions implemented at the Montana Pole and Treating Plant (MPTP) site in Butte, Montana. The purpose of this Five-Year Review is to determine whether the remedy at the Site is protective of human health and the environment, and to identify any issues which keep the remedy from being protective in the long term. The methods, findings, and conclusions of this review are documented in this Five-Year Review report. In addition, this Five-Year Review report identifies remedy issues, if any, and recommends means to address them.

This review is required by CERCLA §121 and the National Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) part 300. Section 121 of CERCLA states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

EPA interpreted this requirement further in the National Contingency Plan (NCP); 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The Five-Year Review report was prepared by Tetra Tech under contract to the Montana Department of Environmental Quality (DEQ). The DEQ is the lead agency for implementation and operation and maintenance of the remedial action at the Site. This Five-Year Review is a cooperative effort of both DEQ and EPA Region 8. The site visit for the Five-Year Review was conducted on March 15, 2011.

This review is required by statute because hazardous substances, pollutants, or contaminants are or will be left on-Site above levels that allow for unlimited use and unrestricted exposure. The triggering action for this third Five-Year Review is the date of the previous (second) Five-Year Review (June 29, 2006).

II. Site Chronology

Table 1: Chronology of Site Events

Date	Event
1983	Initial discovery of the problem
07/1985	Preliminary Assessment/Site Inspection
07/22/1987	NPL listing
04/1990	Administrative Order on Consent
1985 and 1992	Removal actions
02/1993	RI/FS complete
09/22/1993	ROD signature
06/1996	Phase 1 Remedial Design complete
07/16/1996	Initial Consent Decree entered by U.S. District Court
05/1996 - 11/1997	Phase 1 Remedial Action*
12/1998	Phase 2 Remedial Design complete
03/1999 - 05/1999	Phase 2 Remedial Action
07/1999	Phase 3 Remedial Design complete
10/1999 - 12/2000	Phase 3 Remedial Action
04/2001 - current	Phase 4 Remedial Action (ongoing)
06/29/2001	First Five-Year Review
09/2001	Construction Completion date
06/29/2006	Second Five-Year Review
2/2007	Near Creek Trench Field Investigation Report
3/2009	Phase 5 Treatability Study
11/2010	Information Summary, Conceptual Model, And Groundwater Modeling Report: Butte Metro Sewer Treatment Plant Dewatering

**Included construction of current groundwater extraction system, which continues to operate*

III. Background

Site Name, Location, and Description

The Montana Pole and Treating Plant (MPTP) site is located at 220 West Greenwood Avenue, on the western edge of Butte, Montana, in portions of the southeast quarter of Section 23 and the southwest quarter of Section 24, T3N, R8W. MPTP is a former wood treating facility located in the Silver Bow Creek Basin, in the western portion of Butte, Montana. Groundwater at the MPTP site was contaminated by the former wood treating operations, and pentachlorophenol (PCP) is the primary contaminant of concern in groundwater. This site is adjacent to the Silver Bow Creek/Butte Area Superfund Site, and the contaminants of concern are distinct between the two sites (i.e., organics including PCP at the MPTP site versus arsenic and metals and associated with

the adjacent Superfund site). A Five-Year Review is taking place at the adjacent Silver Bow Creek/Butte Area Superfund Site concurrent with this review.

Figure 1 illustrates the following key features in the vicinity of MPTP, including some features associated with remedial activities for other sites:

- *Active Remedy Components at MPTP* – Features highlighted on Figure 1 associated with the remedy at MPTP include the following:

    - *Near Creek Recovery Trench (NCRT)* – Collects contaminated groundwater just south of Silver Bow Creek for treatment at the MPTP water treatment plant.

    - *Near Highway Recovery Trench (NHRT)* – Collects impacted groundwater just north of Interstate-90 (I-90) for treatment at the MPTP water treatment plant.

    - *MPTP Water Treatment Plant* – Location where extracted water from the MPTP is treated. The treated water is primarily discharged to Silver Bow Creek, though several other discharge options are available (discussed later).

    - *Land Treatment Unit (LTU) and Retention Pond* – Located in the southeastern corner of the MPTP site, excavated soils from the MPTP site have been treated at the LTU using biological treatment. Water is re-circulated between the retention pond and the LTU. The retention pond and LTU are not in contact with the groundwater flow system.

- *Silver Bow Creek* – Located north of MPTP, the portion of the creek adjacent to MPTP was reconstructed in the late 1990s as part of the Lower Area One (LAO) removal action. LAO is part of the Butte Priority Soils Operable Unit (BPSOU), which is a portion of the larger Silver Bow Creek/Butte Area Superfund Site, which stretches for approximately 26 miles downstream of Butte, Montana.

- *Old Silver Bow Creek* – The location of "Old Silver Bow Creek" (before the LAO construction) is illustrated with dashed lines on Figure 1. Just north of the MPTP fence line, a remnant portion of "Old Silver Bow Creek" exists as a trench. Further to the west, Old Silver Bow Creek makes up a portion of the Hydraulic Control Channel (illustrated on Figure 2a).

Interstate 15/90 runs across the Site in an east-west direction and partitions the Site into a northern and a southern section. Other features noted on Figure 1 that are not part of the MPTP site include the Hydraulic Control Channel (HCC), Butte-Silver Bow Wastewater Treatment Plant (WWTP), Metals Treatment Lagoons, and Butte Reduction Works (BRW) Ponds. These features are associated with management/treatment of metals in surface water and groundwater that are due to regional mining activities (i.e., different contaminants than those caused by the MPTP site), as part of the BPSOU remedial action.

Figure 2a and Figure 2b illustrate monitoring locations in the vicinity of MPTP (some of which are associated with other sites). These figures are at the same scale, but Figure 2a extends farther west and Figure 2b extends farther south. These figures illustrate groundwater monitoring wells and surface water monitoring locations. As noted on the figures, different well names are used for the same well in different portions of Site data, and the well names on these figures in some cases reflect the "alias" well names for the wells included in Attachment 5 (which presents a listing of wells with coordinates and elevations).

Current zoning in the vicinity of the MPTP site is illustrated on Figure 3 (based on information provided at http://www.bsb.mt.gov/docs/maps/zoning.pdf). The northern portion of the MPTP site (i.e., north of I-90) is currently zoned M1 (Light Industrial). The southern portion of the MPTP site (i.e., south of I-90) is currently zoned M2 (Heavy Industrial). The current zoning therefore precludes residential construction on the MPTP site. As illustrated on Figure 3, zoning in the immediate vicinity of the Site includes a variety of residential and commercial uses.

At the time the ROD was issued, the current land use was described as follows: "The Site is located in a mixed land use area. Much of the land in the vicinity of the Site has been used industrially, usually associated with past and present mining activities, though commercial and residential areas are immediately adjacent to the Site. Two neighborhoods are within a quarter mile of the site. There is one residence, an auto body shop and an architect's office located on-Site. Groundwater use in the area is limited. In the residential area east of the site, there is one well which is currently being used for domestic purposes. The Mount Moriah cemetery south and upgradient of the site uses groundwater for lawn watering." Currently, most land use in the area of the site remains essentially unchanged from the time the ROD was issued. The residence, auto body shop, and architect's office that were on-site are no longer operational so residential use no longer exists. The well in the residential area east of the site is no longer used for domestic purposes.

The future land use at the Site was described as follows in the ROD: "cleanup levels and the selection of the remedy are based upon an assumption of adequate institutional controls to prevent any residential use at the site. Soil cleanup levels have been developed to protect recreational and industrial land users at the Site from excessive health risks. If, for any reason, appropriate land restrictions are not actually implemented, cleanup goals will be adjusted accordingly."

Brief History of Facility Operations

The 1993 Record of Decision (ROD) indicates that MPTP operated as a wood treating facility from 1946 to 1984. During most of this period, a solution of about five percent pentachlorophenol (PCP) mixed with petroleum carrier oil similar to diesel was used to preserve poles, posts and bridge timbers. The PCP solution was applied to wood products in butt vats and pressure cylinders (retorts). Creosote was used as a wood preservative for a brief period in 1969.

The plant initially included a pole peeling machine, two butt treating vats, and related ancillary facilities. In April 1947, the first load of treated timbers was shipped off-site. Major modifications to the plant occurred between 1949 and 1951, and again around 1956. Sometime between 1949 and 1951, a 73-footlong, 6-foot-diameter retort was installed to increase timber treatment production efficiency. A second retort, which was 66 feet long and 7 feet in diameter, was installed around 1956. The retorts were used both to dry green timber using the Boulton process, and to pressure treat timber with a petroleum/pentachlorophenol (PCP or penta) mixture. Drying timber by the Boulton process generated steam, which was condensed. The condensate was discharged to two hot wells where the condensate partially separated into an oil and water phase. The water phase from the hot wells was reportedly discharged into an on-site unlined drainage ditch that flowed northward toward Silver Bow Creek. Onsite sedimentation ponds were also apparently used for waste disposal purposes.

The retorts and butt treatment vats were in continuous operation until May 1969. On May 5, 1969, an explosion occurred while a charge of poles was being treated in the east butt treating vat. The explosion generated a fire that destroyed the east vat, boiler room, and retort building. Although the boiler, retorts, and auxiliary equipment were damaged, the plant was rebuilt and functional by December 1969. The west butt treatment vat was not destroyed by the fire and was thereafter used for timber treatment and mixing the petroleum/PCP product used in the retorts. Petroleum/PCP product reportedly spilled from the east butt treating vat as a result of the explosion and fire. Additional seepage of product occurred from both retorts as a result of broken pipes and valves damaged by the fire. Reportedly, on-site tanks were not ruptured as a result of the fire.
A small on-site sawmill was constructed in the fall of 1978 and was fully operational by the fall of 1979. Additionally, in response to implementation of the Resource Conservation and Recovery Act (RCRA), a closed-loop process water system was constructed in 1980. The primary function of this system was to eliminate overland discharges of Boultonizing water (generated from the drying of green timber). The closed-loop water recovery system operated by collecting wastewater in storage tanks, recirculating this water through the condensing system, and evaporating excess water using aeration sprays. On May 17, 1984, the plant ceased operations.

Hydrogeologic Setting

Most site reports refer to the following stratigraphic units, from bottom to top:

- Bedrock
- Weathered Bedrock
- Alluvium

The MPTP site is located in a valley that dropped (via faulting), and the valley is filled with sediment (alluvium) derived from erosion of the surrounding hills. There is often material of lower hydraulic conductivity consisting of silty clay or peat within the alluvium which separates the upper and lower alluvium and restricts vertical flow to some degree. The bedrock is usually described as “granite” or “quartz monzonite.” The weathered bedrock and lower portion of the alluvium are sometimes hard to differentiate.

A cross-section from the MPTP RI Report is presented on Figure 4. That cross-section is for an east-west section line located in the vicinity of Silver Bow Creek. The unconsolidated alluvium is highly variable and consists of discontinuous layers and lenses of sandy clay, clayey silty sand, sand, and gravel. The shallow subsurface has been highly disturbed in the area on and around MPTP by mining operations, excavation associated with the LAO remedy, and excavation associated with the MPTP remedy. A peat layer is located in the vicinity of Old Silver Bow Creek noted on the RI cross-section presented in Figure 4, as well as on some well logs for recently drilled wells (such as at well 10-01 from 8 to 11.5 feet bgs, at well 10-08 from 9 to 16 feet bgs, and at well 10-13 from 7 to 10 feet bgs). Groundwater is present at the Site under mostly semi-confined conditions, with depth to water approximately 20 feet below grade near Greenwood Avenue, approximately 8 feet below grade beneath I-90, and approximately 2 to 4 feet below grade near Silver Bow Creek.

Regionally, groundwater flows from the hills (primarily bedrock) into the valley (alluvium and bedrock), with groundwater flow in the valley from east to west (in the flow direction of Silver Bow Creek). Before reconstruction of Silver Bow Creek, groundwater discharged to Old Silver Bow Creek from both sides. South of Silver Bow Creek, the flow was generally to the northwest, and north of Old Silver Bow Creek, flow was generally to the southwest. Reconstruction of Silver Bow Creek and implementation of the HCC, most of which occurred after the installation of the MPTP groundwater collection system, changed the flow system. The reconstructed portion of Silver Bow Creek is designed to be above groundwater, and the HCC is designed to intercept groundwater. Therefore, it is expected that groundwater will flow to the northwest toward the HCC from south of the HCC, and that groundwater will flow to the southwest toward the HCC from north of the HCC. Groundwater that does not discharge to the HCC would generally be expected to converge on an east-west axis and flow beneath the HCC or Silver Bow Creek to the west.

Flow patterns at the MPTP site are influenced by extraction at the NCRT and NHRT (locations of these features are illustrated on Figure 1). Groundwater modeling described in the report titled "Information Summary, Conceptual Model, and Groundwater Modeling Report: Butte Metro Sewer Treatment Plant Dewatering" (Tetra Tech, November 2010) indicated that dewatering at the WWTP, associated with construction activities at the WWTP, negatively impacts the capture zone of the NCRT.

Site Contaminants

The 1993 ROD addresses Operable Unit 1 (OU-1), which is the only operable unit for the Site and includes all known sources and contaminated media at the Site. The primary COC at the Site is PCP associated with wood treating operations at the former plant. Other COCs with cleanup standards established in the ROD for soil or groundwater include chlorinated phenols, PAHs, and dioxins/furans. Standards for water discharged from the MPTP treatment plant to surface water also include criteria for six metals due to proximity to the adjacent Silver Bow Creek/Butte Area Superfund Site which primarily addresses metals. However, metals are not considered to be

COCs for the soil or groundwater at the MPTP site. Specific cleanup standards are addressed later in this document (Section IV, Tables 2 to 5).

Enforcement History

In March 1983, a citizen filed a complaint concerning oil seeping into Silver Bow Creek near the Montana Pole facility. The Montana Department of Health and Environmental Services (MDHES), which is now the Department of Environmental Quality (DEQ), investigated the complaint and discovered an oil seep on the south side of Silver Bow Creek directly downgradient from the Montana Pole facility. Further investigation of the Site revealed oil-saturated soils adjacent to the creek and on Montana Pole property. Subsequent sampling confirmed the presence of PCP, polycyclic aromatic hydrocarbons (PAHs), and dioxins/furans in Site soils and oil samples. MDHES and EPA completed a preliminary assessment and site inspection (PA/SI) followed by a Hazard Ranking Score in July 1985. The Montana Pole facility was included on the National Priorities List for Superfund sites on July 22, 1987 (Fed. Reg. Vol. 52, 140 Pg. 17623).

In July 1985, the EPA Emergency Response Branch began conducting a removal action on the Site to minimize impacts to Silver Bow Creek and to stabilize the Site. EPA excavated approximately 6,000 cubic yards of highly contaminated soils, bagged them and placed them in storage buildings (pole barns) constructed on-Site. Tanks, retorts, pipes and other hardware were dismantled and stored on-Site in a former sawmill building. Two groundwater interception/oil recovery systems were installed to alleviate oil seepage into the creek. Contaminated areas of the Site and features of the groundwater recovery system were fenced to restrict public access.

In October 1989, EPA granted MDHES the initial enforcement funding to conduct potentially responsible party (PRP) noticing and administrative order negotiations and issuance. In April 1990, MDHES signed an administrative order on consent with Atlantic Richfield Company (ARCO) under which ARCO agreed to conduct a remedial investigation and feasibility study (RI/FS) at the Site. In June 1990, ARCO began the RI/FS following the MDHES and EPA-approved RI/FS work plan. The remedial investigation complied with federal Superfund law, defined the nature and extent of contamination and provided information to complete the baseline human health and ecological risk assessments. The feasibility study included the development, screening and evaluation of potential site remedies.

In June 1992, the USEPA proposed an additional removal action to control and recover the light nonaqueous phase liquid (LNAPL) (floating oils) identified during the RI. The action included the installation of an 890-foot sheet piling on the south side of Silver Bow Creek. The sheet piling was approximately 50 feet south of the creek. Ten recovery wells were installed on-Site. Eight of the wells were located south of Silver Bow Creek in a north/south line running perpendicular to the creek. Two wells were installed parallel to the creek; one on each end of the sheet piling. The wells were approximately 25 feet deep. Each well had two pumps: one to collect free-floating oil and pump it to an on-site storage tank and the other to pump contaminated groundwater to an on-site granular activated carbon treatment facility built by EPA. The water treatment facility went into operation January 22, 1993, at which time the system installed in 1985 was shut down.

In 1991, the United States filed suit against responsible parties in federal district court for a liability determination and recovery of response costs. The action was litigated for several years. Court ordered settlement negotiations resulted in a "cash out" consent decree for the Montana Pole Site, which was entered on July 16, 1996. EPA recovered some of its past costs and made provisions for the recovery of other costs. Also, the responsible parties provided approximately $35 million for EPA and DEQ to conduct the site cleanup. Under the EPA/DEQ Site-Specific Superfund Memorandum of Agreement, DEQ, with assistance from EPA, is conducting the cleanup at the Site with funds from the MPTP Settlement Fund.

IV. Remedial Actions

Remedy Selection and Remedial Action Objectives

The general remedial action objectives in the ROD are summarized below.

- Soils and Sediments. "The remedial goal is treatment so that the contaminant concentration levels pose no unacceptable risk to human health or the environment. Since no federal or state chemical specific Applicable or Relevant and Appropriate Requirements exist for these media, cleanup levels were determined for contaminants of concern through a site specific risk assessment " (ROD page 43).

- Groundwater. "Remediation goals provide maximum source reduction and protect Silver Bow Creek and uncontaminated groundwater by minimizing migration of contaminants with the groundwater. Cleanup levels for groundwater are MCLs and non-zero MCLGs established by the Safe Drinking Water Act or risk-based levels developed in the absence of MCLs or MCLGs. Attainment of these cleanup levels at groundwater points of compliance will be protective of human health and the environment and will ensure that uncontaminated aquifers and adjacent surface waters are protected for potential beneficial uses." (ROD page 44). "A sampling program for monitoring the remedial action and determining compliance with performance standards shall be implemented during remedial action." (ROD page 45)

- Engineering and Institutional Controls. Based on text on pages 46 to 47 of the ROD, objectives included the following: 1) prevent unauthorized access to contaminated media or to remedial action areas; 2) include adequate zoning restrictions, conservation easements, and other controls to prevent any future residential use of the Site; and 3) prevent any water well drilling in the contaminated groundwater plume and adjacent areas to prevent additional receptors of contaminated groundwater or an expansion of the plume.

Specific performance standards stated in the ROD for soil and sediments were as follows (from ROD pages 43 and 44):

The specific performance standards which will be used to ensure attainment of the remediation levels for these contaminated media [soils and sediments] are:

- *Excavation of accessible soils and associated LNAPLs with contamination levels in excess of the cleanup levels specified in [ROD] Table 23. Depth of excavation, particularly at and below the groundwater table, will be based on field judgment and technical practicability, as determined by the lead agency in consultation with the support agency. LNAPLs at the groundwater table will be recovered to the maximum extent practicable as determined by the agencies.*

- *Soils below the depth of excavation with contaminant levels above cleanup levels specified in [ROD] Table 23 will be bioremediated in place. Biotreatment may include nutrient addition via irrigation, and tilling on routine intervals. After it has been determined by the lead agency, in consultation with the support agency, that in-place bioremediation of these soils is no longer effective or practicable and contaminant levels have plateaued, or it is determined by the agencies that these areas would be effectively addressed by the in-situ bioremediation implemented under the groundwater actions, these areas will be backfilled. Residual contamination will be further treated by in-situ bioremediation as outlined under Performance Standards for Groundwater.*

- *Treatment of excavated and previously excavated soils to achieve cleanup levels specified in [ROD] Table 23. Soils excavated from near Silver Bow Creek which contain tailings materials with elevated metals concentrations will be biologically treated and disposed in an appropriate Butte mine waste repository. All contaminated soils north of the active railroad bed are considered tailings material.*

- *Backfill of treated soils into excavated areas if possible, filling of remaining excavations with clean fill, replacement of all clean soils, surface grading and revegetation or covering with suitable material compatible with existing or future land uses.*

- *Remediation of inaccessible contaminated soils (consisting primarily of those soils underlying Interstate 1-15/90 and any soils under the EPA water treatment plant) by a two phased approach. First, enhanced LNAPL recovery via extraction wells and recovery trenches using hydraulic gradients and soil flushing to remove hazardous substances from these inaccessible soils. Adjustment of pH, use of surfactants and other methods should be considered to maximize recovery of hazardous substances. After it has been determined by the lead agency, in consultation with the support agency, that recovery of hazardous substances from these areas by these methods is no longer effective or practical and contaminant levels have plateaued, these areas will be addressed by in-situ bioremediation as outlined under Performance Standards for Groundwater.*

- *Implementation of engineering and institutional controls during the remedial action to prevent access to contamination and to limit the spread of contamination.*

- *Attainment of all ARARs identified in [ROD] Appendix A for the remediation of soils.*

Compliance with cleanup levels described in Table 23 of the ROD must be met for all excavated soils. As stated above, other performance standards must be achieved for contaminated soils below the depth of excavation or for soils not accessible to excavation (under the EPA water treatment plant and under Interstate I-15/90).

Specific performance standards stated in the ROD for groundwater and discharge of treated water were as follows (from ROD pages 44 and 45):

- *Containment of contaminated groundwater and LNAPL using hydraulic and/or physical barriers (as determined during remedial design) to effectively prevent the spread of contaminated groundwater and LNAPL and limit releases of contamination into Silver Bow Creek. Releases into Silver Bow Creek must be reduced in order to achieve cleanup levels identified in [ROD] Table 26 for Silver Bow Creek. Migration of contaminated groundwater must be limited in order to maintain groundwater cleanup levels ([ROD]Table 25) at groundwater points of compliance;*

- *Treatment of extracted groundwater to cleanup levels in [ROD] Table 27 prior to discharge to Silver Bow Creek. Control and treatment, if necessary, of any contaminated runoff prior to discharge to Silver Bow Creek to meet the same cleanup levels;*

- *Treatment of the contaminated groundwater aquifer and contaminated soils not recovered by excavation by enhanced in-situ bioremediation. In-situ treatment may include the reinjection of treated groundwater and the addition of oxygen and nutrients to promote the biodegradation of contaminants, in-situ treatment of the site groundwater will continue until contaminant levels have plateaued and it is no longer effective or practical to continue treatment, as determined by the lead agency in conjunction with the support agency;*

- *Attainment of all ARARs identified in [ROD] Appendix A for groundwater remediation;*

- *Monitoring of groundwater wells within or proximate to the contaminated groundwater plume for contaminants of concern for groundwater; and*

- *Implementation of institutional controls to prevent access to or impacts upon contaminated groundwater at the site.*

The ROD identifies Silver Bow Creek as a point of compliance for groundwater. Page 42 of the ROD states the following:

> "Along Silver Bow Creek, this [point of compliance] boundary is to be the south bank of the creek. Using this boundary as the point of compliance for attainment of the groundwater

remediation levels is protective of any offsite groundwater uses and protective of the water quality goals for the stream."

However, if appropriate controls are not implemented, the ROD directs that the point of compliance should be viewed as throughout the plume. Silver Bow Creek was subsequently reconstructed as part of the adjacent Silver Bow Creek/Butte Area Superfund Site remediation subsequent to the ROD, and the reconstructed Silver Bow Creek in the vicinity of the MPTP site was designed to be at a high enough elevation to not receive groundwater discharge. Thus, it is appropriate to clarify the groundwater point of compliance established in the ROD. With respect to compliance points for surface water, Page 43 of the ROD states the following: "Surface water cleanup levels must be achieved at all points within Silver Bow Creek."[1]

ROD Cleanup Levels

Cleanup levels that were defined in the 1993 ROD are presented in the following tables:

- Table 2a: Soil Cleanup Levels and Corresponding Risks (ROD Table 23)
- Table 2b: Pathway Risk Estimates Corresponding to Soil Cleanup Levels (ROD Table 24)
- Table 3: Groundwater Cleanup Levels and Corresponding Risks (ROD Table 25)
- Table 4: Surface Water Cleanup Levels and Corresponding Risks (ROD Table 26)
- Table 5: Discharge to Surface Water Cleanup Levels and Corresponding Risks (ROD Table 27)

"B2 PAHs" refer to PAHs that are probable carcinogens, and "Total D PAHs" refer to PAHs that are not classifiable with respect to cancer impacts.

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[1] Prior to the relocation of Silver Bow Creek, the compliance sampling locations were SW-01 (upstream of the MPTP site), SW-02 (immediately downstream of the MPTP site), and SW-03 (further downstream at USGS gauging station SS07). Locations SW-01 and SW-02 were eliminated when Silver Bow Creek was reconstructed. Current surface water monitoring compliance points (in effect during this entire five-year review period) are SW-09 (upstream of the MPTP site), SW-05 (immediately downstream of the MPTP site), and SW-03 (further downstream at USGS gauging station SS07), and these locations are illustrated on Figure 2a.

Table 2a: ROD Table 23 – Soil Cleanup Levels and Corresponding Risks

Media	Contaminant	Cleanup Level (µg/kg)	Basis	Cancer Risk (recreational use for soil)	Noncancer Health Hazard Quotient
Soils	Pentachlorophenol[a]	34,000	risk	1.0×10^{-6}	<1
	B2 PAHs (TEF)[bc]	4,200	risk	1.0×10^{-6}	<1
	Dioxin TCDD (TEF)[bd]	0.20	risk	1.0×10^{-6}	<1

a Levels correspond to an excess cancer risk of 1 x 10-6 and are based on data for the dermal exposure pathway as presented in the Baseline Risk Assessment Report (CDM, 1993).

b Levels correspond to an excess cancer risk of 1 x 10-6 and are based on data for the soil ingestion exposure pathway as presented in the Baseline Risk Assessment Report (CDM, 1993).

c Sum of individual B2 PAH (benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) concentrations multiplied by their corresponding toxicity equivalence factor (TEFs) as shown on Table 28 of the ROD.

d Sum of individual chlorinated dibenzo-p-dioxins and -dibenzofurans concentrations multiplied by their corresponding toxicity equivalence factor (TEF) as shown on Table 29 of the ROD.

Table 2b: ROD Table 24 – Pathway Risk Estimates Corresponding to Soil Cleanup Levels

Recreational Soil Pathway Cancer Risks:

		Risk		
Chemical	Cleanup Level (ug/kg)	Ingestion	Dermal	Total COC
Pentachlorophenol	34,000	1.33E-07	1.00E-06	1.14E-06
Dioxins/Furans (TEFs)	0.2	9.83E-07	7.36E-07	1.72E-06
B2 PAH (TEFs)	4,200	1.00E-06		1.00E-06
Total Pathway		2.12E-06	1.74E-06	
			Total:	3.86E-06

Industrial Soil Pathway Cancer Risks:

		Risk		
Chemical	Cleanup Level (ug/kg)	Ingestion	Dermal	Total COC
Pentachlorophenol	34,000	8.56E-07	3.58E-06	4.44E-06
Dioxins/Furans (TEFs)	0.2	6.29E-06	2.84E-06	9.13E-06
B2 PAH (TEFs)	4,200	6.42E-06		6.42E-06
Total Pathway		2.12E-06	6.42E-06	
			Total:	2.00E-05

Table 3: ROD Table 25 – Groundwater Cleanup Levels and Corresponding Risks

Media	Contaminant	Cleanup Level (µg/l)	Basis	Cancer Risk (drinking use for ground water)	Noncancer Health Hazard Quotient
Groundwater	Pentachlorophenol	1.0	MCL	1.7×10^{-6}	NA
	Benzo(a)pyrene	0.2	MCL	2.1×10^{-5}	NA
	Benzo(a)anthracene	1.0	risk	1.0×10^{-6}	NA
	Benzo(b)fluoranthene	0.2	risk	2.1×10^{-5}	NA
	Benzo(k)fluoranthene	1.0	risk	1.0×10^{-6}	NA
	Chrysene	1.0	risk	1.0×10^{-6}	NA
	Dibenzo(a,h)anthracene	0.2	risk	2.1×10^{-5}	NA
	lndeno(1,2,3-CD)pyrene	1.0	risk	1.0×10^{-6}	NA
	Benzo(g,h,i)perylene	1.0	risk	1.0×10^{-6}	NA
	Total D PAHs[a]	360	hazard quotient	NA	0.9
	Dioxin TCDD (TEF)[b]	3.0×10^{-5}	MCL	6.2×10^{-5}	<1
	2,4,6-trichlorophenol	6.5	risk	1.0×10^{-6}	NA
	2-chlorophenol	45	hazard quotient	NA	0.9
	2,4-dichlorophenol	27	hazard quotient	NA	0.9
	2,3,5,6-tetrachlorophenol	267	hazard quotient	NA	0.9

a Sum of individual D PAH (acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene) concentrations.

b Sum of individual chlorinated dibenzo-p-dioxins and -dibenzofurans concentrations multiplied by their corresponding toxicity equivalence factor (TEF) as shown on Table 29 of the ROD.

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Table 4: ROD Table 26 – Surface Water Cleanup Levels and Corresponding Risks

Media	Contaminant	Cleanup Level (µg/l)	Basis	Cancer Risk (drinking use for surface water)	Noncancer Health Hazard Quotient
Surface Water	Pentachlorophenol	1.0	MCL	1.7×10^{-6}	<1
	Benzo(a)pyrene	0.2	MCL	2.1×10^{-5}	NA
	Benzo(a)anthracene	1.0	risk	1.0×10^{-6}	NA
	Benzo(b)fluoranthene	0.2	risk	2.1×10^{-5}	NA
	Benzo(k)fluoranthene	1.0	risk	1.0×10^{-6}	NA
	Chrysene	1.0	risk	1.0×10^{-6}	NA
	Dibenzo(a,h)anthracene	0.2	risk	2.1×10^{-5}	NA
	lndeno(1,2,3-CD)pyrene	1.0	Risk	1.0×10^{-6}	NA
	Benzo(g,h,i)perylene	1.0	Risk	1.0×10^{-6}	NA
	Total D PAHs[a]	360	hazard quotient	NA	0.9
	Dioxin TCDD (TEF)[b]	1.0×10^{-5}	aquatic criteria	2.0×10^{-5}	<1
	2,4,6-trichlorophenol	6.5	Risk	1.0×10^{-6}	NA
	2-chlorophenol	45	hazard quotient	NA	0.9
	2,4-dichlorophenol	27	hazard quotient	NA	0.9
	2,3,5,6-tetrachlorophenol	267	hazard quotient	NA	0.9

a Sum of individual D PAH (acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene) concentrations.

b Sum of individual chlorinated dibenzo-p-dioxins and -dibenzofurans concentrations multiplied by their corresponding toxicity equivalence factor (TEF) as shown on Table 29 of the ROD.

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Table 5: ROD Table 27 – Discharge to Surface Water Cleanup Levels and Corresponding Risks

Media	Contaminant	Cleanup Level (µg/l)	Basis	Cancer Risk (drinking use for surface water)	Noncancer Health Hazard Quotient
Discharge to Surface Water	Pentachlorophenol	1.0	MCL	1.7×10^{-6}	<1
	Benzo(a)pyrene	0.2	MCL	2.1×10^{-5}	NA
	Benzo(a)anthracene[c]	1.0	Risk	1.0×10^{-6}	NA
	Benzo(b)fluoranthene	0.2	Risk	2.1×10^{-5}	NA
	Benzo(k)fluoranthene	1.0	Risk	1.0×10^{-6}	NA
	Chrysene	1.0	Risk	1.0×10^{-6}	NA
	Dibenzo(a,h)anthracene	0.2	Risk	2.1×10^{-5}	NA
	lndeno(1,2,3-CD)pyrene	1.0	Risk	1.0×10^{-6}	NA
	Benzo(g,h,i)perylene	1.0	Risk	1.0×10^{-6}	NA
	Total D PAHs[a]	360	hazard quotient	NA	0.9
	Dioxin TCDD (TEF)[b]	1.0×10^{-5}	aquatic criteria	2.0×10^{-5}	<1
	2,4,6-trichlorophenol	6.5	Risk	1.0×10^{-6}	NA
	2-chlorophenol	45	hazard quotient	NA	0.9
	2,4-dichlorophenol	27	hazard quotient	NA	0.9
	2,3,5,6-tetrachlorophenol	267	hazard quotient	NA	0.9
	Arsenic	48	aquatic criteria	NA	NA
	Cadmium	1.1	aquatic criteria	NA	NA
	Chromium	11	aquatic criteria	NA	NA
	Copper	12	aquatic criteria	NA	NA
	Lead	3.2	aquatic criteria	NA	NA
	Zinc	110	aquatic criteria	NA	NA

a Sum of individual D PAH (acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene) concentrations.

b Sum of individual chlorinated dibenzo-p-dioxins and -dibenzofurans concentrations multiplied by their corresponding toxicity equivalence factor (TEF) as shown on Table 29 of the ROD.

c Cancer Risk for Benzo(a)anthracene listed in ROD as 1.0×10^{-7} but that is inconsistent with other tables and is assumed to be an error, the assumed value of 1.0×10^{-6} is presented here.

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MPTP Remedy Implementation Phases

The MPTP cleanup is being implemented in a number of phases. These phases are described below.

Phase 1

The design for Phase 1 of the Remedial Action was finalized in June 1996 (CDM, 1996). Construction occurred from May 1996 to November 1997. The primary remedy components completed during Phase 1 of the remedial action consisted of construction of the land treatment unit (LTU) and 13 soil staging and pretreatment piles, building an addition to the previous water treatment plant, construction of two groundwater recovery trenches that form the current remedy extraction system (the NCRT and the NHRT), and excavation of the north-side contaminated soils. The NCRT and NHRT were installed to replace the previous EPA groundwater recovery system (which included sheet piling, extraction wells, and associated piping). The previous EPA system was removed in cooperation with the activities associated with the LAO removal action for the Superfund site adjacent to MPTP. The MPTP Phase 1 construction activities are summarized in the *Phase 1 Construction Report* dated August 2001. The groundwater recovery system installed in Phase 1 continues to operate.

Phase 2

The design for Phase 2 of the Remedial Action was finalized in December 1998 (CDM, 1998). Construction occurred from March 1999 to May 1999. Phase 2 of the remedial action consisted of the removal and disposal of hazardous and non-hazardous waste debris remaining on-Site. Off-site disposal methods included incineration and/or placement in hazardous and non-hazardous waste landfills. Metal debris was pressure washed and recycled. Phase 2 remedial actions are summarized in the *Remedial Action Report, Montana Pole and Treatment Plant Site Phase 2 – Debris Removal* dated September 26, 2000.

Phase 3

The design for Phase 3 of the Remedial Action was finalized in July 1999 (CDM, 1999). Construction occurred from October 1999 to December 2000. Phase 3 of the remedial action consisted of the south-side contaminated soils excavation, off-loading Phase 1 treated soils from the LTU, placing an approximate 132,000 cubic yards of contaminated soil on the LTU, installing the north and south *in situ* treatment systems, and the relocating sewer and potable water lines.

The *in situ* treatment system was operated through November 2002, when a pump required extensive repair. While the pump was out for repairs, analytical data from samples subsequently collected from Silver Bow Creek, a ROD-defined point of compliance, showed significant decrease in PCP concentrations. Since that time, the PCP concentrations in surface water samples from Silver Bow Creek have remained below the ROD cleanup standard. For this reason, the *in situ* system has not been operated continuously since that time.

Phase 4

Phase 4 of this project is a continuation of Phase 3 activities, and entails off-loading the LTU as surface soil lifts are remediated to below the action limits set for the Site. These treated soils are placed on-site. Phase 4 Remedial Action construction began in April 2001 with the offload of approximately 27,000 cubic yards of treated soils from the LTU.

In 2004, eight of the thirteen soil staging and pretreatment piles were determined to have met the cleanup standard for the Site and were dismantled. The treated soils were placed over the south-side in situ system. The covers, liners, piping, and associated equipment were removed from each of the eight soil staging and pretreatment piles, cleaned, and disposed in either a solid waste landfill or segregated and sized appropriately for shipment to a hazardous waste incinerator.

In 2005, approximately 29,000 cubic yards of treated soils were removed from the LTU, and in 2007 with the removal of 32,000 cubic yards of treated soil from the LTU. The soils were backfilled on-site. In 2007, the remaining soil staging and pretreatment piles were dismantled and 8,000 cubic yards of soil were moved from the piles and placed on the LTU for final treatment. To date, approximately 208,000 cubic yards of contaminated soils have been excavated and treated on the LTU; approximately 48,000 cubic yards of these contaminated soils remain on the LTU for treatment. Treated soils have been placed onsite, generally in the areas from which they were excavated.

Small volumes of soil from the NHRT east-end facility abandonment (July 2009), Butte Silver-Bow sanitary sewer re-location (October 2009), and Interstate Bridge pillar drilling were added to the Land Treatment Unit in 2009 and 2010.

Phase 5

Phase 5 will address the contaminated soils beneath Interstate 15/90 (I-90) that divides the Site. In 2001, a preliminary remedial alternatives report (CDM, 2001)was prepared to evaluate various potential remediation methods including surfactant flushing, soil vapor extraction, and hydraulic manipulation. The DEQ, the Montana Department of Transportation (MDT), and the EPA extensively evaluated the vertical and horizontal extent of remaining contaminated soils, and the technical and economic feasibility of excavating and remediating these remaining contaminated soils. Based on the results of these evaluations and preparation of preliminary construction schedules, DEQ concluded, and EPA concurred, that it is not economically or technically reasonable to pursue excavation of these soils during MDT's interstate bridge removal project. MDT's construction activities associated with the bridge replacement commenced in spring 2010 and will continue through 2011.

In March 2009, Tetra Tech submitted a report titled "Final Treatability Study Workplan, Montana Pole and Treating Plant Site – Phase 5" (Tetra Tech, 2009). In preparation for the Phase 5 Treatability Study Work Plan, Tetra Tech conducted a literature review of three in situ treatment technologies: in situ chemical oxidation, in situ soil flushing, and in situ bioremediation. Following the review, two technologies were retained for further evaluation:

- Modified Fenton's Reagent (calcium peroxide-based reagent) such as Cool-Ox® by Deep Earth Technologies

- In Situ Soil Flushing

The treatability study will be revisited beginning in 2012, after MDT's construction activities have been completed. As described on page 44 of the ROD: "After it has been determined by the lead agency, in consultation with the support agency, that recovery of hazardous substances from these areas is no longer effective or practical and contaminant levels have plateaued, these areas will be addressed by *in situ* bioremediation as outlined under Performance Standards for Groundwater."

Phase 6

Phase 6 will consist of removal and disposal of the soil treatment facilities on the south side of the Site, final re-vegetation of all disturbed areas, and implementation of appropriate institutional controls to maintain protectiveness of the remedy. It is possible that this will occur within the next five-year period. It is expected that the final land use at the Site will be determined in conjunction with Butte/Silver Bow, with certain constraints on land use specified by EPA and DEQ consistent with the MPTP ROD.

MPTP Remedy Operations/Modifications Since Previous Five-Year Review

With regard to the LTU, following the last soil offload in 2007 (discussed above) tilling of the LTU has been done annually, and regular irrigation of the LTU has been conducted per the Site-Wide Operating and Maintenance Manual (CDM, 2000). Fertilizer was added to the LTU in March of 2008 and nutrient levels have remained sufficient to the present time. Routine air monitoring around the LTU was conducted with no measurable COC's detected above applicable standards as identified in the ARARs in the ROD. As of October 2010, approximately 90% of remaining LTU soils met the treatment standard for PCP. As noted above, additional soil will likely be added to the LTU in 2011 due to excavation of soils beneath power poles north of the NCRT.

Other significant modifications to the active remedy implemented since the last Five-Year Review include the following:

- In 2008, a significantly improved control system and electrical power upgrades were implemented to the pumps for the NHRT and NCRT extraction trenches, new flow meters were installed in the NHRT and NCRT recovery trenches and the treatment plant with improved accuracy, and a new system control computer and software were installed. Also, new explosive environment detection monitoring and sump level sensors were installed in the water treatment plant.

- In 2008, there was a major removal of no longer needed control components associated with the soil staging and pretreatment piles, LTU, LNAPL recovery, and in situ systems to enhance system ease of operation and reliability.

- In 2008, fiber optic lines to the south-side systems (i.e., south of I-90) were removed to clear the way for planned Highway Bridge work. The location of the planned highway work is illustrated on Figure 3.

- In July 2009, the NHRT was modified to facilitate planned highway work. The modifications included excavation of approximately 150 feet of the NHRT trench between Manhole 1 and Manhole 2 (with the excavated soil spread on the LTU), piping modifications, abandonment of Manhole 1 as well as monitoring wells NHRT PZ-01 and NHRT MH#1, and removal or abandonment of cleanouts and bollards. Several other monitoring wells that were within the construction corridor were abandoned and will be replaced upon completion of the highway construction.

- In October 2009, a manhole and a portion of the BSB sewer line transecting the proposed highway construction area at MPTP were relocated by the BSB Public Works Department. BSB County removed a sewer manhole located between the interstate lanes and also removed approximately 300 feet of sewer line. The line was then realigned so that it would not hinder highway construction activities. Approximately 850 cubic yards of soils from the sewer line removal were placed on the LTU in late October 2009.

- In 2009, the east pumping station for the NCRT, which was not being used, was removed to simplify operation and improve reliability of treatment system.

- In 2010, a new treatment plant lift pump station with operation/safety controls was installed, and new improved piping was installed.

- In 2011, modifications to the MPTP treatment plant were made to allow for higher flow rates, to account for the potential for more pumping from the NCRT as a mitigation strategy that may be implemented during future dewatering at the WWTP.

An update to the O&M Manual to reflect changes to the system is underway. Also, a field investigation of the capture zone of the NCRT (location illustrated on Figure 1) began in fall of 2006, and these efforts were documented in the Near Creek Trench Field Investigation Report (CDM, February 2007). This investigation was designed to evaluate the capture zone of the NCRT, especially in the shallow zone where the highest PCP concentrations are observed. This required installing clustered piezometers adjacent to the NCRT on four transects. These new clustered piezometers were sampled for PCP to characterize the vertical and horizontal distribution of PCP adjacent to the NCRT under current operating conditions. The three-dimensional groundwater flow-field adjacent to the NCRT was found to indicate that flow was principally horizontal or downward adjacent to the trench. Hydraulic gradients near the trench are subtle, but examination of hydraulic gradients over greater distances suggested that a flow reversal toward the trench occurred along its entire length for the January 2007 flow conditions.

The three-dimensional distribution of PCP adjacent to the NCRT during the study confirmed that the shallow zone contained the highest PCP groundwater concentrations, followed by the intermediate zone.

Controlled Ground Water Area (CGA)

The protectiveness statement in the Second Five-Year Review stated that "A Controlled Ground Water Area and other institutional controls, as appropriate, will be developed and implemented to prevent installation of wells that could draw groundwater from or affect groundwater flow within the plume area." A Controlled Ground Water Area was established on October 31, 2009. A copy of the Final Order for the Controlled Ground Water Area is included as Attachment 6. The location of the CGA is illustrated on Figure 5. Key elements of the CGA pertaining to the MPTP contamination include the following (a subset of the items in the Final Order):

- The restrictions apply to both the alluvial and bedrock aquifers.

- New groundwater wells are only allowed in the restricted area after "review and approval of the Butte-Silver Bow Board of Health, acting as the Butte Silver Bow Water Quality District Office, the USEPA, and MDEQ". Superfund or other environmental monitoring/treatment wells necessary for environmental cleanup purposes are allowed.

- An existing well used for irrigation or industrial use may be replaced at the well owner's expense, but only if the replacement irrigation well complies with requirements of MCA Title 85, Chapter 2, Parts 3 and 4 as applicable. Also, the owner must supply data to the Butte Silver Bow Water Quality District indicating that the uses will not be detrimental to the environment or to human health.

The CGA does not explicitly address new or increased pumping rates at existing infrastructure, such as from the dewatering system at the WWTP.

Issues Associated with Dewatering at the WWTP

In November 2009, groundwater levels at the MPTP site were observed to be at historical lows. DEQ subsequently learned that significant dewatering was underway at the WWTP, located on the opposite (north) side of Silver Bow Creek, related to upgrades at the WWTP required by an Administrative Order on Consent (AOC) issued by DEQ Enforcement to bring the treatment system into compliance with nitrate discharge regulations. Two periods of significant dewatering (referred to as the "Phase 1 Dewatering") occurred as follows:

- Period 1 of the dewatering began on August 13, 2009, and ended on February 3, 2010 (generally between 200 and 300 gpm).

- Period 2 of the dewatering began on March 28, 2010, and ended on April 21, 2010 (generally between 250 and 300 gpm, though for the first five days the rate was slightly higher).

Upon learning of the dewatering activities taking place, DEQ initiated collection of additional water level and water quality data, both north and south of Silver Bow Creek. This included the drilling of 21 new monitoring wells (10-1 to 10-21). Water level data clearly indicated that dewatering at the WWTP caused a water level response on both sides of Silver Bow Creek (see Figure 6). The water quality data indicated that concentrations of PCP (the primary contaminant of concern at the MPTP) are above standards in groundwater samples collected north of Silver Bow Creek, including samples of the groundwater extracted by the WWTP dewatering pumps (see Figure 10). In addition, the period of WWTP dewatering (and associated lower water levels) corresponded with a period of significantly reduced PCP concentrations extracted from the NHRT component of the MPTP groundwater remedy (see Figure 8a).

Details regarding the WWTP dewatering, and resulting impacts at MPTP with respect to groundwater flow, contaminant transport, and remedy operations are discussed in a report titled "Information Summary, Conceptual Model, And Groundwater Modeling Report: Butte Metro Sewer Treatment Plant Dewatering" (Tetra Tech, November 2010) which included a summary of groundwater modeling performed as part of that effort. Important observations and conclusions from that report include the following:

- The WWTP dewatering negatively impacted the capture zone of the NCRT that is part of the MPTP remedy.

- Although groundwater discharges to the HCC under normal conditions (by design), the WWTP dewatering caused groundwater levels to be lowered below the bottom of the HCC. This created the potential for groundwater contaminated by PCP to flow beneath the HCC from south to north. PCP is currently detected north of Silver Bow Creek and north of the HCC (see Figure 10). No PCP results for wells north of Silver Bow Creek between the MPTP and the WWTP extraction pumps are available for the period before the dewatering began.

- During the WWTP dewatering, extracted water containing PCP at concentrations up to approximately17 ug/l was discharged to the HCC (see Figure 10). This discharge was subsequently diluted by the other water flowing in the HCC from other sources. At Silver Bow Creek surface water monitoring location SW-03, which is downstream of the location where water in the HCC ultimately discharges to Silver Bow Creek (after residence time in the metals treatment lagoons), the PCP concentrations did not increase during the dewatering and remained below the surface water criterion of 1 ug/l (based on five sampling events over the course of the dewatering). Thus, it appears the discharge of water with PCP to the HCC during dewatering had only limited impact on overall surface water quality.

- The conceptual modeling effort, coupled with the numerical simulations, suggested the potential for a continuing source of PCP beneath the power poles located north of the NCRT that can potentially be drawn north of Silver Bow Creek during periods of WWTP dewatering.

- The simulation model was used to evaluate measures for mitigating impacts to the capture zone of the MPTP remedy during future WWTP dewatering events, and results suggested that the simplest approach would be to increase extraction at the NCRT by approximately 100 gpm during periods of WWTP dewatering. This increase in extraction would be expected to counteract the WWTP dewatering activities to some degree, and thus minimize the spread of the PCP plume further north of Silver Bow Creek that could result from the WWTP dewatering.

DEQ plans to excavate remaining sources of PCP beneath the power poles in 2011, and the MPTP treatment plant has been upgraded to allow for treatment of additional water to be pumped from the NCRT during future WWTP dewatering (as a mitigation strategy). DEQ is working with BSB to minimize impacts from future dewatering.

Montana Department of Transportation's (MDT) Highway Construction

The Montana Department of Transportation's (MDT) decided in 2009 to expedite the replacement of the existing Interstate Highway bridges that bisect the MPTP site as part of the federal stimulus program. MDT and DEQ worked cooperatively to ensure that the road construction does not impact the remedial activities at the Site. Construction on this project began in April 2010. Soil excavated from the pier holes was transported and spread on the LTU and any excess water from the pier concrete pour was pumped onto the LTU. Excess clean soils resulting from the lowering of this new bridge have been stockpiled onsite for use as common cover over treated soils. It is expected that the major construction work will be completed in 2011, with minor finishing work potentially continuing into 2012.

Estimated Annual O&M Costs

An estimate for the routine annual O&M costs for the MPTP system is summarized in Table 6.

Table 6: Annual System Operations/O&M Costs

Item Description	Approximate Annual Cost
Routine Project Management	$90,000
O&M Labor & Reporting	$300,000*
Electricity	$27,000
Supplies and parts	$50,000
Groundwater monitoring (labor and equipment)	$50,000
Analytical	$200,000
Waste Disposal	$3,0000

Other	$25,000
Total Estimated Annual Cost	**$772,000**

*****Reporting includes a portion of O&M for organizing and evaluating the large quantity of O&M data as they are collected, plus production of an Annual O&M report

These annual costs are consistent with the estimated annual costs provided in Table 21 of the ROD, which estimated annual costs for years 11 to 30 of the remedy between $687,000 and $1,348,000 per year.

The O&M operator indicated the following approximate analytical costs per analysis:

- PCP ~$140 per analysis
- Metals and anions ~$140 per analysis
- PAHs ~ $300 per analysis
- Dioxins ~ $1,000 per analysis

All samples are evaluated for PCP, but only a select number of samples are analyzed for the other "extended list" of parameters. It is expected that the analytical costs will be somewhat reduced moving forward based on reduced sampling frequency in the recent Draft Groundwater and Surface Water Monitoring Plan (Tetra Tech, March 2011) compared to the historical totals, because quarterly groundwater sampling has been eliminated moving forward (it will be semi-annual) and the number of groundwater monitoring wells sampled has been reduced.

In addition to the routine annual O&M costs provided in Table 6, there have also been non-routine costs such as addressing the highway work (estimated at $26,000) and assessing the impacts of the BSB Phase 1 WWTP dewatering (estimated at approximately $209,000).

Monitoring Frequency Beginning in 2011

DEQ, through its contractor Tetra Tech, recently developed an updated monitoring plan for the MPTP site entitled "Draft Groundwater and Surface Water Monitoring Plan" (Tetra Tech, March 2011). A summary of the frequency for routine sampling, beginning in 2011, is presented in Table 7.

Table 7: Monitoring Frequency for Routine Sampling Beginning in 2011

Proposed Monitoring Points	Previous Number of Monitoring Points* (Water Levels or Water Quality)	Current Number of Monitoring Points* (Water Levels or Water Quality)
Weekly Sampling Event		
MPTP water treatment plant	3	3
Monthly Sampling Event		
MPTP water treatment plant	5	5

Proposed Monitoring Points	Previous Number of Monitoring Points* (Water Levels or Water Quality)	Current Number of Monitoring Points* (Water Levels or Water Quality)
Semi-annual Sampling Event		
Shallow groundwater monitoring wells	92	57
Intermediate groundwater monitoring wells	10	4
Deep groundwater monitoring wells	27	7
Recovery Trenches	6 (water levels), 2 (water quality)	6 (water levels), 2 (water quality)
Surface water stations	5	5
MPTP water treatment plant	5	5
Annual Sampling Event		
Shallow groundwater monitoring wells	92	62
Intermediate groundwater monitoring wells	10	4
Deep groundwater monitoring wells	27	7
Recovery Trenches	6 (water levels), 2 (water quality)	6 (water levels), 2 (water quality)
Surface water stations	5	5
MPTP water treatment plant	5	5

**Does not include duplicates and other QA/QC samples*

A brief description of the key elements of these sampling activities is provided below:

- The weekly sampling locations at the MPTP treatment plant correspond to the influent, effluent, and a point between the primary and GAC units. System flow is recorded, and analysis is for PCP and field parameters (pH, dissolved oxygen, specific conductance, oxidation-reduction potential, and temperature).

- The monthly sampling locations at the MPTP treatment plant are the same as for the weekly events, plus two additional locations: NCRT effluent and NHRT effluent. The parameters are the same as for the weekly events.

- The semi-annual sampling includes the following:

    - Groundwater sampling at 68 locations with analysis for PCP plus water levels and field parameters (pH, dissolved oxygen, specific conductance, oxidation-reduction potential, and temperature). Water levels will also be collected at 5 additional wells that are sampled for water quality in the annual events, plus any other locations with transducers.

    - Surface water sampling at three compliance locations on Silver Bow Creek (SW-03, SW-05, and SW-09), one additional location on Silver Bow Creek located between the MPTP site and the WWTP (SS-06A, first sampled in 2008), and one

location at the downstream portion of the HCC (SW-06), with analysis for PCP and field parameters (pH, dissolved oxygen, specific conductance, oxidation-reduction potential, and temperature). Locations are illustrated on Figure 2a. Stream flow is recorded for station SW-03 where there is a currently operating U.S. Geological Survey (USGS) continuous recorder.

- For the recovery trenches, water levels are measured at 4 piezometers in the NCRT and 2 piezometers in the NHRT, and water quality is measured at 1 piezometer in each trench with analysis for PCP and field parameters.

- For the MPTP treatment plant, sampling is the same as for the monthly events.

- The annual sampling is the same as the semi-annual sampling plus the following additions:

  - There are five additional groundwater sampling locations near the LTU.

  - There is an expanded water quality parameter list for four groundwater wells (GW-14R-98, INF-04, MW-B-98, and MW-V-01), four surface water locations (SW-03, SW-05, SW-06, and SW-09), and four locations in the MPTP treatment plant. In addition to PCP and field parameters, the extended parameter list includes six filtered samples analyzed for total recoverable of (arsenic, cadmium, chromium, copper, lead, and zinc), PAHs, dioxins and furans, chlorophenols, and six anions (bicarbonate, bromide, chloride, fluoride, phosphate, and nitrate/nitrite). Hardness is also reported by the laboratory.

In addition to the routine monitoring summarized above, supplemental sampling may occur at the request of DEQ if data gaps are identified or non-routine activities occur.

V. Progress Since the Last Five-Year Review

This is the third Five-Year Review conducted for the Site. The second Five-Year Review was completed in June 2006. This section presents the conclusions of the previous Five-Year Review and summarizes progress addressing recommendations from that review.

Protectiveness Statement from the Second Five-Year Review

The protectiveness statement from the second Five-Year Review (June 2006) stated the following:

> *The remedy at the Montana Pole and Treating Plant is expected to be protective of human health and the environment upon completion, and immediate threats have been addressed. Excavation of soils and subsequent treatment is reducing concentrations of contaminants to ROD cleanup levels for PCP and B2PAHs. ROD cleanup levels for*

dioxins in soils have not yet been achieved through biological treatment. To protect surface or groundwater contact with backfilled soils that still contain elevated levels of dioxins/furans, soils are backfilled on clean fill extending at least one foot above the historic high groundwater mark (based on over 15 years of monitoring), and are covered by at least one foot of clean soil. Backfilled areas that will be accessible for future use that might result in human exposure to these soils may be paved. Groundwater capture analysis will continue to make certain that adjustments are made as necessary to ensure capture of the contaminant plume. Groundwater will be captured and treated for decades until cleanup levels for groundwater are met. A Controlled Ground Water Area and other institutional controls, as appropriate, will be developed and implemented to prevent installation of wells that could draw groundwater from or affect groundwater flow within the plume area.

Status of Recommendations From the Second Five-Year Review

Section IX (Recommendations) from the second Five-Year Review included four recommendations, which are listed in Table 8.

Table 8: Actions Taken Since the Last Five-Year Review

Issues	Recommendations/ Follow-Up Actions	Responsible Party	Status of Follow-Up Actions	Milestone Date
1) February 2006 changes in DEQ-7 human health standards	Montana Department of Environmental Quality (DEQ) and EPA will evaluate changing the cleanup standards for dioxins in groundwater and in discharge to surface water to 2 pg/L and 0.13 pg/L respectively. DEQ and EPA will also evaluate changing the cleanup standard for cadmium in groundwater from 1.1 µg/L to 0.755 µg/L	DEQ and EPA	- Complete - The remedy has been deemed appropriate and no Decision Document amendment is necessary. Changing the ROD standards would not change the protectiveness of the remedy.	Completed 6/30/2007
2) Changes in EPA-published toxicity equivalence factors (TEFs) for certain polynuclear aromatic hydrocarbons (PAHs)	DEQ and EPA will evaluate the need to lower the groundwater cleanup levels for both benzo(a)anthracene and indeno (1,2,3-CD)pyrene to 0.2 µg/L.	DEQ and EPA	- Complete - Even though the standards have changed, the levels in the ROD are risk-based and remain protective.	Completed 6/30/2007

Issues	Recommendations/ Follow-Up Actions	Responsible Party	Status of Follow-Up Actions	Milestone Date
3) Cleanup levels for PCP in soils	DEQ and EPA will continue to evaluate the cleanup level for PCP in soils.	DEQ and EPA	- Complete - Even though the Regional Screening Levels for PCP in soils have been revised, the levels in the ROD are risk-based and remain protective	Completed 12/31/10
4) Controlled Ground Water Area	DEQ and EPA will initiate the process to develop and implement a Controlled Ground Water Area (CGA) for the Site.	DEQ and EPA	A Controlled Ground Water Area (CGA) has been established	Completed 10/30/2009

Based on recent events associated with the dewatering for construction at the WWTP, the CGA may require modification. This is discussed further in Section VII (Technical Assessment), Question A.

VI. Five-Year Review Process

This third Five-Year Review for the Site has been conducted in accordance with EPA's Comprehensive Five-Year Review Guidance dated June 2001 (EPA, 2001). This review was performed primarily by (or with the assistance of) the following team members:

- Roger Hoogerheide, RPM, EPA
- Lisa DeWitt, Project Officer, DEQ
- Mary Ann Dunwell, Community Relations, DEQ
- Rob Greenwald, Tetra Tech (contractor to DEQ)
- Colin McCoy, Tetra Tech (contractor to DEQ)
- Tom Bowler, Tetra Tech (MPTP Treatment Plant Operator)

The review process included a Site inspection, interviews with relevant parties, and a review of the applicable Site records and data. These items are discussed in more detail below.

Administrative Components

The Five-Year Review report was prepared by Tetra Tech under contract to the Montana DEQ. The DEQ is the lead agency for implementation and operation and maintenance of the remedial

action at the Site. This Five-Year Review is a cooperative effort of both DEQ and EPA Region 8. The site visit for the Five-Year Review was conducted on March 15, 2011.

Site Inspection

The site inspection was conducted on March 15, 2010. The inspection was led by Roger Hoogerheide of EPA, Lisa DeWitt of DEQ, and Colin McCoy of Tetra Tech. A list of all individuals participating in the inspection is provided in Table 9.

The purpose of the site inspection was to evaluate the condition of the Water Treatment Plant and other Site structures, and to assess the protectiveness of Site operations and of the remedy through visual evaluation of the Water Treatment Plant and associated components, Site fencing, monitoring wells, the Land Treatment Unit, and the cap on the north side of the Site. A completed site inspection checklist is provided in Attachment 1.

On the basis of this inspection DEQ and EPA concluded that the Site is well maintained and no significant issues were identified with respect to Site operations. The condition of the groundwater treatment system components, monitoring wells and the availability of documents such as the O&M Manual and As-Built Drawings, Site security, and other aspects of the Site are detailed on the site inspection checklist provided as Attachment 1. It was noted that screens over vaults at the treatment plant may not be OSHA compliant, and, while this item does not impact the protectiveness of the remedy at the Site, the Site team will investigate this issue. It was also noted that several components of the groundwater remedy are no longer being used. These components can be dismantled and properly disposed of resulting in a small O&M savings.

Table 9: Individuals Present for Site Visit

Name	Affiliation*	Phone	Email
Lisa DeWitt	DEQ	406-841-5037	lidewitt@mt.gov
Roger Hoogerheide	EPA Region 8	406-457-5031	hoogerheide.roger@epa.gov
Tom Bowler	Tetra Tech – Site/Plant Operator	406-723-7247	Tom.bowler@tetratech.com
Colin McCoy	Tetra Tech	406-441-3261	Colin.McCoy@tetratech.com
Rick Appleman	Professor of Environmental Engineering, MT Tech (CTEC member designated to lead the MT Pole initiative)	406-496-4448	rappleman@mtech.edu
Ian Magruder	Kirk Engineering & Natural Resources (contracted by CTEC)	406-842-7224	Ian_Magruder@kirkenr.com
Mary Ann Dunwell	Community Relations, DEQ	406-841-5016	mdunwell@mt.gov

**CTEC = Citizens Technical Environmental Committee*

Note that for the majority of the last five-year period Mr. Bowler served as the MPTP site/plant operator as an employee of the Montana Bureau of Mines and Geology (MBMG). Tetra Tech took over those functions from MBMG in late 2010 and Mr. Bowler continues to serve as the site/plant operator as a Tetra Tech employee.

Community Notification and Involvement (Including Interviews)

Public notices announcing the beginning of the Third Five-Year Review were published in the Montana Standard on the following dates:

- Sunday, January 16, 2011
- Wednesday, January 19, 2011

A copy of the newspaper announcement is included in Attachment 2. An updated fact sheet with notification of the third Five-Year Review, dated March 2011, was distributed as an insert to the Montana Standard and the Butte Weekly newspapers on Wednesday, March 16, and was also made available at the Citizens Technical Environmental Committee (CTEC) office in Butte. This fact sheet was posted on the following website: http://www.deq.mt.gov/Rem/default.mcpx. A copy of this fact sheet is also included in Attachment 2 to this report.

CTEC held a public meeting on March 24, 2011 at the Boulevard Volunteer Fire Hall, 1900 South Franklin, in Butte, for the purpose of assisting DEQ in obtaining community input for the Five-Year Review. The sign-in sheet for the meeting is included in Attachment 2, and a summary of comments and questions raised during the meeting is included in Attachment 8 based on notes provided by Mary Ann Dunwell of DEQ.

Interviews for the Third Five-Year Review were conducted by Lisa DeWitt, Project Officer, DEQ, and by Mary Ann Dunwell, Community Relations, DEQ. The following people were interviewed and represent a mixture of nearby residents and public officials:

- Rick Appleman, Citizens Technical Environmental Committee (CTEC) MPTP Sub-Committee Chair
- Scott Payne, Kirk Engineering and Natural Resources, Inc. and CTEC Technical Advisor
- Janice Hogan, CTEC Technical Assistance Group (TAG) Coordinator
- Leland Greb, CTEC Member
- John Ray, Ph.D., CTEC Board Member, Montana Tech Professor of Speech
- Tom Malloy, Reclamation Manager, BSB County Planning Department
- Dave Palmer, Chair of the Council of Commissioners, Fair Board, BSB County
- Tom Bowler, Tetra Tech, MPTP Site/Plant Operations Manager
- Rick Larson, Operations Manager, Utilities Division, BSB City/County Government, Department of Public Works

- Ed Fisher, Neighborhood Resident
- Elizabeth Erickson, Water and Environmental Technologies, Butte Restoration Alliance, CTEC, and NRD Council Butte Area

Additionally, written comments were received from the following: John Ray; Charles W. Greene and Susan E. Natiello; Bill and Dee Fisher; a letter from residents signed by Charles Greene; and CTEC . Attachment 8 includes interview summary forms and a copy of the written comments listed above. Items identified during the community meeting and interviews included the following:

- Many of those interviewed recognize that significant improvements and progress have been accomplished over the course of the remedy.

- There are some concerns over remedy protectiveness and potential impacts to human health in the surrounding community. Odor in particular is a big concern. Many of those interviewed indicated odor was a problem previously but has not been a problem for some time now.

- There were concerns that dust control is not adequate.

- The residents had questions about the requirements that will be included in the institutional controls.

- There are concerns that the ROD does not fully address contamination at the Site and that the remedy is not protective. Some want a revised ROD and cleanup to residential levels. Some residents questioned why cleanup is not to residential standards, and concerns were raised about the ability of caps to provide protection to human health (specifically with respect to soil containing dioxins/furans left on-Site).

- Many people are interested in possibilities for site re-use. The idea for a fairground was presented at the public meeting by Butte-Silver Bow County Commissioner Dave Palmer, but several of the people interviewed expressed concern that this would not be a good re-use option. Other re-use options mentioned included a walking trail, a riparian corridor, a Greenway Trail, a water park, and a fire training facility. There was some interest in starting a resident-based planning committee to discuss re-use.

- Some stated that the previous Five-Year review was difficult to understand and did not address important issues.

- There were concerns raised that the Five-Year review should be conducted by a third party.

- There was concern about what killed trees that were planted along the site fenceline.

- There are concerns about the LTU location (proximity to residential areas). Some residents interviewed expressed dissatisfaction about the potential of placing additional material in the LTU.

- Some residents indicated they would like to benefit from any remaining funds left when cleanup is complete.

- Some of those interviewed indicated they are aware of potential impacts to the MPTP site caused by the recent dewatering at the WWTP, such as potential spreading of the PCP plume to the north.

- Some of those interviewed indicated that they believe more effort should be expended on removing potential remaining sources of PCP (beneath I-90 and/or power poles).

- Many of those interviewed and at the meeting expressed a desire for greater communication. The community wants more information about the Site and more influence over decisions.

These concerns, as well as additional written comments that DEQ received, are addressed in summary form in the Responsiveness Summary contained in Attachment 9.

Upon final concurrence, this Third Five-Year Review report will be placed in the information repositories for the Site. Once this report is approved, another fact sheet will be developed and distributed. That fact sheet will discuss the findings of the Five-Year Review and announce the availability of the Third Five-Year Review report at the information repositories. Site repositories are the Montana Tech Library (1300 West Park Street, Butte, MT 5970) and the U.S. EPA Region 8 Montana Office (Federal Building, Suite 3200, 10 West 15th Street, Helena, Montana 59626). The Five-Year Review report will also be placed on EPA's website and a link to this web site will be placed on DEQ's website.

Document Review

The following Site documents were reviewed for preparing this Five-Year Review:

- Final Quarterly Report, October – December 2010 (Tetra Tech, April 2011)
- Draft Groundwater And Surface Water Monitoring Plan (Tetra Tech, March 2011)
- Montana Pole and Treating Plant Site Update (EPA and DEQ, March 2011)
- Information Summary, Conceptual Model, and Groundwater Modeling Report: Butte Metro Sewer Treatment Plant Dewatering (Tetra Tech, November 2010)
- Draft Tech Memo: Investigation of PCP Migration in the LAO and Evaluation of Mitigation Alternatives— Includes Well Logs for recently installed wells 10-16/17/18 and 10-19/20/21 (MBMG, July 2010)

- Montana Pole and Treating Plant Site Update (EPA and DEQ, April 2010)
- Final Treatability Study Workplan, Montana Pole And Treating Plant Site – Phase 5 (Tetra Tech, March 2009)
- MPTP Annual Reports for 2009, 2008, 2007, 2006 (Tetra Tech)
- Near Creek Trench Field Investigation (Camp Dresser & McKee [CDM], February 2007)
- MPTP Second Five-Year Review (DEQ, June 2006)
- Montana Pole and Treating Plant Site Additional Remediation Beneath I15/90 Phase 5 Remedial Action (CDM, September 2001)
- Montana Pole and Treating Plant Site Vadose Zone Soils Dioxin/Furan Mobility Evaluation (CDM, September 2001)
- Site-Wide O&M Manual, Montana Department of Environmental Quality Montana Pole and Treatment Plant Site (CDM, December 2000)
- MPTP Record of Decision (ROD) (EPA and DEQ, 1993)
- Final Baseline Risk Assessment for the Montana Pole NPL Site (CDM, 1993)
- MPTP Remedial Investigation (RI) Report (James M. Montgomery, 1993)

The MPTP treatment plant operator also provided updated site data. Other general references are provided in Section XII. The Remedial Action Objectives, cleanup levels and ARARs (summarized earlier) are all contained within the MPTP ROD.

Data Review

As part of the data review operating, sampling, and analytical data for the last five years were reviewed. Any data not available from the above documents were obtained from the Site Operator. Data summaries are provided below for the following items:

- Groundwater
    - Groundwater Plume Maps
    - Recent PCP Concentrations North of Silver Bow Creek and at Newly Installed Wells
    - Potential Remaining PCP Source beneath Power Poles
    - Residential Well Sampling

- MPTP Water Treatment Plant
    - Groundwater Extraction Rates
    - Effluent PCP Concentrations from MPTP Treatment Plant
    - Extracted PCP Concentration Trends (i.e., Plant Influent)

- Product Recovery

- Surface Water

- Soils (LTU Sampling)

Data are provided in tables (included in Attachment 3) and/or figures that are referenced in the text for each of the items listed above. Note that effluent concentrations for metals have always been below ROD standards, and have also always been below aquatic and chronic aquatic life standards in the current Montana DEQ-7 standards (adjusted for hardness), so those data are not presented in Attachment 3.

Groundwater

Groundwater Plume Maps (PCP)

Interpreted PCP plume maps for groundwater that were included in the "Final Quarterly Report, October – December 2010" (Tetra Tech, April 2011) are presented in Attachment 4, for the following sampling periods:

- August 2005
- August 2008
- August 2009 (just prior to Phase 1 dewatering at the WWTP)
- August 2010 (after Phase 1 dewatering at the WWTP)
- November 2010 (after Phase 1 dewatering at the WWTP)

Observations from these maps include the following:

- These maps indicate that the PCP plume is approximately 750 feet wide by at least 1,800 feet long oriented along the principal direction of groundwater flow (southeast to northwest).

- There are several "hot spots" for the PCP concentrations, one of which is just north of I-90 at monitoring well MW-B-04 (PCP concentrations greater than 1,000 ug/l). That monitoring well was abandoned during reconstruction of the Interstate-90 bridge, so it has not been sampled in the most recent events. Upon completion of the MDT construction work, wells will be reinstalled in this area.

- The two most recent maps, based on data collected after the Phase 1 dewatering (that began in mid-August 2009 and lasted through mid-April 2010) illustrate the presence of PCP north of Silver Bow Creek and north of the HCC. There are no PCP sample results from prior to the Phase 1 dewatering at locations north of the HCC.

- Some of the highest PCP concentrations in groundwater are found just north of the NCRT. Examples from these maps include location MW-I-01, with PCP concentrations generally

exceeding 100 ug/l and sometimes exceeding 1,000 ug/l. Given that groundwater flowing around the edges of the NCRT has much lower concentrations of PCP (generally on the order of 10 ug/l or less), it appears that the high concentrations of PCP in groundwater north of the NCRT such as at MW-I-01 originates north of the NCRT, likely beneath one of more of the power poles. DEQ plans to address potential remaining sources of PCP beneath power poles north of the NCRT later in 2011.

Recent PCP Concentrations North of Silver Bow Creek and at Newly Installed Wells

Figure 10 presents the results of PCP sampling at wells located north of Silver Bow Creek and at new wells 10-01 to 10-21, conducted after the Phase 1 dewatering at the WWTP was initiated. Screened intervals are included on the figure. These results represent the only recent samples for PCP north of Silver Bow Creek between MPTP and the WWTP extraction pumps (i.e., no PCP data in that area are available before the recent WWTP dewatering). Observations from Figure 10 include the following:

- PCP is currently detected in groundwater north of Silver Bow Creek and north of the HCC (see Figure 10). No wells north of Silver Bow Creek between MPTP and the WWTP extraction pumps were sampled for PCP prior to the Phase 1 dewatering at the WWTP that began on August 13, 2009, so it cannot be determined if PCP was present north of the HCC prior to the dewatering at the WWTP. However, groundwater typically flows north to south towards the HCC in the WWTP area, and the presence of PCP in groundwater north of the HCC after the dewatering began is consistent with the fact that groundwater levels were lowered below the bottom of the HCC during the Phase 1 dewatering, allowing for contaminant transport below the HCC from south to north.

- The highest PCP concentrations on Figure 10 were observed at new wells 10-02 and 10-15, which are the shallowest wells in the cluster located nearest to the power poles (discussed in detail below). Of the remaining results on Figure 10, the results with the highest concentrations are all located in a general path between the power poles and the WWTP extraction pumps. Coupled with the figure presented on Figure 9 (which showed very high PCP concentrations in groundwater north of the NCRT near the southernmost power pole), these data strongly suggest that a continuing source of PCP exists under one or more of the power poles.

- Where wells are clustered, the higher PCP concentrations are generally found in the shallower wells.

Potential Remaining PCP Source beneath Power Poles

Three power poles located north of the NCRT and MPTP fence are illustrated on Figure 2a. These power poles are potentially significant because soils beneath these power poles were not previously excavated during the LAO Removal Action. Thus, there is a potential for there to be residual LNAPL beneath these power poles that might serve as a continuing source of dissolved PCP impacts in groundwater. Although all three power poles are south of the current Silver Bow

Creek, only the southernmost of the three power poles (located northeast of well MW-87-3 and located just west of the ND-06 monitoring cluster) was located on the MPTP side of Old Silver Bow Creek. During the time of plant operations, free-phase oil that contained PCP was known to extend to Old Silver Bow Creek, so there is an enhanced possibility that soil beneath this southernmost power pole could be contaminated relative to the other two poles. The other poles could have been affected after Old Silver Bow Creek was reconstructed during LAO operations.

Figure 9 is based on a figure from CDM's 2007 "Near Creek Trench Investigation" with annotations added by Tetra Tech to illustrate the potential significance of the southernmost power pole. This figure includes PCP concentrations observed in shallow monitoring wells on both sides of the NCRT. Key observations include the following:

- On the north side of the recovery trench, there are extremely high concentrations of PCP (greater than 1,000 µg/L) at monitoring points located between the power pole described above and the NCRT (ND-06-S and NCTR-02-1)

- The concentrations entering the NCRT from the south side (the MPTP side) are lower than from the north side (the power pole side)

- The concentrations of PCP near the edges of the NCRT, while not necessarily below the cleanup standard, are low

This pattern of PCP concentration strongly suggests the potential for a continuing source of dissolved PCP impacts beneath this power pole, with localized groundwater flow toward the NCRT (because of the extraction in the NCRT) resulting in the high concentrations of PCP observed at ND-06-S and NCTR-02-1. The fact that there are very low concentrations at the edges of the NCRT strongly suggests that these very high concentrations at ND-06-S and NCTR-02-1 are not a result of transport of PCP around the NCRT.

The remaining sources of PCP beneath the power poles north of the NCRT will be investigated, and removed/treated as appropriate, during 2011. Excavated soil would be placed on-site for treatment or taken to the mine waste repository if the soils are found to contain mine tailings.

Residential Well Sampling

The ROD requires sampling of residential wells within one quarter mile of the groundwater contaminant plume for PCP. Five wells have been traditionally sampled over the years. Sampling results are presented in Table A3-1 in Attachment 3. Only one of these five wells (the Bowler well) is within one quarter mile of the groundwater contaminant plume. Two of the locations are south or southeast of MPTP, two of the locations are east of the southern portion of the MPTP site, and one location is north of MPTP (the Bowler well, just northeast of the WWTP). PCP concentrations were not detected or were far below the cleanup standard of 1 ug/l for each of these wells from 2001 to 2008, and the four wells outside the quarter-mile distance from the contaminant plume were not sampled in 2009 or 2010. The owners of these wells will be

contacted to determine whether or not they desire continued sampling to occur.

For the residential well located just northeast of the WWTP (the Bowler well), PCP results were typically non-detect in annual samples between 2001 and 2009, although there have been a few detections of PCP at very low levels that are below the groundwater standard of 1.0 µg/L (such as 0.12 µg/L in 2001, 0.47 µg/L in 2007, and 0.08 µg/L in 2008). These PCP concentrations at the Bowler residence are much lower than the PCP concentrations detected north of Silver Bow Creek between MPTP and the WWTP after the WWTP dewatering began, and these low PCP concentrations at the Bowler residence could be caused by cross-contamination of equipment in the field or in the laboratory. The Bowler well was sampled on December 30, 2009 during the WWTP dewatering, was analyzed for PCP, and PCP was not detected. The Bowler well will continue to be sampled annually.

Dioxin Toxicity Equivalent (TEQ) and PAHs/Chlorophenols (other than PCP)

A small number of monitoring wells are sampled annually for dioxin TEQ, PAHs, and chlorophenols. The specific monitoring locations have changed over time. However, the best indicator of the limited distribution of these constituents in groundwater at the Site is the low concentrations extracted at the two recovery trenches (the NCRT and NHRT). Data regarding concentrations extracted at the NCRT and NHRT are provided on the following tables in Attachment 3:

- Table A3-3: Dioxin TEQ in influent and effluent
- Table A3-4: PAHs and Chlorophenols in influent and effluent

For Dioxin TEQ (Table A3-3) the extracted water from both the NCRT and NHRT is always far below the ROD cleanup criteria for groundwater of 30 pg/l (although some results from some individual monitoring wells exceed the criteria). For PAHs and Chlorophenols other than PCP (Table A3-4) the extracted water from both the NCRT and NHRT is also always below the ROD cleanup criteria (and is generally non-detect for these constitiuents). These data indicate that impacts to groundwater from dioxins, PAHs and Chlorophenols are limited, and it is appropriate to focus on PCP impacts as the primary concern in groundwater at this Site.

The levels of PCP and dioxin TEQ in the groundwater (within the contaminant plume) currently exceed the ROD cleanup levels (though, as stated above the extent of dioxin impacts is limited since water extracted from the NCRT and NHRT are below criteria for dioxin TEQ). However, the contaminant levels in groundwater are declining, and it is anticipated that if the remedy continues to function as intended in the ROD, all ROD surface water cleanup levels will ultimately be met without additional action.

MPTP Water Treatment Plant

Groundwater Extraction Rates

Extraction rates over time at the NCRT and NHRT are provided on Table A3-1 in Attachment 3, and are illustrated on Figure 7. This figure illustrates that the total extraction rate has increased in recent years to approximately 335 gpm, whereas before 2004 the total extraction rate was generally less than 250 gpm. Recent extraction rates at the MPTP trenches have been essentially constant, with extraction rates of approximately 210 gpm at the NCRT and 125 gpm at the NHRT.

Influent and Effluent Concentrations from MPTP Treatment Plant

Data regarding MPTP treatment plant influent and effluent are provided on the following tables in Attachment 3:

- Table A3-2: PCP in influent and effluent
- Table A3-3: Dioxin TEQ in influent and effluent (standards are based on Dioxin TEQ)
- Table A3-4: PAHs and Chlorophenols in influent and effluent

With respect to treatment plant influent, data are provided for the effluent of the each of the two extraction trenches (NCRT and NHRT) as well as the combined influent.

Extracted PCP concentrations over time at the extraction trenches are illustrated on Figure 8a. Extracted concentrations of PCP have always been lower at the NCRT versus the NHRT, and concentrations of PCP at both extraction trenches have been declining over time as a result of the soil remediation and soil flushing to date.

The recent "Phase 1" dewatering period at the WWTP that occurred in late 2009 and early 2010 is indicated on Figure 8a. A sharp decline in PCP concentrations in the water extracted at the NHRT occurred during the Phase 1 dewatering. PCP concentrations dropped from 236 µg/L on August 10, 2009, shortly before dewatering began, to a low of 28.6 µg/L on January 27, 2010, near the end of dewatering, and then rebounded back to approximately 200 µg/L after the WWTP dewatering was terminated. The concentration of PCP extracted at the NCRT has been below 10 µg/L since early 2003 (the PCP groundwater standard is 1 µg/L), but was generally less than 5 µg/L during the WWTP dewatering. There is an apparent correlation on these figures between the WWTP dewatering and lower influent concentrations at the NHRT and, to a lesser degree, the NCRT. The sharp decline in PCP concentrations at the NHRT that occurred during Phase 1 dewatering may indicate that Phase 1 dewatering caused the water table to drop below the zone of highest contaminant concentration, causing capture of contaminant mass to be less effective at this trench.

Water is treated at the MPTP water treatment plant using granular activated carbon (GAC) with no additional metals treatment and is generally discharged to Silver Bow Creek near the

northwestern corner of the MPTP site. Treated water can also be used to replenish the retention pond adjacent to the LTU (though that has usually not been needed), and treated water can also be injected into a series of injection cells that were constructed on the Site. Effluent concentrations for PCP from the MPTP plant since the previous Five-Year review are presented on Figure 8b. These samples have been collected weekly. It is clear from Figure 8b that the MPTP treatment plant routinely treats PCP concentrations to below the discharge standard of 1 ug/l. There are infrequent samples where the discharge standard of 1 ug/l is slightly exceeded, but such events are not repeated. Discussions with the treatment plant operator indicate that, when an exceedance has occurred, a cause has been identified and immediately addressed.

With respect to dioxin TEQ for the last five years (Table A3-3), the combined influent to the MPTP treatment plant has always been below the effluent standard of 10 pg/l. Therefore, the effluent has also been below the standard. With respect to PAHs and chlorophenols (other than PCP) for the last five years (Table A3-4), there have been very low concentrations of some parameters in MPTP plant influent and effluent, but none of the detections have been above cleanup standards in either the influent or the effluent.

The discharge to surface water criteria in the ROD also include limits for several metals, and effluent concentrations for each of the metals is consistently well below the ROD cleanup standard, and below aquatic and chronic aquatic life standards in the current Montana DEQ-7 standards (adjusted for hardness).

Product Recovery

Over the last five year period there has been a significant decline in the number of individual monitoring locations that have had measurable free oil, as well as in recovered volume of free oil in the capture and recovery system.

With respect to individual locations, the wells that most recently had measurable free product were all beneath the interstate highway footprint, or within the NHRT. It should be noted that due to the interstate highway bridge replacement work, a number of wells within the highway footprint had to be abandoned and will not be replaced until that work is complete in late 2011. However, there has been no measurable or recoverable oil in the NHRT since early 2009, suggesting the likelihood that no free product will be seen in the replacement wells immediately upgradient of the NHRT (since none appears to be entering the trench currently and the previous wells had no measurable oil for more than a year prior to abandonment). Some monitoring locations in the NHRT and immediately upgradient of the NHRT exhibited “sheen” of visual oil on the well measuring equipment subsequent to having a quantifiable thickness of oil, but that trend has also declined.

With respect to recovered product, all free product recovery in this Five-Year Review period was accomplished via a belt skimmer located at Manhole #2 within the NHRT. Recovered oil is transferred to a storage tank for ultimate disposal by incineration. The last shipment of oil for disposal occurred in November of 2004. Oil recovery declined dramatically during this five-year

period versus the previous five-year period, as illustrated in Table 10. No oil has been recovered since February of 2009, when 6 gallons of recovered oil was transferred to storage.

Table 10: Decline in Annual Volume of Free Product Recovery

Year	Gallons of Free Oil Recovered
2000	967
2001	1,367
2002	2,104
2003	570
2004	523
2005	511
2006	461
2007	3
2008	46
2009	6
2010	0
2011 (through April)	0

Surface Water

As part of routine monitoring for the MPTP site, the following surface water locations have historically been sampled quarterly for PCP and annually for dioxins/furans and PAHs (locations are illustrated on Figures 2a and 2b):

- SW-03: on Silver Bow Creek, located far west (downstream) of the MPTP site
- SW-05: on Silver Bow Creek, just west (downstream) of the MPTP site
- SW-06: on the HCC, at the far western (downstream) end of the HCC
- SW-09: on Silver Bow Creek, just east (upstream) of the MPTP site

Three of those locations are surface water compliance points on Silver Bow Creek (SW-03, SW-05, and SW-09). Location SW-06 is located at the downstream end of the HCC, and provides information regarding surface water quality downstream of the portion of the HCC that corresponds to the old channel of Silver Bow Creek. The ROD recognized that some residual PCP concentrations would exist in portions of the Silver Bow Creek Channel downstream of the Site for some time. As stated on page 24 of the ROD: "Once site remediation has effectively contained the contaminated groundwater and LNAPL, and releases to Silver Bow Creek have been effectively reduced or eliminated, it is expected that natural biodegradation and attenuation would effectively reduce the levels of organic contaminants in Silver Bow Creek, stream sediments and groundwater downstream of the site. These natural mechanisms would be relied upon to address the low level contamination found in this area." Since SW-06 is downstream of a portion of Old Silver Bow Creek that was not excavated, it is a good location for monitoring the attenuation of low levels of PCP released from that portion Old Silver Bow Creek.

As part of additional investigation in response to the Phase 1 dewatering at the WWTP, the following additional surface water locations were sampled for PCP at least once since December 2009:

- SS-06: on Silver Bow Creek, between the MPTP site and the WWTP
- HCC-01: on the HCC, east (upstream) of the WWTP
- HCC-01A: on the HCC, south of the WWTP
- HCC-02: on the HCC, northwest (downstream) of the WWTP

Data regarding surface water samples are provided on the following tables in Attachment 3:

- Table A3-5: PCP in surface water
- Table A3-6: Dioxin TEQ in surface water
- Table A3-7: PAHs and Chlorophenols in surface water

Important observations from surface water results for PCP over the last five year period include the following:

- As indicated in Table A3-5 in Attachment 3, the surface water standard of 1 ug/l for PCP is consistently achieved at the compliance sampling locations in Silver Bow Creek (SW-03, SW05, and SW-09). The only exceptions in the last five years were PCP concentrations just above the cleanup standards in two samples at SW-03 (1.81 ug/l in October 2006 and 1.69 ug/l in August 2009) and one sample at SW-05 (1.03 ug/l in November 2006). These concentrations just slightly exceed the standard for PCP, and values exceeding the standard were not repeated in subsequent samples. At SW-09, located on Silver Bow Creek upgradient of the MPTP site, PCP is generally detected at very low concentrations of 0.2 ug/l or less (or in some cases is not detected). Monitoring will continue over the duration of the remedy.

- As indicated in Table A3-5 in Attachment 3, PCP concentrations at location SW-06 (located at the downstream end of the HCC) often slightly exceed the surface water criterion of 1 ug/l, though PCP concentrations are generally below 2 ug/l. As mentioned earlier, this appears to be due to residual PCP in the portion of Old Silver Bow Creek that forms a portion of the HCC upstream of SW-06. The process of natural attenuation envisioned in the ROD for these residual PCP impacts is likely occurring although slowly, based on observed concentrations in surface water that have declined over time. The maximum PCP concentrations at SW-06 were higher in previous years (e.g., 7.4 ug/l in November 1998) than during the last five years (generally below 2 ug/l).

- As indicated in Table A3-5 in Attachment 3, the PCP concentration at SS-06A (located on Silver Bow Creek between the MPTP site and the WWTP) was very low (0.1 ug/l) the one time it was sampled prior to the WWTP dewatering that started in late 2009, and remained low throughout the WWTP dewatering (generally non-detect, maximum of 0.1 ug/l). This is consistent with groundwater generally not discharging to the reconstructed Silver Bow

Creek near the MPTP site, including the period of WWTP dewatering when groundwater levels were lowered.

- As indicated in Table A3-5 in Attachment 3, PCP was sampled at HCC-01 (located upstream of the WWTP) during and after the WWTP dewatering, and the PCP concentrations were below the surface water criterion of 1 ug/l in each sample. PCP was sampled at HCC-01A (just south of the WWTP) and at HCC-02 (just west of the WWTP) after the WWTP dewatering (which ended in April 2010) and the PCP concentrations were also below the surface water criterion of 1 ug/l in each sample.

With respect to dioxins/furans in surface water for the last five years (Table A3-6), all results have been far below the ROD surface water criterion of 10 pg/l, with the maximum detection in the last five years less than 1 pg/l. With respect to PAHs and chlorophenols (other than PCP) for the last five years (Table A3-7), there have been been just a few minor detections all of which are well below the ROD surface water criteria.

Accordingly, it is anticipated that if the remedy continues to function as intended in the ROD, all ROD surface water cleanup levels will be met without additional action.

Soils

LTU Sampling

There was one offload of the LTU in the last five years, which occurred in 2007 with the removal of 32,000 cubic yards of treated soil from the LTU. The soils were backfilled on-site. In 2007, the remaining soil staging and pretreatment piles were dismantled and 8,000 cubic yards of soil were moved from the piles and placed on the LTU for final treatment. Small volumes of soil from the NHRT east-end facility abandonment (July 2009), Butte Silver-Bow sanitary sewer re-location (October 2009), and Interstate Bridge pillar drilling were added to the LTU in 2009 and 2010. Data are provided in Attachment 3 for LTU sampling results prior to the 2007 offload (Table A3-8) and subsequent to the 2007 offload (Table A3-9). There are ten LTU zones that are sampled (see Figure 11), and each section has five borings per sampling event. The sampling occurs as follows:

- The upper five aliquots of soil for each section, from a depth of 0" to 24", are composited to make one sample for PCP analysis per section for the shallow soil.

- The lower five aliquots of soil for each section, from 24" to 36", are composited to make one sample for PCP analysis per section for the deeper soil.

With respect to the current soils remaining at the LTU (see Table A3-9), the easternmost four sections of the LTU had previously had two consecutive sampling rounds where all soils met the standard for PCP and PAHs, so those were not sampled in 2010. Sections one through six had also previously met the standard for PAH, so those were only sampled for PCP in 2010.

The results from the October 2010 sampling round showed that one upper section and two lower sections of the sampled areas were still above the 34 ppm treatment standard for PCP, and all other samples were less than the clean-up standard. This indicates that approximately 85% of the remaining LTU soil volume meets the treatment standard. Samples for all COCs will be collected prior to the final offload and closure of the LTU.

The levels of dioxin in the soils currently being treated on the LTU exceed the ROD cleanup levels, and approximately 15% of the soils exceed the ROD cleanup levels for PCP. The PCP levels in the soils are declining, and it is anticipated that if the remedy continues to function as intended in the ROD, all ROD soil cleanup levels for PCP and PAHs will be met without additional action. It is anticipated that if the remedy continues to function as intended in the ROD, the dioxin TCDD-TEQ cleanup levels may not be met without additional action.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

No. As a whole, the remedy continues to operate and function as designed and outlined in the ROD. However, the dioxin TCDD-TEQ cleanup level for soils outlined in the ROD is not being achieved, as described further in this document.

With respect to groundwater, the remedial goals are to provide maximum source reduction and protect Silver Bow Creek and uncontaminated groundwater by minimizing migration of contaminants within the groundwater and meet cleanup levels outlined in the ROD at the point of compliance. Under typical operating conditions groundwater capture associated with the MPTP extraction system appears to be sufficient. This determination is based on the recent groundwater modeling. The MPTP plant meets discharge requirements. PCP concentrations at the extraction trenches have declined substantially over the course of the remedy and the quantity of LNAPL recovered from the area beneath the interstate has decreased as well (no free oil has been recovered since 2009), indicating that the soil remediation coupled with natural flushing has reduced the PCP source significantly. The current groundwater pump and treat system has been operating since 1997. The ROD anticipated "…the groundwater action would occur for a period of 30 years. Although groundwater remediation to cleanup levels is expected…some inaccessible source areas (under the interstate highway) would remain and be treated in place. Therefore, actual costs and efforts associated with site monitoring, enforcement of institutional controls and operation and maintenance of the groundwater treatment system for the inaccessible source areas (under the interstate highway) may be incurred beyond 30 years."

With respect to surface water, page 39 of the ROD recognized that once site remediation has effectively contained the contaminated groundwater and LNAPL and releases to Silver Bow Creek have been effectively reduced or eliminated, it is expected that natural biodegradation and attenuation will effectively reduce the levels of organic contaminants in Silver Bow Creek, stream sediments and groundwater downstream of the site. A portion of the Old Silver Bow Creek

channel now comprises a downstream portion of the HCC, and there are some measurements of PCP at location SW-06 (at the downstream end of the HCC) that slightly exceed the surface water criterion of 1 ug/l, likely due to residual PCP associated with the channel of Old Silver Bow Creek. This portion of the HCC discharges through the metals treatment lagoons to Silver Bow Creek, and the downstream sample for Silver Bow Creek (SW-03) has lower levels of PCP that generally do not exceed the surface water criteria of 1 ug/l. Therefore, impacts to surface water appear to be minor and limited under normal operations. Residual PCP associated with the channel of Old Silver Bow Creek is expected to continue to attenuate over time, as indicated in the ROD. Cleanup levels are expected to be met if the remedy continues to function as intended in the ROD.

With respect to soils, excavation of soils and subsequent treatment at the Land Treatment Unit (LTU) effectively reduces concentrations of contaminants to ROD cleanup levels for PCP and B2PAHs, and remaining soils at the LTU are approaching those cleanup levels. It is possible that all soil treatment for these contaminants of concern at the LTU will be completed within the next five years.

ROD cleanup levels for dioxin, expressed as TCDD-TEQ, in soils have not been achieved with biological treatment at the LTU, and are not anticipated to be met if the current remedy operates as intended. Page 30 of the ROD states "Biological land treatment is not expected to achieve the degree of treatment provide by incineration; however, it is anticipated that allowable final contaminant levels will be achieved. Design studies would be utilized to determine achievable treatment efficiencies and identify any additional remedial actions which may be necessary in conjunction with biological land treatment."

CDM's Technical Memorandum *Vadose Zone Soils Dioxin/Furan Mobility Evaluation*, September 27, 2001, presented the results of modeling conducted to evaluate the potential for dioxins and furans that remain in treated soil backfilled within the vadose zone onsite to leach into the groundwater via porous media flow. This evaluation concluded that dioxins and furans are not likely to be treated, biodegraded, or leached from soils during bioremediation, and that the predicted aquifer concentration under unrealistically worst-case conditions is just barely over the ROD cleanup levels of 3.0E-8 mg/L TCDD equivalent. The risk exposure pathways for soils are ingestion or direct contact. By backfilling the treated soils that still contain dioxins/furans above the historic high groundwater level (based on over 20 years of monitoring), and by covering these soils with at least one foot of clean soil (as indicated in the September 2001 "Vadose Zone Soils Dioxin/Furan Mobility Evaluation" by CDM), these exposure pathways are rendered incomplete. This is not a contingency remedy outlined in the ROD. Further management of these soils will be evaluated once EPA has finalized the revised interim PRGs for dioxin and dioxin-like compounds.

For institutional controls, the objectives included the following: 1) prevent unauthorized access to contaminated media or to remedial action areas; 2) include adequate zoning restrictions, conservation easements, and other controls to prevent any future residential use of the Site; and 3) prevent any water well drilling in the contaminated groundwater plume and adjacent areas to prevent additional receptors of contaminated groundwater or an expansion of the plume. With

respect to these items:

- The Site fence (which is an engineering control) is well-maintained and prevents trespassing.

- The northern portion of the MPTP site (i.e., north of I-90) is currently zoned M1 (Light Industrial). The southern portion of the MPTP site (i.e., south of I-90) is currently zoned M2 (Heavy Industrial). The current zoning therefore precludes residential construction on the MPTP site. Long-term institutional controls precluding future residential use of the Site will need to be implemented, or the ROD states that the cleanup levels will need to be revised.

- A Controlled Ground Water Area was established after the Second Five-Year Report, which prevents new wells from being drilled. Based on the site inspection and discussions with DEQ and the MPTP plant operator, there are no known new well installations for other than remedial purposes have taken place within the CGA.

This review has identified several issues that potentially impact long-term protectiveness if not addressed, as follows:

- The Controlled Ground Water Area implemented in October 2009 does not explicitly address large increases in groundwater extraction from existing infrastructure, such as is used for dewatering at the WWTP to allow for construction at that facility. Such extraction negatively impacts the MPTP capture zone. Additional dewatering at the WWTP is anticipated in the future. DEQ and Butte/Silver Bow are working cooperatively to address this issue and minimize future impacts to the MPTP capture zone.

- There are potential remaining sources of PCP contamination in the subsurface beneath power poles in the area of Silver bow Creek.

- The compliance point for groundwater described in the ROD is the south bank of Silver Bow Creek. However, after the ROD, Silver Bow Creek was reconstructed to a new location and to a new elevation to avoid groundwater discharge to the creek. Also, PCP is currently observed in groundwater north of Silver Bow Creek and the HCC, likely due in large part to dewatering at the WWTP. Accordingly, the point of compliance for groundwater needs to be clarified to ensure that cleanup levels are met in accordance with the ROD.

- Although current zoning precludes residential uses of the Site, permanent and enforceable ICs have not yet been established to prevent future residential use of the property.

Recommendations to address these issues are provided in Section IX. DEQ indicates that adequate monies remain to take this Site through to final cleanup. Annual site costs are summarized in Section IV, and annual O&M costs (see Table 6) are consistent with ROD estimates.

As progress towards meeting remedial goals continues, opportunities for optimization include removal of infrastructure that is no longer needed, such as the oil/water separator and the product recovery tank. Removal of such components will reduce annual operations and maintenance costs. It is anticipated that removal of infrastructure that is no longer needed will be addressed during the next five-year period, and subsequent optimization opportunities will be addressed in the next 5-Year Review.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?

Yes. There have been no changes in the items listed in Question B that would affect the protectiveness of the remedy. The Baseline Risk Assessment (CDM, 1993) provides the basis for taking action and indicates the exposure pathways that need to be addressed by the remedial action. The Baseline Risk Assessment indicates that the principal threats stem from contaminated groundwater, releases of contaminated groundwater and oily wood treating fluids into surface water, and surface soils. The primary human health risk exposure pathways are ingestion of and direct contact with contaminated groundwater, and ingestion of or direct contact with soils. Potentially affected receptors include residents, workers, trespassers, recreational users, and aquatic biota. The ecological risk assessment evaluated the potential for harm to terrestrial and aquatic populations following exposure to contaminants. These items remain valid.

Since 1993, some EPA risk assessment guidance on estimating exposure and the exposure point concentration term has been updated and revised. Toxicity values for a number of chemicals listed as contaminants of concern in the 1993 risk assessment have also been updated. These changes are discussed below.

<u>Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics</u>

Susan Griffin, an EPA Region 8 toxicologist, evaluated the changes in risk assessment procedures and methodology that have occurred between 1993 and the present, and her assessment concluded that although there were a number of examples where use of more current guidance would either slightly increase or decrease the overall exposure assessment, this would not significantly affect the calculations of exposure or final conclusions of the 1993 assessment. This evaluation is provided in Attachment 7. If the 1993 risk assessment were revised to include this newer information, the quantitative risk estimates may increase slightly (or decrease slightly depending on the contaminant). However, the overall conclusions of unacceptable risk and the basis for site remediation would not change.

EPA's dioxin reassessment has been developed and undergone review over many years with the participation of scientific experts in EPA and other federal agencies, as well as scientific experts in the private sector and academia. The Agency followed current cancer guidelines and incorporated the latest data and physiological/biochemical research into the assessment. The results of the assessment have currently not been finalized and have not been adopted into state or federal standards. EPA anticipates that a final revision to the dioxin toxicity numbers may be

released by the end of 2011. In addition, EPA/OSWER has proposed to revise the interim Preliminary Remediation Goals (PRGs) for dioxin and dioxin-like compounds, based on technical assessment of scientific and environmental data. However, EPA has not made any final decisions on interim PRGs at this time. Therefore, the dioxin toxicity reassessment for this Site will be updated during the next Five-Year Review. The toxicity profile for PCP was updated in the September 2010 toxicological assessment reports issued by the USEPA National Center for Environmental Assessment at the end of FY2010 in support of the IRIS, as per the following website: http://www.epa.gov/ncea/iris/subst/0086.htm. EPA's Region 8 toxicologist evaluated this update (see Attachment 7), and concluded that if the 1993 human health risk assessment were updated to use the more current cancer and non-cancer toxicity values and TEF data, the risks estimated would slightly increase for pentachlorophenol and PAHs, but the overall conclusions regarding unacceptable risks presented in the Baseline Risk Assessment would not change.

Changes in Non-Risk-Based Standards

Cleanup criteria in the ROD that were not based on site-specific risk calculations are as follows:

- Groundwater:
  - Based on MCLs - PCP, Benzo(a)pyrene, and Dioxin TEQ

- Surface water and discharge to surface water
  - Based on MCLs – PCP and Benzo(a)pyrene
  - Based on aquatic standards – Dioxin TEQ

The following evaluation was performed for the Five-Year Review regarding changes to criteria for these constituents:

- MCLs - MCLs have not changed since the time of the ROD for the constituents listed above.

- 2010 Montana DEQ-7 water quality standards (the successor to the Gold Book standards referenced in the Montana Contaminant-Specific ARARs in the ROD) -

  - For groundwater, the DEQ-7 "Human Health Standards – Groundwater" were compared to the ROD cleanup criteria:

    - For PCP, the principal site contaminant, the DEQ-7 standard of 1 ug/l is identical to the ROD cleanup criterion.

    - For Benzo(a)pyrene the DEQ-7 standard is 0.05 ug/l, versus the ROD cleanup criterion of 0.2 ug/l. Note that the DEQ-7 standard is lower than the reporting limit stated in the DEQ-7 standards (0.1 ug/l), and lower than is typically reported for MPTP samples (generally 0.2 to 0.5 ug/l). Using influent from the NCRT and NHRT as indicators of groundwater impacts

(see Table A3-4), all samples for Benzo(a)pyrene for the last five years have been "non-detect," so it appears that there are not significant groundwater impacts for this constituent. Future sampling and analysis, however, should be reported to 0.1 ug/l if possible.

- For Dioxin TEQ, the DEQ-7 standard is 2 pg/l versus the ROD cleanup criterion of 30 pg/l. This difference is noted, but it does not impact the protectiveness of the remedy because Dioxin is relatively immobile in groundwater and human use of groundwater is restricted by the Controlled Ground Water Area for an area much greater than the extent of the PCP plume. Note that the DEQ-7 standards utilize different TEFs for calculating Dioxin TEQ than the TEFs in the ROD (The DEQ-7 TEFs are equal to TEFs provided in "*Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8-Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds"* (US EPA, December 2000). In general, the ROD TEFs are higher than the DEQ-7 TEFs factors (i.e., for the constituents typically detected at MPTP), such that the Dioxin TEQ values calculated using the ROD TEFs (used for Site data to date) are conservatively high. In the future, it is appropriate to calculate Dioxin TEQs using both sets of TEFs. However, since groundwater use is restricted, no change in the remedy is warranted. DEQ intends to conduct a comprehensive review of the remedy for dioxin in all media once EPA has finalized the revised interim preliminary remediation goals (PRGs) for dioxin and dioxin-like compounds.

- For surface water and discharge to surface water, the ROD identified the basis for certain of the surface water and discharge to surface water standards as the DEQ-7 "Aquatic Life Standards." The current DEQ-7 "Aquatic Life Standards" were compared to the ROD cleanup criteria for the following contaminants:

  - For PCP, the DEQ-7 standards are higher than the ROD cleanup criterion (5.3 ug/l for acute and 4.0 ug/l for chronic, versus the ROD criterion of 1 ug/l).

  - For Benzo(a)pyrene and Dioxin TEQ, there are no values for "Aquatic Life Standards" provided in the DEQ-7 standards.

  - For metals that are monitored (other than Arsenic), the 2010 DEQ-7 Aquatic Life Standards depend on hardness. At MPTP the hardness in the treatment plant effluent exceeds 400 mg/l, so the standards for treatment plant effluent are calculated using a value of 400 mg/l for hardness as per the DEQ-7 instructions in note 12.

    - For Arsenic, the 2010 DEQ-7 standards are higher than the ROD cleanup criterion (340 ug/l for acute and 150 ug/l for chronic,

versus the ROD criterion of 48 ug/l).

- For Cadmium, the 2010 DEQ-7 standards are mixed versus the ROD cleanup criterion (8.7 ug/l for acute is higher than the ROD criterion of 1.1 ug/l, and 0.8 ug/l is slightly lower than the ROD criterion of 1.1 ug/l). Results for effluent from the Water Treatment Plant collected during the previous year were all less than the calculated chronic value.

- For Chromium, the 2010 DEQ-7 standards are higher than the ROD cleanup criterion (5,614 ug/l for acute and 268 ug/l for chronic, versus the ROD criterion of 11 ug/l).

- For Copper, the 2010 DEQ-7 standards are higher than the ROD cleanup criterion (51.7 ug/l for acute and 30.5 ug/l for chronic, versus the ROD criterion of 12 ug/l).

- For Lead, the 2010 DEQ-7 standards are higher than the ROD cleanup criterion (476.8 ug/l for acute and 18.6 ug/l for chronic, versus the ROD criterion of 3.2 ug/l).

- For Zinc, the 2010 DEQ-7 standards are higher than the ROD cleanup criterion (387.8 ug/l for acute and chronic, versus the ROD criterion of 110 ug/l).

- Based on recent sampling, the hardness of water in Silver Bow Creek in the vicinity of the Site averages approximately 149 mg/L. So the standards for surface water in Silver Bow Creek are calculated using a value of 149 mg/l for hardness as per the DEQ-7 instructions in note 12.

  - For arsenic, the 2010 DEQ-7 standards are 340 ug/l for acute and 150 ug/l for chronic. These are higher than the ROD cleanup criterion of 48 ug/l.

  - For cadmium, the 2010 DEQ-7 standards are 0.52 ug/l for acute and 0.1 ug/l for chronic at 25 mg/L hardness; using the DEQ-7 correction for the Site's average hardness of 149 mg/l, these values become 3.19 ug/l for acute and 0.37 ug/L for chronic. The ROD cleanup criterion is 1.1 ug/l, which is lower than the calculated acute value and higher than the calculated chronic value. Results for stream samples collected during the previous year were all less than the calculated chronic value.

  - For chromium, the 2010 DEQ-7 standards are 579.32 ug/l for acute and 27.69 for chronic at 25 mg/l hardness; using the DEQ-7

correction for the Site's average hardness of 149 mg/l, these values become 2509.48 ug/l for acute and 119.46 ug/l for chronic. These are higher than ROD cleanup criterion of 11 ug/l.

- For copper, the 2010 DEQ-7 standards are 3.79 ug/l for acute and 2.85 ug/l for chronic at 25 mg/l hardness; using the DEQ-7 correction for the Site's average hardness of 149 mg/L, these values become 20.38 ug/l for acute and 13.11 ug/l for chronic. The calculated values are higher than the ROD cleanup criterion of 12 ug/l.

- For lead, the 2010 DEQ-7 standards are 13.98 ug/l for acute and 0.54 ug/l for chronic at 25 mg/l hardness; using the DEQ-7 correction for the Site's average hardness of 149 mg/l, these values become 135.64 for acute and 133.62 for chronic. The calculated values are higher than the ROD criterion of 3.2 ug/l.

- For Zinc, the 2010 DEQ-7 standards are 37.02 ug/l for both acute and chronic at 25 mg/l hardness; using the DEQ-7 correction for the Site's average hardness of 149 mg/l, these values become 167.97 ug/l for both acute and chronic. The calculated values are higher than the ROD criterion of 110 ug/l.

The ROD identified the basis for the PCP and Benzo(a)pyrene surface water and discharge to surface water cleanup levels as the MCL. The MCL for each of these is equal to the ROD cleanup levels of 1 ug/l and 0.2 ug/l, respectively.

Based on this evaluation, no change to the remedy is warranted. For PCP, the principal Site contaminant, the ROD cleanup criteria are consistent with (or more strict than) current MCLs and DEQ-7 standards. The ROD cleanup criterion for Dioxin TEQ in groundwater (30 ug/l) is consistent with the current MCL but is higher than the DEQ-7 human health standard for groundwater (2 pg/l). However, because Dioxin is relatively immobile in groundwater and human use of groundwater is restricted by the Controlled Ground Water Area for an area much greater than the extent of the PCP plume, this does not impact the protectiveness of the remedy. With respect to metals in the plant effluent, the hardness-adjusted DEQ-7 Aquatic Life Standards are all higher than the ROD criteria, except for the chronic standard for cadmium (0.8 ug/l) which is just slightly below the ROD criterion (1.1 ug/l). The revised chronic standard does not require a change to the selected remedy. The effluent values for cadmium have not exceeded 0.25 ug/l in the last five years. The selected remedy is protective because it meets the modified chronic value for cadmium, as well as the standard identified in the ROD. However, it is recommended that the new DEQ-7 chronic value for cadmium be adopted as a cleanup standard through the appropriate decision document.

Potential of Vapor Intrusion

Vapor intrusion is an emerging exposure pathway being evaluated by EPA. According to tables in the 2002 guidance, PCP (the primary contaminant) is not sufficiently volatile to present a vapor intrusion risk. In more recent, updated tables, PCP is stated as not sufficiently volatile to present a risk from groundwater, but it is possible that impacted soils can present a vapor intrusion risk. However, PCP-impacted soils have been addressed by the remedy to date, and DEQ will also be implementing institutional controls that restrict residential use of the Site. When these institutional controls are implemented, DEQ will also include a requirement that any structures constructed on the Site have proper DEQ-approved indoor air mitigation systems, as appropriate.

The remedy is progressing as expected. Groundwater treatment is generally effective in removing contaminants of concern. PCP and PAHs in soils are being effectively degraded through treatment in the Land Treatment Unit, while dioxins/furans are not effectively removed to meet the cleanup standards specified in the ROD. After remediation, the treated soils containing dioxins and furans will remain onsite. Soils containing dioxins and furans are unlikely to present a vapor intrusion risk. The risks associated with the remaining dioxins/furans in soils will be evaluated upon finalization of EPA's dioxin reassessment, as described above.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Yes. The dewatering activity at the WWTP located just north of the MPTP negatively impacted the capture zone of the MPTP extraction system (which in the absence of such off-Site extraction appears to provide adequate hydraulic containment for the groundwater plume at the MPTP site). Investigation conducted as a result of the WWTP dewatering determined that PCP concentrations in groundwater currently extend north of Silver Bow Creek and the HCC (likely due in large part to the dewatering activity), and also determined that water containing PCP was discharged to the HCC during the dewatering. Furthermore, it is likely that low levels of PCP in groundwater that were pulled towards the HCC and under the HCC during the WWTP dewatering are now discharging at low concentrations to the HCC, since groundwater discharges to the HCC under normal conditions. Surface water concentrations at compliance points in Silver Bow Creek have not increased and remain below standards. Information gathered as a result of the WWTP dewatering has led to the identification of several of the "issues" discussed in Section VIII of this Five-Year Review. DEQ and BSB are working cooperatively to develop and implement strategies to eliminate negative impacts (including impacts to the capture zone of the MPTP remedy) that might otherwise be caused by future WWTP dewatering activities.

VIII. Issues

Issues with respect to OU-1 (which is the only operable unit at the Site) are noted on Table 11.

Table 11: Issues

Issues	Affects Protectiveness (Y/N)	
	Current	Future
The Controlled Ground Water Area (CGA) implemented in October 2009 does not explicitly address large increases in groundwater extraction from existing infrastructure, such as is used for dewatering at the Butte-Silver Bow wastewater treatment plant (WWTP) to allow for construction at that facility. Such extraction negatively impacts the MPTP capture zone.	N	Y
There are potential remaining sources of PCP contamination in the subsurface beneath power poles north of the Near Creek Recovery Trench (NCRT).	N	Y
PCP is currently observed in groundwater north of Silver Bow Creek and north of the HCC, likely due to in large part to dewatering at the WWTP. The point of compliance for groundwater needs to be clarified to ensure that cleanup levels are met in accordance with the ROD.	N	Y
Although current zoning precludes residential uses of the Site, permanent ICs for soil have not yet been established to prevent residential use of the property.	N	Y
The hardness-adjusted DEQ-7 Aquatic Life Standard for the chronic standard for cadmium (0.8 ug/l) is below the ROD criterion (1.1 ug/l).	N	N

IX. Recommendations and Follow-up Actions

Recommendations and follow-up actions for OU1 (which is the only operable unit at the Site) are listed in Table 12.

Table 12: Recommendations and Follow-up Actions

Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current	Future
Modify the existing Controlled Ground Water Area established in October 2009 to address significant increases in groundwater withdrawals from existing infrastructure that are planned in the vicinity of MPTP.	Butte-Silver Bow County Health Department, as sponsor of the original Controlled Ground Water Area; DEQ	DEQ, EPA,	12/31/13	N	Y
Remove PCP contaminated soil beneath power poles.	DEQ	EPA, DEQ	9/30/12	N	Y
Clarify the points of compliance for groundwater to reflect the current configuration of Silver Bow Creek, the current PCP plume distribution, and the updated conceptual site model.	EPA, DEQ	EPA, DEQ	12/30/12	N	Y
Develop and implement permanent ICs to prevent future on-site residential use and restrict land use where waste has been left in place above levels that allow for unlimited use/unrestricted exposure.	DEQ, EPA, Butte Silver Bow County	DEQ, EPA	1/1/16	N	Y
Through the appropriate decision document, adopt the August 2010 DEQ-7 chronic value for cadmium as a cleanup standard. The revised chronic standard does not require a change to the selected remedy because it meets the modified chronic value for cadmium, as well as the standard identified in the ROD.	DEQ, EPA	DEQ, EPA	12/30/12	N	N

X. Protectiveness Statement(s)

The remedy at OU 1 currently protects human health and the environment because exposure pathways that could result in unacceptable risk are being controlled by soil containment, hydraulic capture of impacted groundwater, access controls, and a Controlled Ground Water Area (an institutional control). However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure long-term protectiveness:

- Document that the Controlled Ground Water Area has been modified to address large withdrawals of water from existing infrastructure in the vicinity of the Site.
- Characterize and remove potential sources of PCP beneath power poles north of the NCRT.
- Update site information to account for the current PCP plume distribution and the reconstruction of Silver Bow Creek that occurred after the ROD was completed.
- Implement permanent and enforceable ICs to prevent future on-site residential use.
- Treated soils are expected to contain dioxins above the current ROD cleanup levels, and appropriate management of these soils will be evaluated and the administrative record/ROD will be updated once EPA has finalized the revised interim preliminary remediation goals (PRGs) for dioxin and dioxin-like compounds. Re-evaluate appropriate cleanup standards for dioxin and dioxin-like compounds in groundwater at that time as well.

XI. Next Review

The next Five-Year Review for Montana Pole and Treating Plant Site is required by June 2016, five years from the date of this review.

XII. References

Site documents reviewed and/or referenced are listed in Section VI. Other references are provided below.

- Information regarding the Butte Alluvial and Bedrock Controlled Ground Water Area - http://www.dnrc.mt.gov/wrd/water_rts/cgwa/butte/default.asp
- Lower Area One (LAO) Construction Report, Volumes 1-6, 2002 (HKM Engineering and Anderson Engineering) — PDF, except many drawings not included
- Current zoning in the vicinity of the MPTP site is provided at http://www.bsb.mt.gov/docs/maps/zoning.pdf)

- Montana Department of Environmental Quality, February 2010. *Circular DEQ-7, Montana Numeric Water Quality Standards.*
  http://www.deq.mt.gov/wqinfo/circulars/DEQ-7.pdf
- U.S. Environmental Protection Agency, December 2010. *Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8-Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds (EPA/100/R 10/005)*
  http://www.epa.gov/raf/files/tefs-for-dioxin-epa-00-r-10-005-final.pdf

Figures

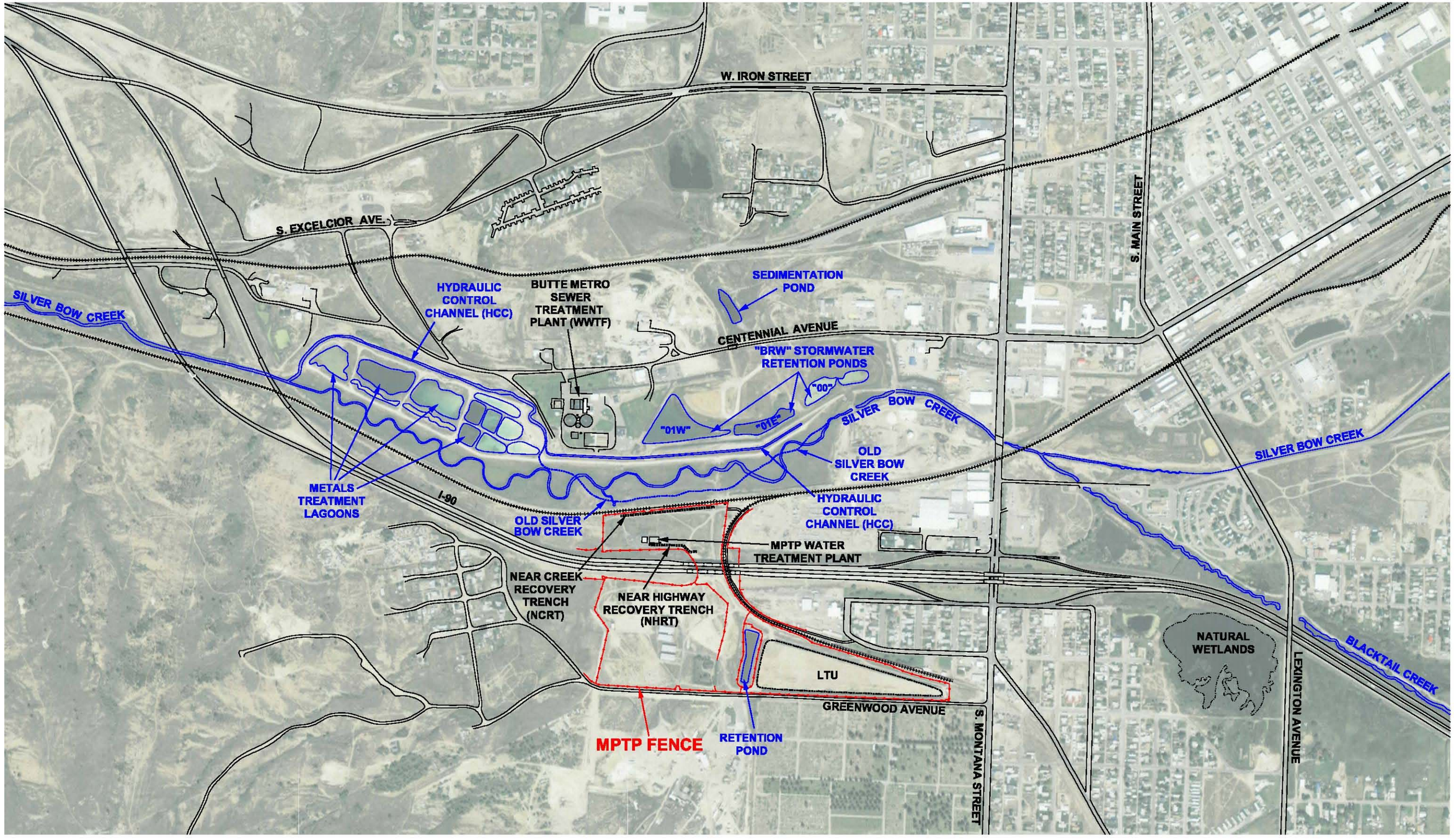

Figure 1. Key Features in Vicinity of MPTP Site

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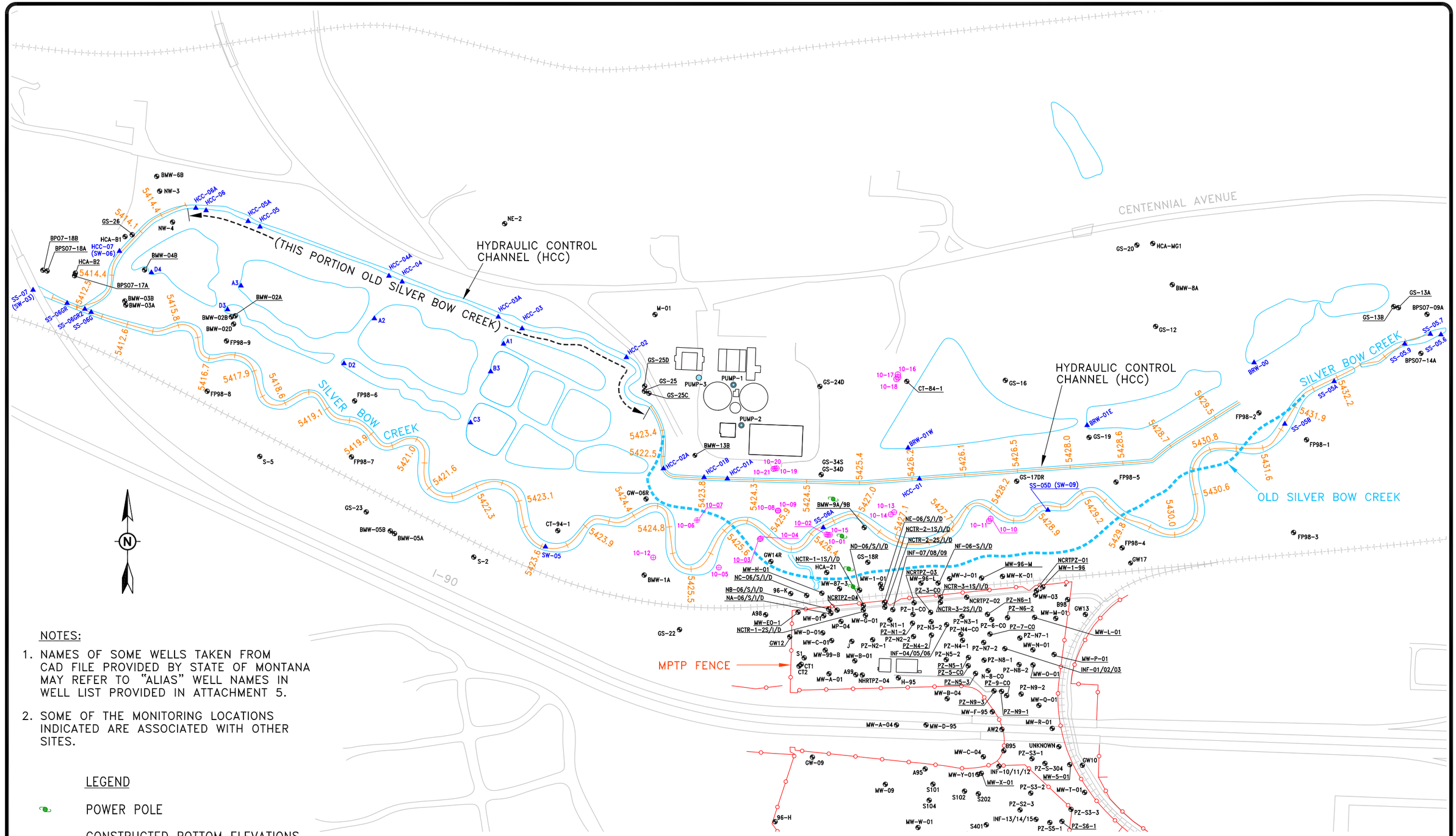

NOTES:

1. NAMES OF SOME WELLS TAKEN FROM CAD FILE PROVIDED BY STATE OF MONTANA MAY REFER TO "ALIAS" WELL NAMES IN WELL LIST PROVIDED IN ATTACHMENT 5.
2. SOME OF THE MONITORING LOCATIONS INDICATED ARE ASSOCIATED WITH OTHER SITES.

LEGEND

POWER POLE

CONSTRUCTED BOTTOM ELEVATIONS OF SILVER BOW CREEK AND HCC

0 350 700

SCALE IN FEET

0509147003A.DWG

Figure 2a. Monitoring Locations and Constructed Bottom Elevations of Silver Bow Creek and HCC

Tetra Tech

HYDRAULIC CONTROL CHANNEL (HCC)

CENTENNIAL AVENUE

HYDRAULIC CONTROL CHANNEL (HCC)

SILVER BOW CREEK

OLD SILVER BOW CREEK

I-90

MPTP FENCE

NOTES:

1. NAMES OF SOME WELLS TAKEN FROM CAD FILE PROVIDED BY STATE OF MONTANA MAY REFER TO "ALIAS" WELL NAMES IN WELL LIST PROVIDED IN ATTACHMENT 5.
2. SOME OF THE MONITORING LOCATIONS INDICATED ARE ASSOCIATED WITH OTHER SITES.

LEGEND

POWER POLE

CONSTRUCTED BOTTOM ELEVATIONS OF SILVER BOW CREEK AND HCC

0 350 700

SCALE IN FEET

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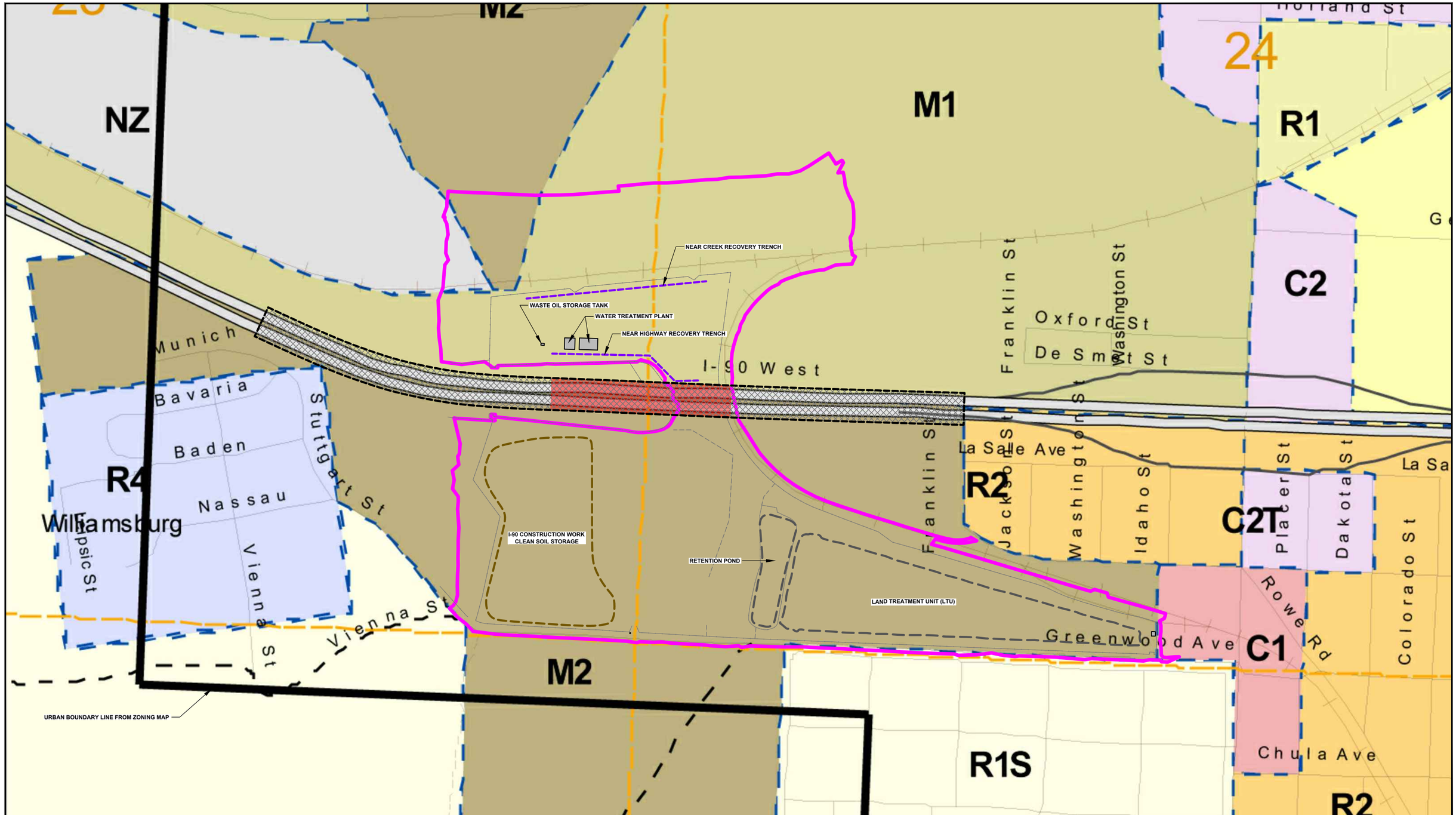
Figure 2b. Monitoring Locations and Constructed Bottom Elevations of Silver Bow Creek and HCC (Shows Southern Part of MPTP Site)

Tetra Tech



ZONING MAP SOURCE: http://www.bsb.mt.gov/docs/maps/zoning.pdf

ZONING CLASSIFICATIONS

C1	LOCAL COMMERCIAL	NZ	NOT ZONED OR EXEMPT
C2	COMMUNITY COMMERCIAL	R1	ONE FAMILY RESIDENTIAL
C2T	TRANSITIONAL COMMUNITY COMMERCIAL	R1S	ONE FAMILY SUBURBAN RESIDENTIAL
M1	LIGHT INDUSTRIAL	R2	TWO FAMILY RESIDENTIAL
M2	HEAVY INDUSTRIAL	R4	MOBILE HOMES

FEATURE LEGEND

- PROJECT BOUNDARY
- BUILDING
- FENCE
- AREA OF I-90 CONSTRUCTION WORK
- POTENTIAL REMAINING SOURCE OF PCP BENEATH I-90 CONSTRUCTION WORK

N

200 0 200 400

SCALE IN FEET

Montana Pole and Treating Plant
Butte/Silver Bow Montana

FIGURE 3
CURRENT ZONING AND LOCATION OF I-90 CONSTRUCTION

TETRA TECH EM, INC.

Figure 3_ Zoning and Construction Location.dwg - DWH - 04/07/2011

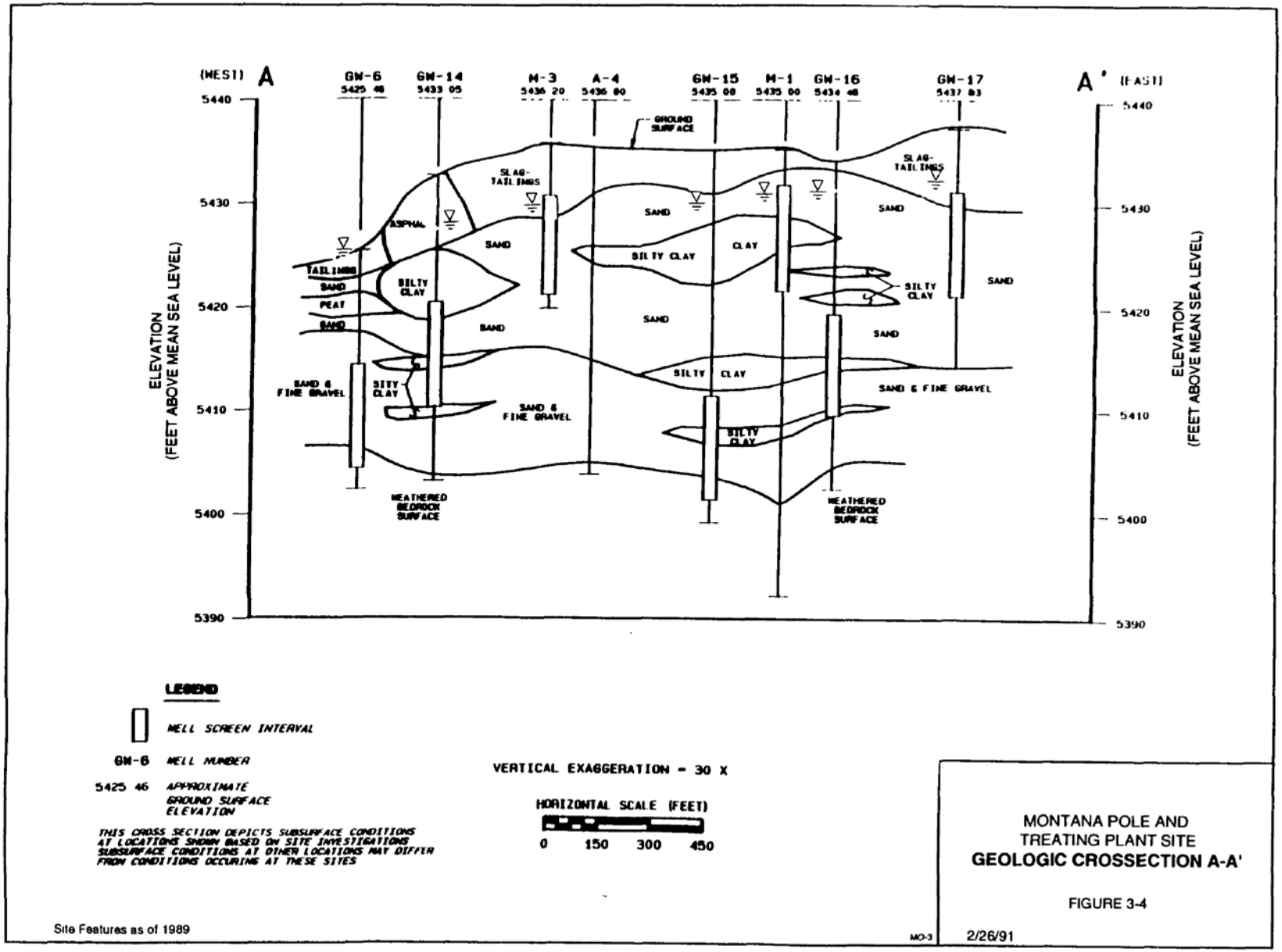
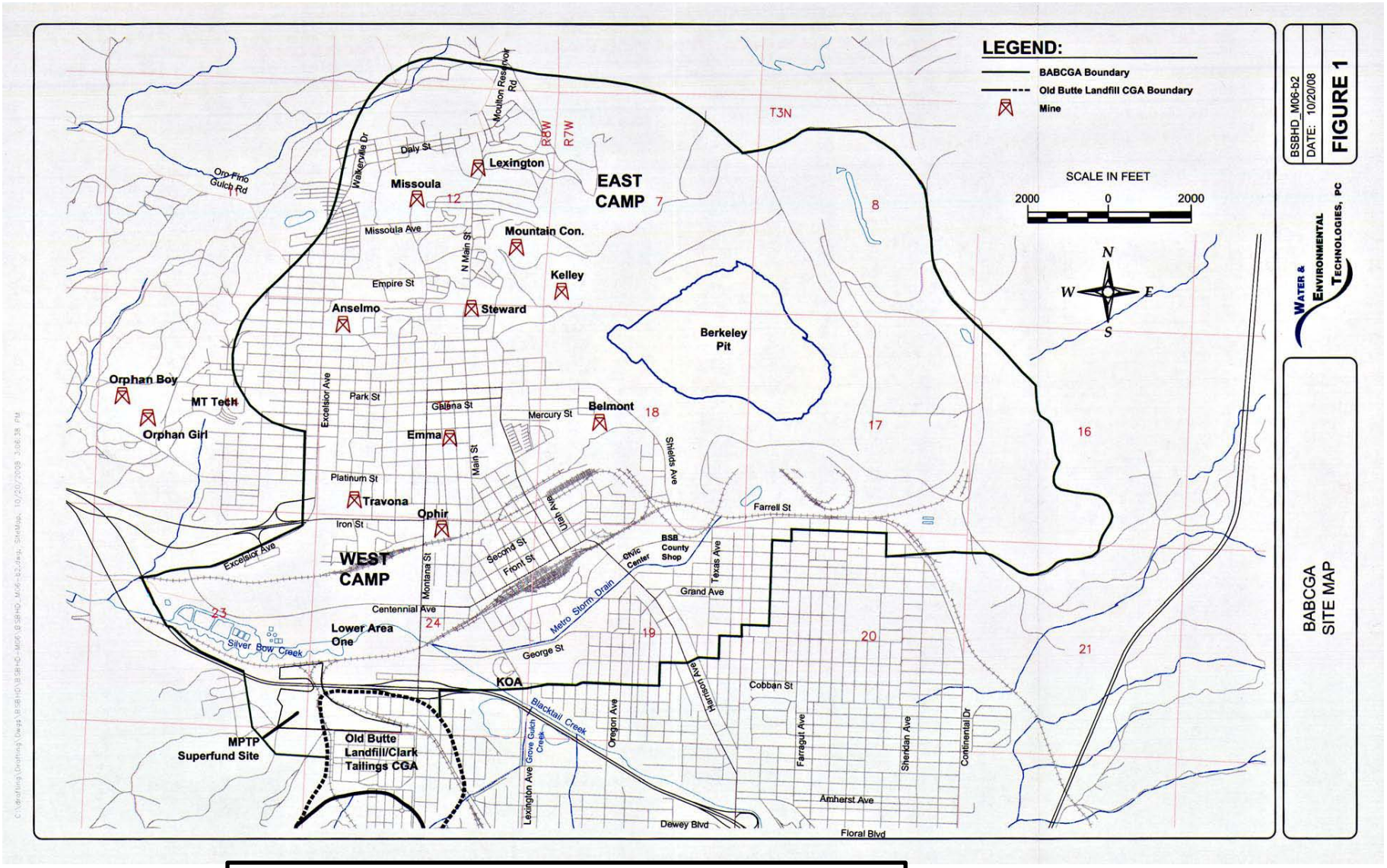


Figure 4. East-West Cross Section, Near Silver Bow Creek, from MPTP RI (Prior to Excavation Associated with MPTP and LAO Remedies)

TETRA TECH



From Figure 1 of the CGA Final Order, October 30, 2009

Figure 5. Location of Controlled Ground Water Area (CGA)

TETRA TECH

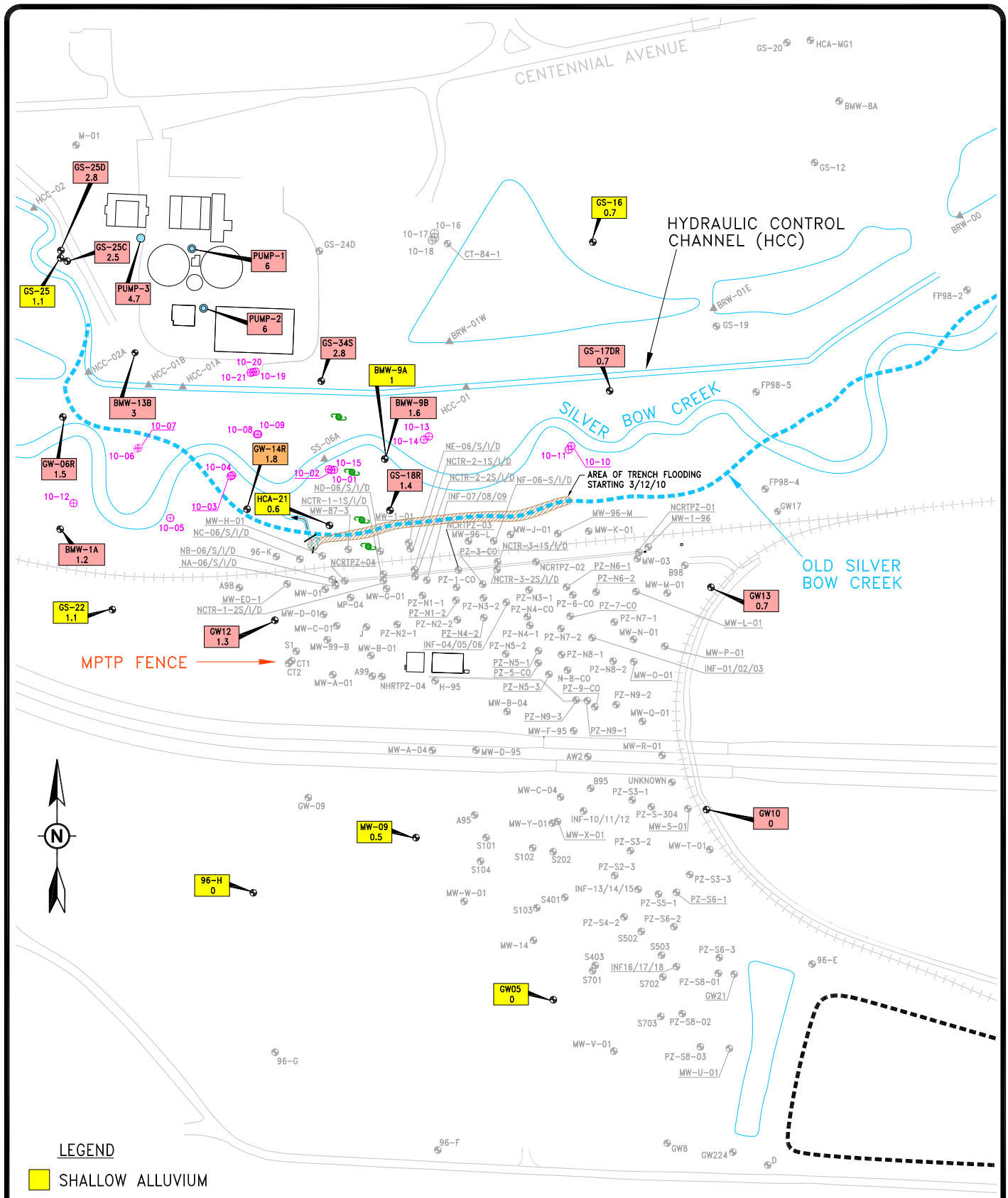


Figure 6. Observed Water Level Response to Dewatering Activities at WWTP

Tetra Tech

0509147006A.DWG

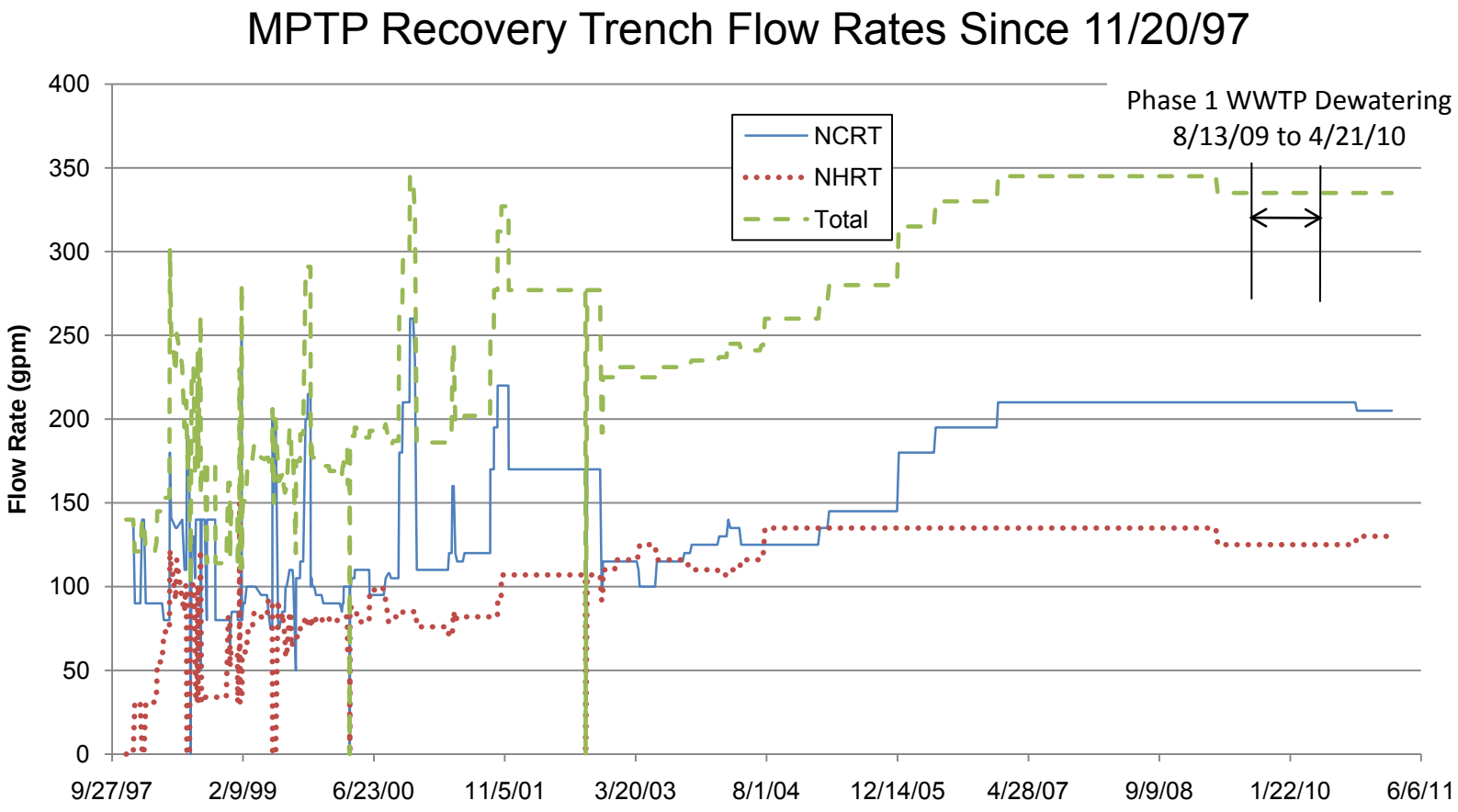
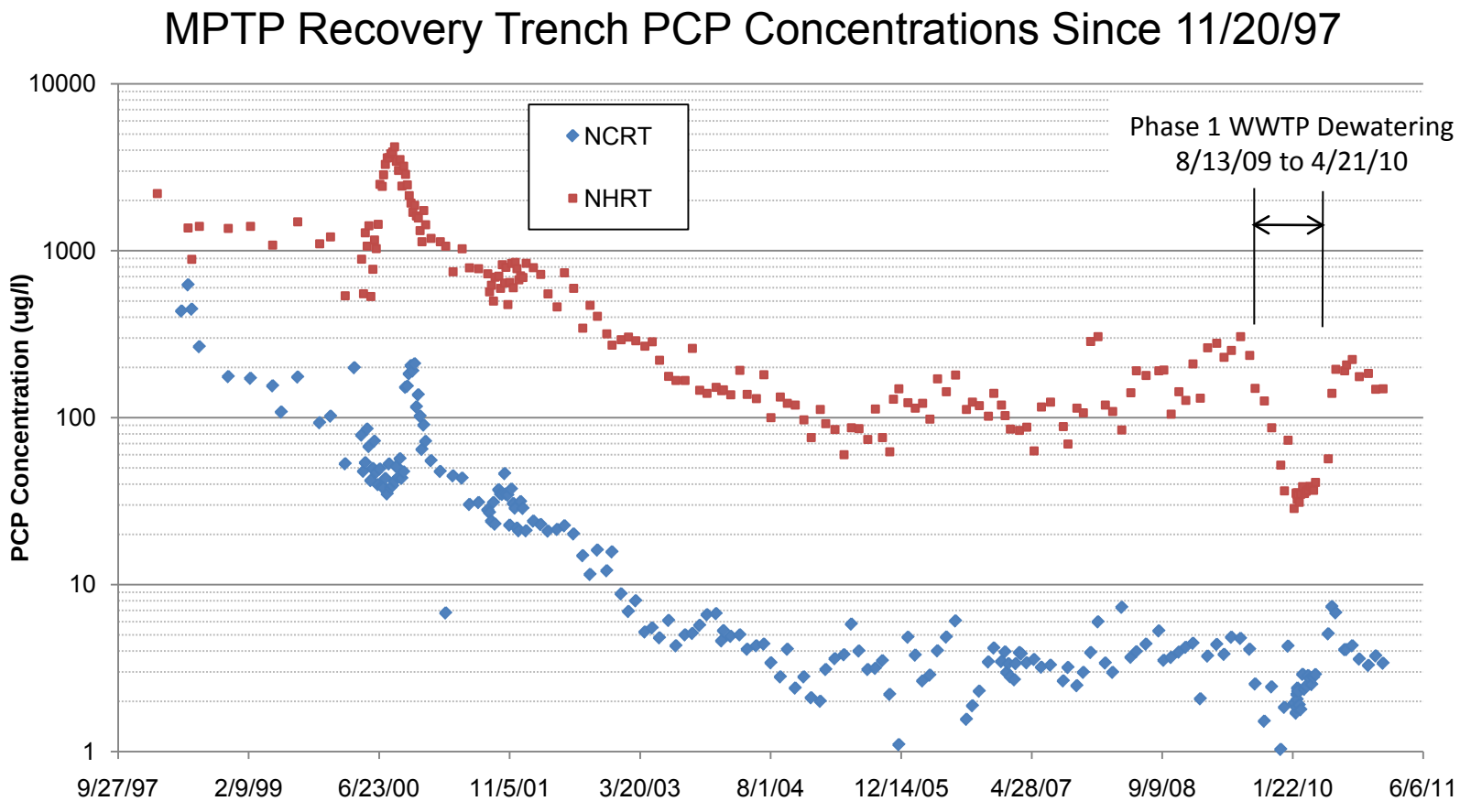


Figure 7. Flow Rates at MPTP Recovery Trenches Since 11/20/97

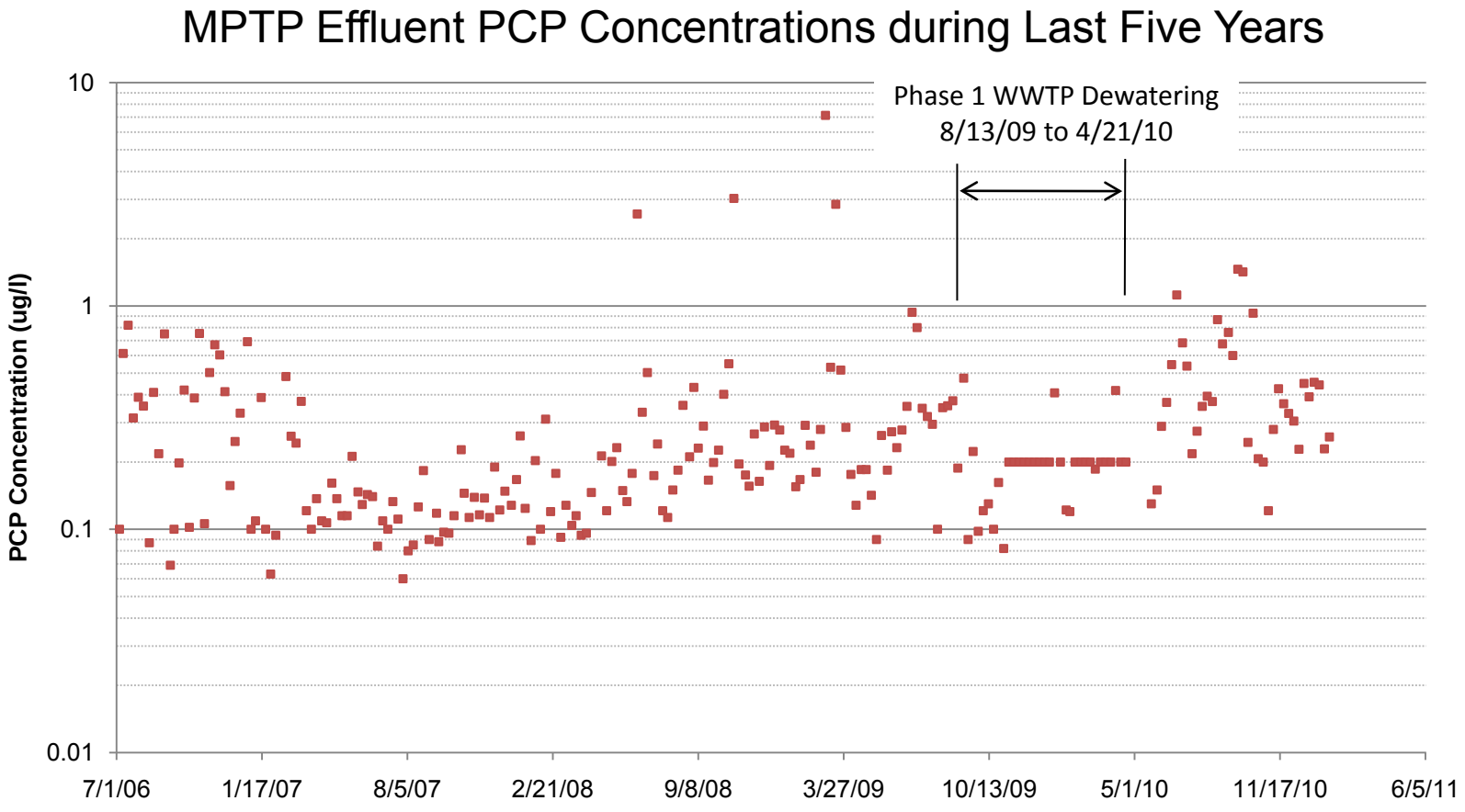
TETRA TECH



Groundwater cleanup criterion for PCP is 1 ug/l

Figure 8a. PCP Concentrations at MPTP Recovery Trenches Since 11/20/97

TETRA TECH



- Groundwater discharge criterion for PCP is 1 ug/l
- Non-detects plotted at the detection limit

Figure 8b. PCP Concentration in MPTP Treatment Plant Effluent during Last Five Years

TETRA TECH

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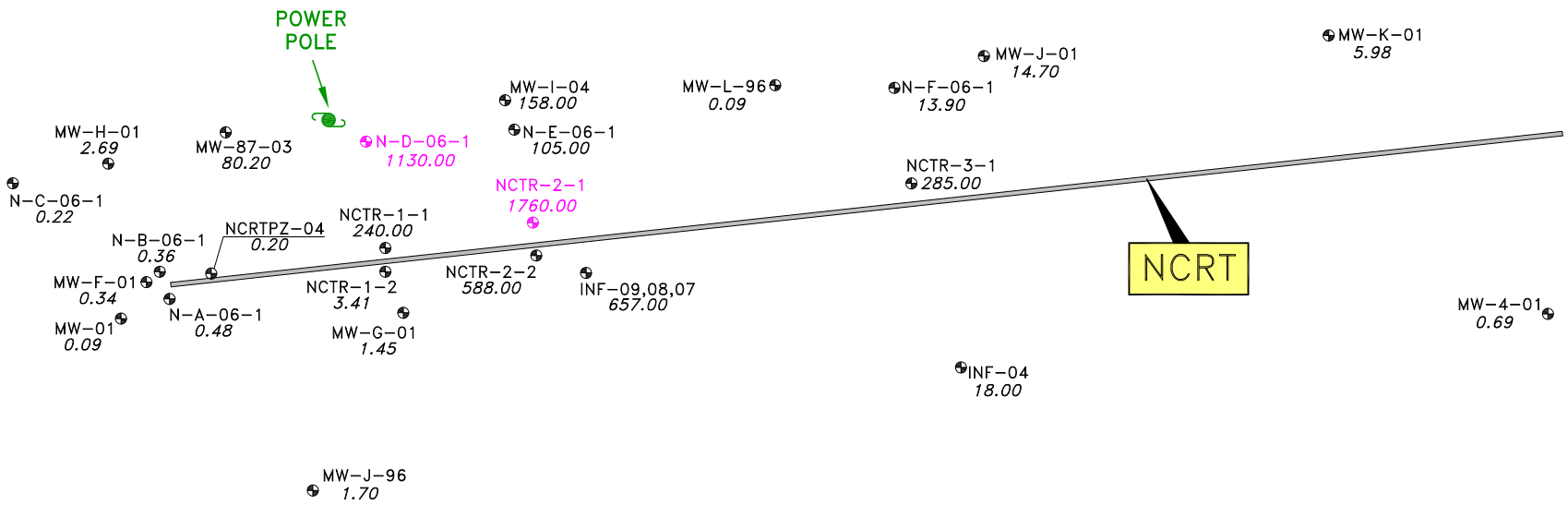
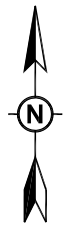


NOTES:

1. POSTED VALUES ARE PCP CONCENTRATIONS IN μg/L, WELLS WITH HIGHEST PCP VALUES HIGHLIGHTED IN PINK.
2. CLEANUP CRITERION FOR PCP IN GW IS 1 μg/L.
3. FIGURE BASED ON CDM'S 2007 "NEAR CREEK TRENCH INVESTIGATION", FIGURE 31, FOR SHALLOW WELL PCP CONCENTRATIONS ON OCTOBER 9, 2006.



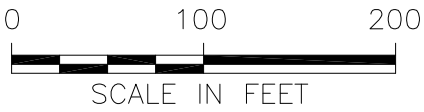


Figure 9. Example of Figure From CDM's 2007 "Near Creek Investigation" Illustrating High Concentrations of PCP North of NCRT Potentially Caused by Residual Product Beneath Power Pole

Tetra Tech

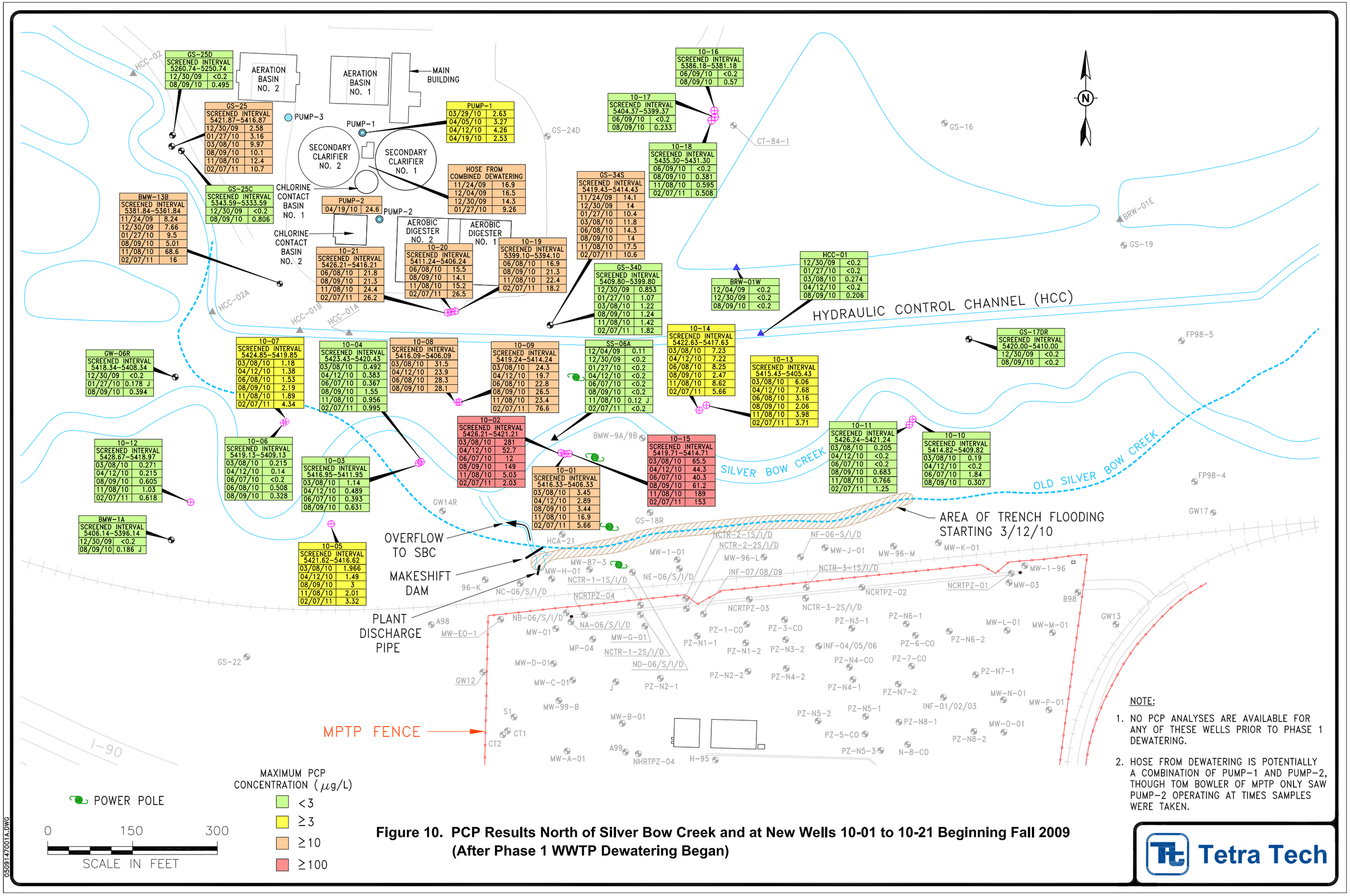


Figure 10. PCP Results North of Silver Bow Creek and at New Wells 10-01 to 10-21 Beginning Fall 2009 (After Phase 1 WWTP Dewatering Began)

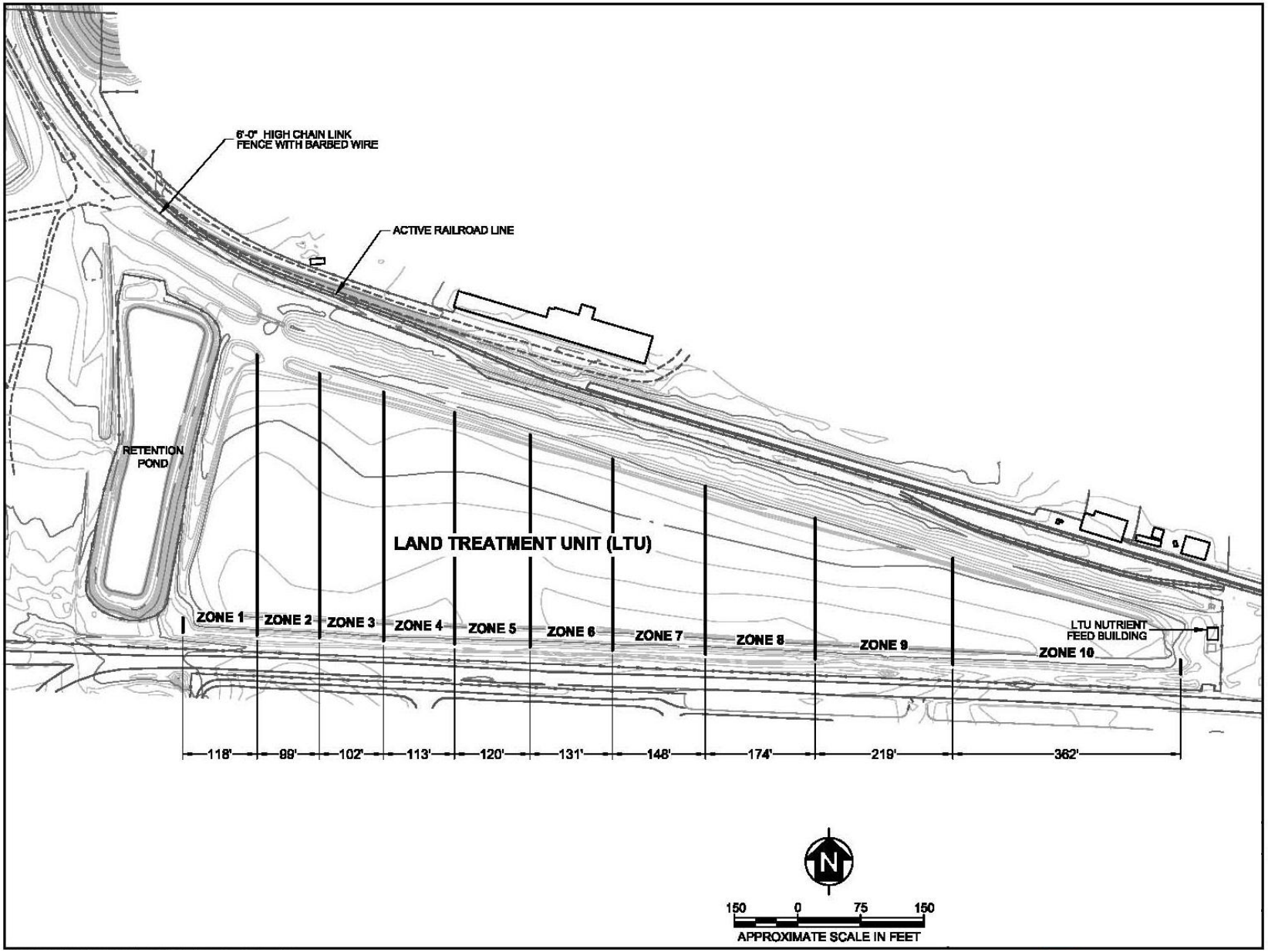


Figure 11. Locations of LTU Sampling Zones

TETRA TECH

Attachments

Attachment 1

Completed Site Inspection Checklist

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Montana Pole and Treating Plant	**Date of inspection:** 3/15/11
Location and Region: Butte, MT Region 8	**EPA ID:** MTD986073583
Agency, office, or company leading the five-year review: Montana DEQ, cooperatively with USEPA Region 8	**Weather/temperature:** Partly Cloudy, mid-40s

Remedy Includes: (Check all that apply)

- ☑ Landfill cover/containment
- ☑ Access controls
- ☑ Institutional controls
- ☑ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other_____
- ☐ Monitored natural attenuation
- ☑ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☑ Inspection team roster attached (see main report) ☑ Site map attached (see main report)

II. INTERVIEWS (Check all that apply)

1. **O&M site manager**
   Name: **Tom Bowler** Title: **Site Operations Manager** Date: 3/15/11
   Interviewed ☑ at site ☐ at office ☐by phone Phone no. 406-723-7247

   Problems, suggestions; ☑ Report attached: see interview summary for Mr. Bowler in Attachment 2.

2. **O&M Staff**
   Name: Title: Date:
   Interviewed ☐ at site ☐ at office ☐by phone Phone no.

   Problems, suggestions; ☐ Report attached

3. **Other Interviews**

   See interview summaries in Attachment 2.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	**O&M Documents**			
	☑ O&M manual	☑ Readily available	☑ Up to date	☐ N/A
	☑ As-built drawings	☑ Readily available	☑ Up to date	☐ N/A
	☑ Maintenance logs	☑ Readily available	☑ Up to date	☐N/A
	Remarks :*Daily inspections conducted and summed up electronically*			
2.	**Site-Specific Health and Safety Plan**	☑ Readily available	☑ Up to date	☐ N/A
	Contingency plan/emergency response plan	☑ Readily available	☑ Up to date	☐ N/A
	Remarks:			
3.	**O&M and OSHA Training Records**	☑ Readily available	☑ Up to date	☐ N/A
	Remarks:			
4.	**Permits and Service Agreements**			
	☐ Air discharge permit	☐ Readily available	☐ Up to date	☑ N/A
	☐ Effluent discharge	☐ Readily available	☐ Up to date	☑ N/A
	☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☑ N/A
	☐ Other permits_____	☐ Readily available	☐ Up to date	☑ N/A
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	☑ N/A
	Remarks:			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☑ N/A
	Remarks:			
7.	**Groundwater Monitoring Records**	☑ Readily available	☑ Up to date	☐ N/A
	Remarks: *Available electronically at the Site and also available on the state of Montana's Groundwater Information Center Database.*			
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	☑ N/A
	Remarks:			
9.	**Discharge Compliance Records**			
	Air	☐ Readily available	☐ Up to date	☑ N/A
	Water (effluent)	☑ Readily available	☑ Up to date	☐ N/A
	Remarks: *Available electronically.*			
10.	**Daily Access/Security Logs**	☑ Readily available	☑ Up to date	☐ N/A
	Remarks :			

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☑ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____

2. **O&M Cost Records**

☑ Readily available ☑ Up to date
☑ Funding mechanism/agreement in place
Original O&M cost estimate_____ ☐ Breakdown attached

Information regarding costs are provided in Section IV and Table 6 of the Five-Year Review Report. The annual cost for routine O&M, based on the last three years, is ~ $772,000 per year.

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons:

Due to dewatering efforts from an outside party, additional wells were installed and frequency of monitoring increased during the dewatering. Performed groundwater modeling to better understand the impacts to the flow system caused by the dewatering.

Had to redo the potable water line to the Site due to a leak in the pipe and because bridge construction required rerouting of line to allow future access.

V. ACCESS AND INSTITUTIONAL CONTROLS ☑ Applicable ☐ N/A

A. Fencing

1. Fencing damaged ☐ Location shown on site map ☑ Gates secured ☐ N/A
Remarks :

Fencing damaged in highway corridor. Will be repaired upon completion of bridge work. Fence is inspected daily during site inspections.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
Remarks

Signs are placed on fence in 50 yard intervals around the Site.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _____

Frequency _____

Responsible party/agency _____

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A

Violations have been reported ☐ Yes ☐ No ☐ N/A

Other problems or suggestions: ☐ Report attached

As discussed in text of Five-Year Review Report, there is a Controlled Groundwater Area (CGA) that was put in place in after the Second Five-Year Report, which prevents new wells from being drilled. It does not appear that new well installations have taken place within the CGA. However, the CGA did not include controls for notifying DEQ or EPA about the dewatering activities at the WWTP that occurred in late 2009 and early 2010. Modification to the existing Controlled Groundwater Area is suggested in this Five-Year Review.

2. **Adequacy** ☐ ICs are adequate ☑ ICs are inadequate ☐ N/A

Remarks

Upon closure of LTU, land use restrictions will need to be implemented for the Site. Controlled Groundwater Area needs to be revised to include notification of any activity that may impact the migration of the plume.

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☐ No vandalism evident

Remarks:

Transients have been known use interstate corridor have been known to cut through the fence. There have been no known occurrences of this in the past several years.

2. **Land use changes on site** ☐ N/A

Remarks:

No long term land use changes noted. Short term land use changes include a construction corridor on site for the I-90bridge replacement that restricts movement on Site, and placing excess soils removed during I-90 bridge replacement on Site.

3. **Land use changes off site** ☑ **N/A**
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☑ Applicable ☐ N/A

1. Roads damaged ☐ Location shown on site map ☑ Roads adequate ☐ N/A
Remarks:

Road under the Interstate bridge will have to be regraded upon completion of bridge replacement.

B. Other Site Conditions

Remarks:

VII. LANDFILL COVERS ☑ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☑ Settlement not evident
Areal extent_____ Depth_____
Remarks:

2. **Cracks** ☐ Location shown on site map ☑ Cracking not evident
Lengths_____ Widths_____ Depths_____
Remarks:

3. **Erosion** ☐ Location shown on site map ☑ Erosion not evident
Areal extent_____ Depth_____
Remarks:

4. **Holes** ☐ Location shown on site map ☑ Holes not evident
Areal extent_____ Depth_____
Remarks:

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☑ No signs of stress
Trees/Shrubs (indicate size and locations on a diagram)

Remarks:

6. **Alternative Cover (armored rock, concrete, etc.)** ☑ N/A
Remarks:

7. **Bulges** Location shown on site map ☑ Bulges not evident
Areal extent_____ Height_____
Remarks:

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident

☐ Wet areas	☐ Location shown on site map	Areal extent_____
☑ Ponding (of snow melt)	☐ Location shown on site map	Areal extent 30 x 75ft
☐ Seeps	☐ Location shown on site map	Areal extent_____
☐ Soft subgrade	☐ Location shown on site map	Areal extent_____

Remarks:

MDT moved a berm for bridge construction resulting in a change of site runoff. This will need to be remedied for final site configuration.

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☑ No evidence of slope instability
Areal extent_____
Remarks:

B. Benches ☐ Applicable ☑ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

C. Letdown Channels ☐ Applicable ☑ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

D. Cover Penetrations ☐ Applicable ☑ N/A

E. Gas Collection and Treatment ☐ Applicable ☑ N/A

F. Cover Drainage Layer ☐ Applicable ☑ N/A

G. Detention/Sedimentation Ponds ☐ Applicable ☑ N/A

H. Retaining Walls ☐ Applicable ☑ N/A

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☑ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☑ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☑ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☑ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☑ Good condition ☑ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks:

Replaced pumps and control circuitry in the past two years

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☑ Good condition ☐ Needs Maintenance
Remarks:

Replaced all pumps and control circuitry in the last two years. Weather seal on NCRT meter vault needs to be replaced.

3. **Spare Parts and Equipment**
☑ Readily available ☑ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks:

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☑ N/A

C. Treatment System ☑ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☑ Carbon adsorbers
☐ Filters_____
☐ Additive (*e.g.*, chelation agent, flocculent)
☐ Others_____
☑ Good condition ☐ Needs Maintenance
☑ Sampling ports properly marked and functional
☑ Sampling/maintenance log displayed and up to date
☑ Equipment properly identified
☑ Quantity of groundwater treated annually: *~ 177 million gallons treated annually*

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ☑ Good condition ☐ Needs Maintenance
Remarks:

Modified and upgraded in last three years

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☑ Good condition ☑ Proper secondary containment ☐ Needs Maintenance

Remarks:

Screens over vaults may not be OSHA compliant. Recommend that it needs to be evaluated for OSHA compliance. Frozen water noted in LNAPL secondary containment structure. Recommend that this gets drained once it melts.

4. **Discharge Structure and Appurtenances**

☐ N/A ☑ Good condition ☐ Needs Maintenance

Remarks:

5. **Treatment Building(s)**

☐ N/A ☑ Good condition (esp. roof and doorways) ☐ Needs repair

☑ Chemicals and equipment properly stored

Remarks:

6. **Monitoring Wells** (pump and treatment remedy)

☑ Properly secured/locked ☑ Functioning ☑ Routinely sampled ☑ Good condition

☐ All required wells located ☐ Needs Maintenance ☐ N/A

Remarks:

Wells inside fenced area are not locked. Wells outside fenced area that are not in the controlled area are locked. In controlled area (Silver Bow Creek floodplain), wells serve multiple purposes and are not locked to allow access by multiple parties. Frost upheaval on wells near Silver Bow Creek particularly BMW-9A were noted during the site inspection. Recently installed wells have used PVC as a protective well casing instead of state approved metal casing due to potential for frost heaving in this area.

D. Monitoring Data

1. Monitoring Data

☑ Is routinely submitted on time ☑ Is of acceptable quality

2. Monitoring data suggests:

☑ Groundwater plume is effectively contained ☑ Contaminant concentrations are declining

No longer have free flowing product.

Extracted PCP concentrations have declined since remedy began (see Figure 8 of Five-Rear Review).

Modeling (Tetra Tech, 2010) suggests containment is adequate under typical conditions.

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☑N/A
   Remarks:

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

No major issues identified as part of site inspection. It was noted during the site inspection that if a video truck is on site to evaluate the NHRT, it is suggested that a select quantity of monitoring wells be videotaped to evaluate continued integrity of the PVC inner casings of the monitoring wells

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No issues noted during the site inspection.

C.	Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

See report for detailed discussion of the WWTP dewatering and related impacts. It was also discussed during the site inspection of the need to re-evaluate what are appropriate Points of Compliance in light of a reconstructed Silver Bow Creek channel. The compliance point for groundwater described in the ROD is the south bank of Silver Bow Creek. However, after the ROD, Silver Bow Creek was reconstructed to a new location and to a new elevation to avoid groundwater discharge to the creek. Also, PCP is currently observed in groundwater north of Silver Bow Creek and the HCC, likely due to dewatering at the WWTP.

D.	Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

It was discussed during the site inspection that components and/or appurtenances that are no longer used can be eliminated to achieve utility savings and reduce the potential for frozen control valves or other points of failure.

Attachment 2

Notices of Third Five-Year Review

- ***Newspaper Ads***
- ***MPTP Site Update, March 2011***
- ***Sign-in From Community Meeting of 3/24/11***

Montana Standard: Sunday 1/16/11 and Wednesday 1/19/11

Review of Cleanup Scheduled at the Montana Pole Superfund Site

The Montana Department of Environmental Quality and U.S. Environmental Protection Agency are conducting a Five-Year Review on the Montana Pole and Treatment Plant Superfund Site. The site, which is associated with a previous wood treating facility, is located at 220 West Greenwood Avenue, Butte, Montana. The review process begins in January 2011 and is planned to be completed by June 2011.

The Five-Year Review is a regular checkup on a Superfund site to ensure that cleanup decisions continue to protect people and the environment. This represents the third Five-Year Review of the remedial actions implemented at the site.

Montana Pole is one of several Clark Fork Basin Federal Superfund Sites. It was added to the National Priority List in 1987. The groundwater and soils at the site were contaminated with PCP, PAHs, dioxins and furans. After more than 20 years of thorough environmental study and complex cleanup, the site is reaching its final phase of soil remediation and the water treatment plant continues its operation. If you would like to learn more about the site, please visit the following web site: http://www.epa.gov/region8/superfund/mt/montana_pole/index.html#8

For more information contact:

Lisa DeWitt
DEQ Project Officer
406-841-5037
lidewitt@mt.gov

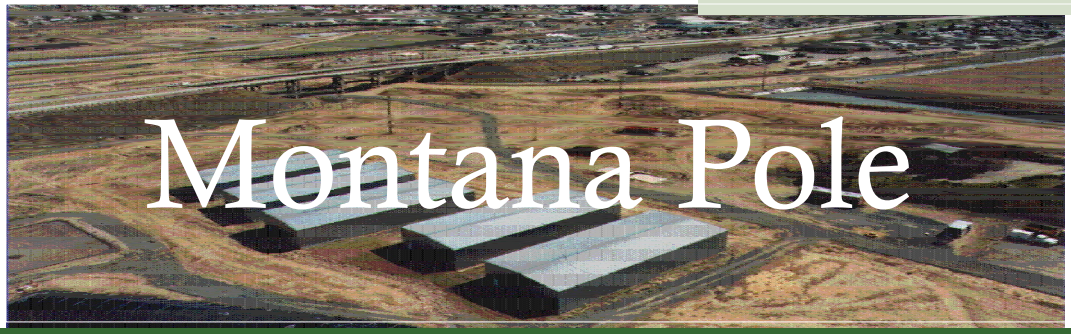
Roger Hoogerheide
EPA Remedial Project Officer
Toll free at 1-866-457-2690 ext. 5031
hoogerheide.roger@epa.gov

Montana Department of Environmental Quality

United States Environmental Protection Agency

Montana Pole and Treating Plant Federal Superfund Site

Montana Pole



Site Update **March 2011**

Five-Year Review at Montana Pole

The Montana Department of Environmental Quality (DEQ) and U.S. Environmental Protection Agency (EPA) are conducting a Five-Year Review on the Montana Pole and Treating Plant Federal Superfund Site. The review process began in January 2011 and will culminate with the release and distribution of the Five-Year Review Report in July 2011.

The Five-Year Review is EPA's regular checkup on a Superfund site to ensure that cleanup decisions continue to protect people and the environment. This is the third Five-Year Review. Like all stages of the process to clean up contaminated sites, this one calls for public involvement. Please read in this Site Update about a community meeting and community interviews about the Site.

Community Meeting

Thursday
March 24, 2011
7 p.m.
Boulevard Volunteer Fire Hall

About the Site

The Montana Pole Site, which was a wood treating facility, is located at 220 West Greenwood Avenue, Butte, Montana. Montana Pole is one of several Clark Fork Basin Federal Superfund Sites. It was added to the National Priority List in 1987.
The groundwater and soils at the Site were contaminated with pentachlorophenol (PCP), related chlorinated phenols, polynuclear aromatic hydrocarbons (PAHs), dioxins and furans.

The DEQ and EPA have removed immediate sources of soil contamination, treated groundwater, and restricted access to the Site. All the accessible contaminated soil has been excavated and soil remediation is nearly complete. This amounts to more than 200,000 cubic yards. All the excavated soil has been moved to the on-site land treatment unit (LTU) to biologically break down the contaminants. Once the soil has been treated it is placed back on site. The groundwater treatment system is operating as designed and currently treats, on average, 345 gallons a minute. So far, nearly two billion gallons of water have been treated. Another 30 years of operation is expected for the water treatment plant.

If you would like to learn more about the Site, please visit the following website:
http://www.epa.gov/region8/superfund/mt/montana_pole/index.html#8

For more information:

Montana DEQ
Remediation Division
P.O. Box 200901
1100 N. Last Chance Gulch
Helena, MT 59620

Lisa DeWitt
Project Officer
(406) 841-5037
(406) 431-1408 cell
lidewitt.@mt.gov

Mary Ann Dunwell
Public Information
(406) 841-5016
(406) 461-5358 cell
mdunwell@mt.gov

U.S. EPA
Montana Office
10 West 15th Street
Suite 3200
Helena, MT 59626

Roger Hoogerheide
Remedial Project Manager
(406) 457-5031
hoogerheide.roger@epa.gov

Nikia Greene
Community Involvement
(406) 457-5019
greene.nikia@epa.gov

CTEC
P.O. Box 593
27 W. Park Street
Butte, MT 59703

Janice Hogan
TAG Coordinator
(406) 723-6247
buttectec@hotmail.com

Montana Department of Environmental Quality

United States Environmental Protection Agency

Please Come to a Community Meeting

As we conduct the third Five-Year Review for the Montana Pole Site, DEQ and EPA invite you to attend a community meeting. You'll hear updated information and be able to provide your comments. The community meeting will be held at 7 p.m., Thursday, March 24, 2011, at the Boulevard Volunteer Fire Hall, 1900 South Franklin in Butte. We hope to see you there!

Community Interviews

Members of the Five-Year Review team are collecting information about site cleanup activities. This includes talking with community members and local officials to get input about how we're doing with remediation. We ask about opportunities and ideas for improvement, concerns, and effects Montana Pole activities have had on the surrounding community over the past five years, and ideas for future use. We welcome your input. If you'd like to be interviewed, please contact Mary Ann Dunwell at (406) 841-5016 or mdunwell@mt.gov.

Five-Year Review Timeline

Community Interviews
February and March 2011

Site Inspection
March 2011

Community Meeting
March 24, 2011

Preparation of Five-Year Review Report
May and June 2011

Final Five-Year Review Report
Summer 2011

Interstate 15/90 Bridge Replacement through Montana Pole Site

The DEQ, EPA, and Citizens Technical Environmental Committee (CTEC) would like you to know that the Montana Department of Transportation (MDT) will be continuing bridge replacement work that started last spring on Interstate 15/90. This is the bridge that bisects the Montana Pole Site. The MDT work will start up again in April 2011 and will end in November 2011.

Waste Water Treatment Plant Construction Dewatering

Butte-Silver Bow County recently conducted dewatering to support construction activities associated with Waste Water Treatment Plant upgrades. This dewatering impacted the groundwater at the Montana Pole Site, leading to expansion of PCP contamination. DEQ and Butte Silver Bow are working together to identify ways in which both the Waste Water Treatment Plant upgrade and the Montana Pole Site cleanup can proceed with minimal negative impact on contaminants in the groundwater.

About CTEC

CTEC facilitates public involvement in the Superfund remediation, restoration and redevelopment of the Butte area. To join or find out more, contact Janice Hogan at (406) 723-6247 or buttectec@hotmail.com.

Mt Pole Superfund Site
5-Year Review
Public Meeting
March 24, 2011
7pm
Boulevard Fire Hall

NAME	ADDRESS	CITY	PHONE	E-MAIL
Robert O'Bill	1917 So Wash.	Butte	782-9467	
Leland & Eileen Greb		Butte	782-3719	on file
[illegible]		Helena	841-5016	
John W Ray	915 West Galena	Butte	7820681	
Ashley Makoroski	102 E Broadway	Butte	461-2132	amakoroski@mtech.edu
Charles Greene	199 S. Washington	Butte	498-0885	Jrechus@bresnan.net
Dan Powers	25 W. Front	Butte	497-5025	dpowers@bsb.mt.gov

NAME	ADDRESS	CITY	PHONE	E-MAIL
Bill Fisher	1912 So Franklin	Butte	723-3121	✓ Meeting Group
Corey Dietz	1905 S. Jackson	Butte	782-5844	✓
TERI Fisher	1918 So. Jackson	Butte	782-2917	
Ed Fisher	1918 So. Jackson	Butte	782-2917	
Pat Cunneen	1144 W. Gold	Butte	533-6882	pcunneenemt.gov
Tom Prosser	800 W silver	Butte	533-9243	tprosser@mtech.edu
Tom Magruder	658 Speedway Ave	Missoula	439 0049	
[illegible]	1035 Caledonia	Butte	782-7517	sparker@mtech.edu
Kriss Douglass	721 N Opie	Butte	782-9010	[illegible]

NAME	ADDRESS	CITY	PHONE	E-MAIL
Rich Appleman	1149 W. Platinum	Butte	723-3633	rappleman@mtech.edu
Dave Palmer	2217 N. Main	Walkerville	490-3364	dave.palmer@sjh-mt.org
Dan Foley	910 W. Porphyry	Butte	723-3836	danfoley@bresnan.net
Dave Erickson	119451 Governor Gulch	Butte	782 5220	derickson@WET-LLC.com
Elizabeth Ferguson	" "	"	" "	EERICKSON@WET-LLC.COM
Tom M. Malloy	155 W. Granite St.	Butte	497-6257	tmalloy@bsb.mt.gov ✓
Joe Griffin	1121 W. Diamond	Butte	560 6060	jgriffin@mt.gov ✓
Janice Hogan				Buttectec@hotmail

Attachment 3

Data Summary Tables

Table A3-1. PCP Concentrations in Residential Wells 2001-2009

Date	Laboratory	Method	Wayrnernens	Town Pump #1	Bowler	Hendrickson	Dixon (Rongstad)
			Upgradient Business Well - South of Contaminant Plume	Upgradient Business Well - East Of Land Treatment Unit	Domestic Irrigation Well - North of Contaminant Plume	Domestic Potable Water well -South East of Contaminant Plume	Domestic Irrigation Well - North of Land Treatment Unit
			PCP	PCP	PCP	PCP	PCP
	Units		(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
	Cleanup Level		1.0	1.0	1.0	1.0	1.0
2001	Energy	8151A	**0.13**	**0.14**	**0.12**	**0.11**	<0.1
2002	Energy	E515.1	<0.2	<0.2	<0.2	<0.2	<0.2
2002	Energy	E515.1	<0.1	<0.1	<0.1	<0.1	<0.1
2003	Energy	E515.1	<0.040	<0.040	<0.040	<0.040	**0.071**
2004	Energy	E515.1	<0.040	<0.040	<0.040	<0.040	<0.040
2005	Energy	E515.1	<0.040	<0.040	<0.040	<0.040	<0.040
2006	MBMG	8041A	<0.1	<0.1	<0.1	<0.1	<0.1
2007	MBMG	8041A	**0.101**	**0.057**	**0.467**	**0.056**	**0.096**
2008	MBMG	8041A	**0.131**	**0.073**	**0.083**	**0.102**	**0.115**
2009	MBMG	8041A	NS	NS	<0.2 / <0.2	NS	NS

Notes:

µg/L = Micrograms per liter

<0.2 = Not detected at specified laboratory detection limit

PCP = Pentachlorophenol

Bold = Detected concentration

Energy = Energy Laboratories Inc.

MBMG = Montana Bureau of Mines and Geology Laboratory

NS = Not sampled

Note: Town Pump #2 (adjacent to Town Pump 1) was also sampled in 2002 and was non-detect for PCP (<0.1 ug/l)

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
11/20/1997	140	0	140			917	3.18
12/11/1997	140	0	140			1070	0.96
12/17/1997	140	0	140			481	0.32
12/23/1997	90	31	121			650	0.32
12/31/1997	90	31	121			0.32	0.65
1/6/1998	90	31	121			1550	1.77
1/13/1998	90	31	121			1110	2.47
1/20/1998	140	0	140			965	2.28
1/27/1998	140	0	140			468	0.94
2/3/1998	90	31	121			169	0.83
2/4/1998	90	31	121				
2/9/1998	90	31	121			878	0.52
2/16/1998	90	31	121			1130	0.62
2/24/1998	90	31	121		2200	413	<0.20
3/3/1998	90	31	121			887	0.23
3/10/1998	90	31	121				
3/16/1998	90	37	127			1160	0.5
3/17/1998	90	43	133				
3/18/1998	90	49	139				
3/19/1998	90	55	145				
3/23/1998	90	55	145				
3/30/1998	90	55	145			1010	0.53
4/6/1998	90	55	145				
4/13/1998	80	73	153				
4/20/1998	80	73	153			1110	<0.2
4/27/1998	80	73	153				
5/4/1998	80	73	153			864	<0.2
5/6/1998	180	122	302				
5/11/1998	140	110	250				
5/14/1998	140	110	250			1680	<0.2
5/28/1998	135	92	227	435			
6/1/1998	135	116	251			1430	<0.2
6/22/1998	140	92	232	624	1370	1370	<.2
7/1/1998	110	85	195				
7/6/1998	110	101	211	446	888	888	<0.2
7/8/1998	110	101	211				
7/10/1998	190	0	190				
7/13/1998	170	0	170				
7/15/1998	190	0	190				
7/20/1998	150	0	150			14.6	<.2
7/24/1998	0	101	101				
7/28/1998	130	101	231				
8/4/1998	130	101	231	266	1400	1400	<.20
8/10/1998	105	64	169				
8/13/1998	140	31	171				
8/18/1998	140	31	171			707	<0.2
8/20/1998	140	101	241				
8/22/1998	140	31	171			830	<0.2
8/31/1998	140	122	262				
9/1/1998	50	104	154			1500	<0.22
9/4/1998	140	31	171				
9/14/1998	140	31	171			525	<0.2
9/16/1998	140	34	174				

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
9/24/1998	80	34	114				
9/25/1998	140	34	174				
10/5/1998	140	34	174			464	<0.2
10/26/1998	140	34	174			650	1.07
10/27/1998	80	34	114				
11/9/1998	80	34	114			732	1
11/23/1998	80	34	114	176	1360	639	0.98
12/7/1998	80	34	114			562	0.67
12/15/1998	80	82	162				
12/21/1998	80	82	162			1070	<0.2
12/22/1998	65	52	117				
12/25/1998	80	61	141				
12/28/1998	85	61	146				
1/4/1999	85	61	146			1020	<0.2
1/19/1999	85	61	146			825	<0.2
1/20/1999	80	31	111				
1/26/1999	80	61	141				
1/27/1999	80	150	230				
1/28/1999	80	122	202				
1/29/1999	80	31	111			1260	<0.2
2/1/1999	80	31	111			692	<0.2
2/2/1999	150	31	181				
2/3/1999	200	31	231				
2/4/1999	250	31	281				
2/5/1999	80	31	111				
2/6/1999	80	61	141				
2/10/1999	90	61	151				
2/16/1999	90	61	151	172	1400	772	<0.2
2/23/1999	100	61	161				
2/26/1999	100	73	173				
3/1/1999	100	73	173			604	<0.2
3/15/1999	100	73	173			921	<0.2
3/24/1999	100	85	185				
3/29/1999	100	85	185			755	<0.2
4/19/1999	95	82	177			829	<0.2
5/1/1999	95	81	176				
5/3/1999	95	81	176			669	<0.2
5/10/1999	95	82	177				
5/12/1999	95	82	177	155	1080	917	2.33
5/17/1999	85	92	177				
5/25/1999	75	92	167				
6/1/1999	75	92	167			836	<0.2
6/2/1999	206	0	206				
6/7/1999	150	0	150				
6/10/1999	200	0	200				
6/14/1999	200	0	200	108		108	<0.2
6/23/1999	80	92	172				
6/25/1999	75	88	163				
6/28/1999	75	88	163			1230	0.348
7/9/1999	85	82	167				
7/12/1999	85	84	169			731	0.231
7/13/1999	85	77	162				
7/19/1999	85	71	156				
7/22/1999	100	58	158				

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
7/26/1999	100	58	158			657	0.93
8/6/1999	110	85	195				
8/12/1999	110	82	192				
8/13/1999	110	64	174				
8/16/1999	110	64	174	175	1490	738	0.274
8/17/1999	110	67	177				
8/20/1999	105	70	175				
8/30/1999	50	70	120			676	<0.2
8/31/1999	105	70	175				
9/10/1999	105	70	175				
9/13/1999	105	70	175			748	0.709
9/15/1999	105	70	175				
9/16/1999	115	76	191				
9/27/1999	115	76	191			756	<0.2
10/6/1999	200	82	282				
10/11/1999	200	82	282			528	<0.2
10/13/1999	200	82	282				
10/15/1999	215	76	291				
10/18/1999	215	76	291				
10/21/1999	215	76	291			479	<0.2
10/25/1999	215	76	291			518	<0.2
10/26/1999	100	79	179				
10/29/1999	105	82	187				
11/1/1999	100	77	177				
11/8/1999	100	77	177	93.2	1100	641	<0.2
11/15/1999	95	81	176				
11/19/1999	95	79	174				
11/22/1999	95	79	174			816	0.708
12/6/1999	95	79	174			719	<0.2
12/13/1999	90	82	172				
12/20/1999	90	82	172	102	1210	781	0.761
1/3/2000	90	82	172			642.5	<0.5
1/6/2000	90	79	169				
1/18/2000	90	79	169			640.1	
1/31/2000	90	79	169			511.4	<0.5
2/14/2000	90	82	172	52.9	537	183	0.421
2/22/2000	85	82	167				
2/25/2000	90	82	172				
2/28/2000	90	82	172			750	<0.2
2/29/2000	100	82	182				
3/6/2000	100	82	182			702	45.8
3/13/2000	100	82	182			649	42.4
3/15/2000	100	61	161				
3/20/2000	100	61	161	199		946	29.9
3/23/2000	100	61	161			1069	71.6
3/23/2000	0	0	0				
3/24/2000	100	88	188				
3/27/2000	100	88	188			763	0.214
3/30/2000	105	85	190				
4/10/2000	105	85	190				
4/11/2000	110	85	195				
4/17/2000	110	85	195	78.5	891	467	<0.2
4/24/2000	110	79	189	47.7	553	333	0.266
4/29/2000	110	79	189			433	0.561

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
5/1/2000	110	79	189	53.7	1282	384	0.306
5/8/2000	110	79	189	85.4	1065	633	0.37
5/15/2000	110	79	189	67.1	1411	550	0.861
5/22/2000	110	79	189	42	532	366	<0.2
5/30/2000	110	79	189	49.6	774	333	0.671
6/5/2000	110	79	189	72.2	1160	560	<0.2
6/7/2000	95	98	193				
6/12/2000	95	98	193	46.9	1030	638	0.277
6/19/2000	95	98	193	39.7	1440	847	<0.2
6/26/2000	95	98	193	49.2	2500	1510	<0.2
7/5/2000	95	99	194	38.9	2430	1890	0.254
7/10/2000	95	99	194	38	2850	1750	<0.2
7/17/2000	95	99	194	43.2	3290	1840	0.396
7/24/2000	95	100	195	34.9	3600	2130	0.328
7/31/2000	95	98	193	52.8	3610	2190	0.204
8/7/2000	105	92	197	38	3810	1830	<0.1
8/14/2000	107	84	191	39	3910	2130	0.212
8/18/2000	108	79	187				
8/21/2000	108	79	187	41.5	4190	2210	<0.2
8/28/2000	105	79	184	51	3430	1970	<0.2
9/5/2000	105	82	187	43.9	3030	1380	<0.2
9/11/2000	105	82	187	56.7	3520	1760	<0.2
9/18/2000	105	82	187	43.3	2442	1310	<0.2
9/25/2000	105	82	187	47.3	3210	1690	<0.2
9/28/2000	180	82	262				
10/2/2000	180	82	262	152	2865	1491	<0.2
10/9/2000	180	82	262	154	2480	1550	0.653
10/12/2000	210	85	295				
10/16/2000	210	85	295	183	2140	1260	<0.2
10/18/2000	210	85	295			574	<0.2
10/23/2000	210	85	295	205	1930	754	0.254
10/30/2000	210	85	295	190	1700	947	<0.2
11/6/2000	210	85	295	210	1874	1030	0.37
11/8/2000	260	85	345				
11/13/2000	260	85	345	116	1616	770	<0.2
11/20/2000	260	85	345	137	1570	838	<0.1
11/27/2000	235	85	320	102	1320	727	<0.1
12/1/2000	150	85	235				
12/4/2000	110	76	186	64.5	1133	640	<0.2
12/11/2000	110	76	186	90.2	1742	862	0.452
12/18/2000	110	76	186	72	1430	778	<0.1
12/26/2000	110	76	186			581	<0.1
1/2/2001	110	76	186			591	<0.2
1/8/2001	110	76	186	55.2	1185	571	<0.2
1/16/2001	110	76	186			517	<0.2
1/22/2001	110	76	186			554	<0.1
1/29/2001	110	76	186			550	<0.2
2/5/2001	110	76	186			631	<0.2
2/12/2001	110	76	186	47.6	1132	600	<0.2
2/19/2001	110	76	186			581	<0.2
2/26/2001	110	76	186			354	<0.2
3/5/2001	110	76	186	6.76	1066	530	<0.2
3/8/2001	110	76	186				
3/12/2001	110	76	186			463	<0.2

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
3/19/2001	110	76	186			488	<0.2
3/26/2001	110	76	186			404	<0.2
4/2/2001	110	76	186	44.8	749	385	0.343
4/6/2001	120	70	190				
4/9/2001	120	70	190			546	0.309
4/16/2001	120	73	193			491	0.29
4/19/2001	160	73	233				
4/23/2001	160	85	245			365	0.446
4/24/2001	160	85	245				
4/30/2001	120	79	199			380	0.475
5/7/2001	115	82	197	43.4	1027	487	1.12
5/14/2001	115	82	197			458	0.939
5/21/2001	115	82	197			197	<50
5/29/2001	115	82	197			226	<50
6/4/2001	120	82	202	30.2	790	336	0.061
6/11/2001	120	82	202			333	0.054
6/18/2001	120	82	202			322	0.3
6/25/2001	120	82	202			308	<0.1
7/2/2001	120	82	202			361	<0.1
7/9/2001	120	82	202	31	781	380	<0.1
7/16/2001	120	82	202			396	0.07
7/23/2001	120	82	202			337	<0.1
7/30/2001	120	82	202			266	<0.1
8/6/2001	120	82	202			336	0.28
8/13/2001	120	82	202	28	727	323	<0.1
8/20/2001	120	82	202	27	567	276	0.041
8/27/2001	120	82	202	24	622	254	<0.1
9/4/2001	120	82	202	31	500	350	0.083
9/10/2001	120	82	202	23	695	269	0.4
9/11/2001	170	82	252				
9/24/2001	170	82	252	37	704	303	0.054
9/25/2001	195	82	277				
10/1/2001	195	82	277	35	596	254	<0.2
10/8/2001	195	82	277	34.7	824	352	<0.2
10/9/2001	220	92	312				
10/17/2001	220	92	312	46.2	641	316	<0.2
10/22/2001	220	92	312	34.9	795	418	<0.2
10/23/2001	220	107	327				
10/29/2001	220	107	327	34.3	476	289	<0.2
11/5/2001	220	107	327	22.7	646	130	0.723
11/12/2001	220	107	327	37.3	840	448	<0.2
11/19/2001	220	107	327	30.6	600	276	0.377
11/20/2001	170	107	277				
11/26/2001	170	107	277	28.7	852	258	<0.2
12/3/2001	170	107	277	21.8	781	350	<0.2
12/10/2001	170	107	277	21	670	343	<0.1
12/17/2001	170	107	277	31.4	707	257	<0.2
12/26/2001	170	107	277	28.6	691	357	<0.2
1/2/2002	170	107	277			230	<0.2
1/7/2002	170	107	277	21	842	378	<0.1
1/14/2002	170	107	277			302	0.37
1/21/2002	170	107	277			463	<0.2
1/28/2002	170	107	277			348	<0.2
2/4/2002	170	107	277	24	792	374	<0.1

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
2/11/2002	170	107	277			366	0.289
2/18/2002	170	107	277			373	0.206
2/25/2002	170	107	277			261	<0.2
3/4/2002	170	107	277	22.9	722	318	0.223
3/11/2002	170	107	277			283	0.221
3/18/2002	170	107	277			265	
3/25/2002	170	107	277			281	<0.2
4/1/2002	170	107	277	20.9	552	291	0.238
4/8/2002	170	107	277			301	<0.2
4/15/2002	170	107	277			197	<0.2
4/22/2002	170	107	277			283	<0.2
4/29/2002	170	107	277			345	<0.2
5/6/2002	170	107	277	21.4	461	332	0.218
5/13/2002	170	107	277			261	0.237
5/20/2002	170	107	277			317	0.448
5/28/2002	170	107	277			258	<0.2
6/3/2002	170	107	277	22.5	738	374	<0.2
6/10/2002	170	107	277			283	0.804
6/17/2002	170	107	277			372	<0.2
6/24/2002	170	107	277			301	0.363
7/1/2002	170	107	277			235	0.692
7/8/2002	170	107	277	20.1	596	281	0.273
7/15/2002	170	107	277			239	<0.2
7/22/2002	170	107	277			361	<0.2
7/29/2002	170	107	277			243	<0.2
8/5/2002	170	107	277			241	0.342
8/12/2002	170	107	277	14.9	344	154	<0.2
8/19/2002	170	107	277			240	0.076
8/26/2002	170	107	277			192	0.076
9/3/2002	170	107	277			251	7.08
9/9/2002	170	107	277	11.5	471	239	4.48
9/10/2002	0	0	0				
9/16/2002	170	107	277			143	0.251
9/23/2002	170	107	277			189	0.841
9/30/2002	170	107	277			203	0.045
10/7/2002	170	107	277	16.1	405	183	0.737
10/14/2002	170	107	277			147	0.331
10/21/2002	170	107	277			192	0.399
10/28/2002	170	107	277			188	0.884
11/4/2002	170	107	277			169	0.65
11/10/2002	100	92	192				
11/12/2002	100	92	192	12.1	318	231	1.02
11/14/2002	100	92	192				
11/15/2002	115	110	225				
11/18/2002	115	110	225			195	0.408
11/25/2002	115	110	225			214	0.871
12/2/2002	115	110	225	15.7	272	179	0.965
12/9/2002	115	110	225			169	0.072
12/16/2002	115	110	225			170	0.091
12/23/2002	115	110	225			148	0.044
12/30/2002	115	110	225			155	0.081
1/1/2003	115	116	231				
1/6/2003	115	116	231	8.8	293	144	0.1
1/13/2003	115	116	231			157	<0.040

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
1/20/2003	115	116	231			130	0.072
1/27/2003	115	116	231			163	0.074
2/3/2003	115	116	231	6.9	304	147	0.092
2/10/2003	115	116	231			133	0.058
2/17/2003	115	116	231			133	0.078
2/24/2003	115	116	231			149	0.074
3/3/2003	115	116	231	8	289	142	0.073
3/10/2003	115	116	231			122	0.12
3/17/2003	115	116	231			142	0.14
3/24/2003	115	116	231			154	0.16
3/31/2003	110	119	229			117	0.11
4/4/2003	100	125	225			262	
4/7/2003	100	125	225	5.2	268	178	1.7
4/14/2003	100	125	225			159	0.21
4/21/2003	100	125	225			144	0.15
4/28/2003	100	125	225			174	0.18
5/5/2003	100	125	225	5.5	285	157	0.23
5/12/2003	100	125	225			120	0.1
5/19/2003	100	125	225			138	0.1
5/27/2003	100	125	225			102	0.13
6/2/2003	100	125	225	4.8	221	130	0.13
6/9/2003	115	116	231			118	0.098
6/16/2003	115	116	231			123	0.1
6/23/2003	115	116	231			123	0.22
6/30/2003	115	116	231			74	0.11
7/7/2003	115	116	231	6.1	177	94	0.13
7/14/2003	115	116	231			94	0.14
7/21/2003	115	116	231			76	0.14
7/28/2003	115	116	231			78	0.073
8/4/2003	115	116	231	4.3	167	104	0.084
8/11/2003	115	116	231			74	0.11
8/18/2003	115	116	231			77	0.087
8/25/2003	115	116	231			96	0.064
9/2/2003	115	116	231			92	0.082
9/8/2003	115	116	231	5	167	70	0.099
9/15/2003	115	116	231			77	0.092
9/22/2003	120	113	233			54	0.074
9/29/2003	120	113	233			65	0.073
10/6/2003	120	113	233	5.1	260	126	0.37
10/13/2003	120	113	233			78	0.096
10/20/2003	125	110	235			64	0.097
10/27/2003	125	110	235			47	
11/3/2003	125	110	235	5.7	146	55	0.12
11/10/2003	125	110	235			56	0.085
11/17/2003	125	110	235			57	0.085
11/24/2003	125	110	235			61	0.074
12/1/2003	125	110	235	6.6	140	66	0.097
12/8/2003	125	110	235			63	0.068
12/15/2003	125	110	235			61	<0.040
12/22/2003	125	110	235			55	0.08
12/29/2003	125	110	235			68	0.078
1/5/2004	125	110	235	6.7	152	63	0.08
1/12/2004	125	110	235			55	0.095
1/19/2004	125	110	235			56	0.085

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
1/26/2004	125	110	235	4.6	145	65	0.081
2/2/2004	130	107	237	5.3	147	63	0.082
2/9/2004	130	107	237			54	0.11
2/16/2004	130	107	237			65	0.076
2/23/2004	130	107	237			58	0.076
3/1/2004	130	107	237	4.9	137	73	0.12
3/8/2004	140	107	247			61	0.063
3/15/2004	135	110	245			72	0.08
3/22/2004	135	110	245			57	0.075
3/29/2004	135	110	245			59	0.092
4/5/2004	135	110	245	5	192	79	0.22
4/12/2004	135	110	245			74	0.078
4/19/2004	135	110	245			74	0.074
4/26/2004	125	116	241			62	0.069
5/3/2004	125	116	241	4.1	138	73	0.11
5/10/2004	125	116	241			33	0.075
5/17/2004	125	116	241			80	0.086
5/24/2004	125	116	241			58	0.11
6/1/2004	125	116	241			66	0.081
6/7/2004	125	116	241	4.3	130	68	0.15
6/14/2004	125	116	241			48	0.086
6/21/2004	125	116	241			65	0.14
6/28/2004	125	116	241			79	0.11
7/6/2004	125	116	241	4.4	181	57	0.074
7/12/2004	125	119	244			69	0.093
7/19/2004	125	119	244			74	0.077
7/26/2004	125	135	260			72	0.094
8/2/2004	125	135	260	3.4	100	58	0.096
8/9/2004	125	135	260			77	0.16
8/16/2004	125	135	260			72	0.079
8/23/2004	125	135	260			80	0.095
8/30/2004	125	135	260			82	0.11
9/7/2004	125	135	260	2.8	133	80	0.074
9/13/2004	125	135	260			79	0.39
9/20/2004	125	135	260			69	0.14
9/27/2004	125	135	260			62	0.056
10/4/2004	125	135	260	4.1	122	66	0.11
10/11/2004	125	135	260			74	0.094
10/18/2004	125	135	260			68	0.13
10/25/2004	125	135	260			66	0.1
11/3/2004	125	135	260	2.4	119	48	0.067
11/8/2004	125	135	260			54	0.095
11/15/2004	125	135	260			61	0.1
11/22/2004	125	135	260				0.12
11/29/2004	125	135	260			58	0.089
12/6/2004	125	135	260	2.8	97	56	0.086
12/13/2004	125	135	260				0.11
12/20/2004	125	135	260			53	0.062
12/27/2004	125	135	260			52	0.071
1/3/2005	125	135	260	2.1	76	52	0.07
1/10/2005	125	135	260			45	0.064
1/18/2005	125	135	260			53	0.073
1/24/2005	125	135	260			54	0.092
1/31/2005	125	135	260			53	0.099

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
2/7/2005	125	135	260	2	112	56	0.088
2/14/2005	125	135	260			55	0.083
2/21/2005	135	135	270			51	0.08
2/28/2005	135	135	270	3.1	92	56	0.12
3/7/2005	135	135	270			50	0.081
3/14/2005	135	135	270			50	0.077
3/21/2005	135	135	270			50	0.083
3/28/2005	145	135	280			48	0.067
4/4/2005	145	135	280	3.6	85	40	0.09
4/11/2005	145	135	280			40	0.096
4/18/2005	145	135	280			38	0.065
4/25/2005	145	135	280			39	0.11
5/2/2005	145	135	280			46	0.1
5/9/2005	145	135	280	3.8	60	50	0.094
5/16/2005	145	135	280			44	0.066
5/23/2005	145	135	280			58	0.11
5/31/2005	145	135	280			46	0.095
6/6/2005	145	135	280	5.8	87	48	0.077
6/13/2005	145	135	280			63	0.12
6/20/2005	145	135	280			40	0.069
6/27/2005	145	135	280			54	0.4
7/5/2005	145	135	280	4	86	54	0.13
7/11/2005	145	135	280			51	0.11
7/18/2005	145	135	280			52	0.24
7/25/2005	145	135	280			50	0.16
8/1/2005	145	135	280			43	0.14
8/8/2005	145	135	280	3.1	74	42	0.14
8/15/2005	145	135	280			39	0.1
8/22/2005	145	135	280			27	0.11
8/29/2005	145	135	280			73.7	0.03
9/6/2005	145	135	280	3.15	112.6	39.5	0.16
9/12/2005	145	135	280			43.52	0.03
9/19/2005	145	135	280			32.2	<0.1
9/26/2005	145	135	280			44	<0.1
10/3/2005	145	135	280	3.5	76	53	<0.1
10/10/2005	145	135	280			42	0.05
10/17/2005	145	135	280			37.2	<0.1
10/24/2005	145	135	280			33.3	0.06
10/31/2005	145	135	280	2.2	62.5	38.9	0.05
11/7/2005	145	135	280			58.7	<0.1
11/14/2005	145	135	280		129	41.8	0.08
11/21/2005	145	135	280			50.2	<0.1
11/28/2005	145	135	280			51.9	<0.1
12/5/2005	145	135	280	1.1	149	73.5	<0.1
12/12/2005	145	135	280			34.3	0.107
12/19/2005	180	135	315			31	0.216
12/27/2005	180	135	315			25.7	0.136
1/3/2006	180	135	315			59	0.141
1/9/2006	180	135	315	4.84	123	55.7	0.163
1/17/2006	180	135	315			47.9	0.118
1/23/2006	180	135	315			40	0.144
1/30/2006	180	135	315			56.5	0.149
2/6/2006	180	135	315	3.78	114	40.7	0.092
2/13/2006	180	135	315			35.9	0.08

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
2/21/2006	180	135	315			40.9	
2/27/2006	180	135	315			33.8	0.139
3/6/2006	180	135	315	2.65	122	35.9	0.057
3/13/2006	180	135	315			34.4	0.066
3/20/2006	180	135	315			32	0.061
3/27/2006	180	135	315			48.9	0.073
4/3/2006	180	135	315	2.87	98	47.1	0.085
4/10/2006	180	135	315			55.6	0.13
4/17/2006	180	135	315			55.4	0.363
4/24/2006	180	135	315			81.9	0.2
5/2/2006	180	135	315	4.01	171	83.6	3.35
5/9/2006	195	135	330			72.4	0.12
5/15/2006	195	135	330			66.3	0.248
5/22/2006	195	135	330			75.6	0.599
5/30/2006	195	135	330			75.5	0.34
6/5/2006	195	135	330	4.85	143	67.3	0.076
6/13/2006	195	135	330			69.7	1.29
6/19/2006	195	135	330			60.8	0.288
6/26/2006	195	135	330			63.4	0.402
7/5/2006	195	135	330			64.7	<0.1
7/10/2006	195	135	330	6.06	180	78	0.613
7/17/2006	195	135	330			4.21	0.819
7/24/2006	195	135	330			8.81	0.315
7/31/2006	195	135	330			98.8	0.39
8/7/2006	195	135	330			61.5	0.356
8/15/2006	195	135	330			78.1	0.087
8/21/2006	195	135	330	1.56	112	71.4	0.41
8/28/2006	195	135	330			66.6	0.218
9/5/2006	195	135	330			32.8	0.749
9/13/2006	195	135	330	1.88	124	51	0.069
9/18/2006	195	135	330			46	<0.1
9/25/2006	195	135	330			74.9	0.198
10/2/2006	195	135	330			22.8	0.42
10/9/2006	195	135	330	2.3	118	78.7	0.102
10/16/2006	195	135	330			30.7	0.387
10/23/2006	195	135	330			26.2	0.753
10/30/2006	195	135	330			22.1	0.106
11/6/2006	195	135	330			39.4	0.503
11/13/2006	195	135	330	3.44	102	84.8	0.67
11/20/2006	195	135	330			54.7	0.603
11/27/2006	195	135	330			59.9	0.413
12/4/2006	195	135	330	4.17	140	54.7	0.157
12/11/2006	195	135	330			47.8	0.247
12/18/2006	195	135	330			44.4	0.331
12/28/2006	195	135	330			56.2	0.692
1/2/2007	210	135	345	3.46	119	53.6	<0.1
1/8/2007	210	135	345			44.9	0.109
1/16/2007	210	135	345	3.95	103	44.5	0.389
1/22/2007	210	135	345	2.98		49.6	0.1
1/29/2007	210	135	345	3.36		46.9	0.063
2/5/2007	210	135	345	2.81	85.5	35.6	0.094
2/12/2007	210	135	345			28.1	
2/19/2007	210	135	345			36.5	0.483
2/21/2007	210	135	345	2.69			

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
2/26/2007	210	135	345	3.36		36.3	0.261
3/5/2007	210	135	345			32.8	0.243
3/12/2007	210	135	345	3.92	84	35.2	0.374
3/19/2007	210	135	345	3.84		48.5	0.121
3/26/2007	210	135	345			52.8	<0.1
4/2/2007	210	135	345			42	0.137
4/9/2007	210	135	345	3.4	87.7	36	0.109
4/16/2007	210	135	345			40.9	0.107
4/23/2007	210	135	345			44.1	0.161
4/30/2007	210	135	345			50.7	0.137
5/7/2007	210	135	345	3.56	63.2	41.7	0.115
5/14/2007	210	135	345			38.6	0.115
5/21/2007	210	135	345			45.6	0.212
5/29/2007	210	135	345			47.6	0.147
6/4/2007	210	135	345	3.2	116	52.6	0.129
6/11/2007	210	135	345			19.3	0.143
6/18/2007	210	135	345			20.1	0.14
6/25/2007	210	135	345			46.5	0.084
7/2/2007	210	135	345			65	0.109
7/9/2007	210	135	345	3.29	124	43.1	<0.1
7/16/2007	210	135	345			54.3	0.133
7/23/2007	210	135	345			43.5	0.111
7/30/2007	210	135	345			31.4	0.06
8/6/2007	210	135	345			30	0.08
8/13/2007	210	135	345			32.6	0.085
8/20/2007	210	135	345			35	0.126
8/27/2007	210	135	345	2.65	88.5	19.3	0.183
9/4/2007	210	135	345			24.1	0.09
9/14/2007	210	135	345	3.19	69.5	29.3	0.118
9/17/2007	210	135	345			29	0.088
9/24/2007	210	135	345			24.9	0.097
10/1/2007	210	135	345			25.7	0.096
10/8/2007	210	135	345			36.3	0.115
10/18/2007	210	135	345	2.48	114	43.5	0.227
10/22/2007	210	135	345			43.1	0.145
10/29/2007	210	135	345			47.9	0.113
11/5/2007	210	135	345			42.8	0.139
11/12/2007	210	135	345	2.98	107	44.5	0.116
11/19/2007	210	135	345			42.3	0.138
11/26/2007	210	135	345			82.2	0.113
12/3/2007	210	135	345			85.2	0.19
12/10/2007	210	135	345	3.92	286	92.7	0.122
12/17/2007	210	135	345			85.2	0.148
12/26/2007	210	135	345			310	0.128
1/2/2008	210	135	345			62	0.167
1/7/2008	210	135	345	5.98	306	80.2	0.262
1/14/2008	210	135	345			296	0.124
1/22/2008	210	135	345			54.9	0.089
1/28/2008	210	135	345			41.5	0.203
2/4/2008	210	135	345	3.39	119	35.4	<0.1
2/11/2008	210	135	345			39.1	0.311
2/18/2008	210	135	345			33.7	0.12
2/25/2008	210	135	345			38.1	0.178
3/3/2008	210	135	345	2.98	109	25.2	0.092

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
3/10/2008	210	135	345			27.6	0.128
3/18/2008	210	135	345			28.2	0.104
3/24/2008	210	135	345			32.7	0.115
3/31/2008	210	135	345			31.3	0.094
4/7/2008	210	135	345	7.31	84.5	27.7	0.096
4/14/2008	210	135	345			35.1	0.146
4/21/2008	210	135	345				
4/28/2008	210	135	345			52.9	0.213
5/5/2008	210	135	345			53.1	0.121
5/12/2008	210	135	345	3.67	141	51.7	0.201
5/19/2008	210	135	345			54.5	0.232
5/27/2008	210	135	345			57.6	0.149
6/2/2008	210	135	345	3.96	191	56.9	0.133
6/9/2008	210	135	345			34.1	0.178
6/16/2008	210	135	345			85.2	2.58
6/23/2008	210	135	345			16.7	0.334
6/30/2008	210	135	345			34.4	0.503
7/9/2008	210	135	345	4.4	179	61	0.174
7/14/2008	210	135	345			43.5	0.241
7/21/2008	210	135	345			33.7	0.121
7/28/2008	210	135	345			37.1	0.113
8/4/2008	210	135	345			51.9	0.15
8/11/2008	210	135	345			53.6	0.184
8/18/2008	210	135	345			69.8	0.359
8/27/2008	210	135	345	5.28	191	83.7	0.211
9/2/2008	210	135	345			95	0.432
9/8/2008	210	135	345			42.3	0.231
9/15/2008	210	135	345	3.52	193	56.2	0.29
9/22/2008	210	135	345			43.8	0.166
9/29/2008	210	135	345			47.9	0.199
10/6/2008	210	135	345			43	0.226
10/13/2008	210	135	345	3.66	105	58.3	0.402
10/20/2008	210	135	345			29.7	0.551
10/27/2008	210	135	345			90.8	3.03
11/3/2008	210	135	345			47.5	0.196
11/12/2008	210	135	345	3.94	143	43.4	0.175
11/17/2008	210	135	345			34.1	0.156
11/24/2008	210	135	345			56	0.267
12/1/2008	210	135	345			48	0.164
12/8/2008	210	135	345	4.21	127	64.4	0.287
12/15/2008	210	135	345			59.9	0.193
12/22/2008	210	135	345			66.9	0.293
12/29/2008	210	135	345			72.6	0.278
1/5/2009	210	135	345	4.45	210	87	0.226
1/12/2009	210	135	345			81.5	0.219
1/20/2009	210	135	345			56.5	0.155
1/26/2009	210	135	345			47.6	0.167
2/2/2009	210	135	345	2.07	131	43.8	0.292
2/9/2009	210	135	345			40.3	0.238
2/17/2009	210	135	345			40.1	0.18
2/23/2009	210	135	345			51.6	0.28
3/2/2009	210	135	345	3.73	262	149	7.13
3/9/2009	210	135	345			98.4	0.531
3/16/2009	210	135	345			145	2.85

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
3/23/2009	210	135	345			153	0.516
3/30/2009	210	135	345			101	0.286
4/6/2009	210	135	345	4.38	279	102	0.176
4/13/2009	210	135	345			94	0.128
4/20/2009	210	125	335			94.1	0.185
4/27/2009	210	125	335			74.2	0.185
5/4/2009	210	125	335	3.82	230	76.7	0.142
5/11/2009	210	125	335			83.3	0.09
5/18/2009	210	125	335			75.1	0.263
5/26/2009	210	125	335			97	0.184
6/1/2009	210	125	335	4.84	253	88.7	0.273
6/8/2009	210	125	335			82.4	0.232
6/15/2009	210	125	335			87.1	0.278
6/22/2009	210	125	335			81	0.355
6/29/2009	210	125	335			106	0.937
7/6/2009	210	125	335	4.76	306	88.9	0.8
7/13/2009	210	125	335			83.5	0.348
7/20/2009	210	125	335			69	0.32
7/27/2009	210	125	335			68.6	0.295
8/3/2009	210	125	335			72.6	<0.1
8/10/2009	210	125	335	4.1	236	72.8	0.35
8/17/2009	210	125	335			58.6	0.357
8/24/2009	210	125	335			46.8	0.376
8/31/2009	210	125	335	2.54	150	30.4	0.188
9/8/2009	210	125	335			47.4	0.475
9/14/2009	210	125	335			37.6	0.09
9/21/2009	210	125	335			33.9	0.223
9/28/2009	210	125	335			32.3	0.098
10/5/2009	210	125	335	1.52	126	25.9	0.121
10/12/2009	210	125	335			39.8	0.13
10/19/2009	210	125	335			32.7	<0.1
10/26/2009	210	125	335			34.5	0.162
11/2/2009	210	125	335	2.44	87.1	33.6	0.082
11/9/2009	210	125	335			28.7	<0.2
11/16/2009	210	125	335			32.2	<0.2
11/23/2009	210	125	335			26.9	<0.2
11/30/2009	210	125	335			27.1	<0.2
12/7/2009	210	125	335	1.03	52	22	<0.2
12/14/2009	210	125	335			25	<0.2
12/21/2009	210	125	335	1.84	36.4	17.8	<0.2
12/28/2009	210	125	335			19.2	<0.2
1/4/2010	210	125	335	4.28	73.3	21.8	<0.2
1/11/2010	210	125	335			20.4	0.408
1/19/2010	210	125	335			11.8	<0.2
1/27/2010	210	125	335	1.95	28.6	12.6	0.122
2/1/2010	210	125	335			10.8	0.12
2/4/2010	210	125	335	1.699	35.4		
2/5/2010	210	125	335	1.724	35		
2/6/2010	210	125	335	1.844	34.8		
2/7/2010	210	125	335	2.2	35		
2/8/2010	210	125	335	2.05	32.5	11.5	<0.2
2/9/2010	210	125	335	2.4	35.5		
2/10/2010	210	125	335	2.3	34.5		
2/16/2010	210	125	335	1.9	31.1	11.73	<0.2

Table A3-2. Trench Extraction Rates, and MPTP Plant Influent and Effluent PCP Concentrations

Date	Extraction Rates (gpm)			PCPin Plant Influent (ug/l)			PCP in Plant Effluent (ug/l)
	NCRT	NHRT	TOTAL	NCRT	NHRT	COMBINED	Cleanup Level 1 ug/l
2/22/2010	210	125	335	1.78	34.8	12.88	<0.2
3/1/2010	210	125	335	2.9	38.6	15.8	<0.2
3/8/2010	210	125	335	2.36	35.1	13.2	0.186
3/15/2010	210	125	335	2.47	36.2	15.3	<0.2
3/22/2010	210	125	335	2.85	37.1	14.4	<0.2
3/29/2010	210	125	335	2.74	38.8	14.3	<0.2
4/5/2010	210	125	335	2.52	38.4	14.7	0.418
4/12/2010	210	125	335	2.78	36.7	14.2	<0.2
4/19/2010	210	125	335	2.89	41	16	<0.2
4/26/2010	210	125	335				
5/3/2010	210	125	335				
5/10/2010	210	125	335				
5/17/2010	210	125	335				
5/24/2010	210	125	335			22.4	0.13
6/1/2010	210	125	335			25.4	0.15
6/7/2010	210	125	335	5.07	56.7	27.6	0.289
6/14/2010	210	125	335			31.6	0.37
6/21/2010	210	125	335	7.38	140	58.4	0.546
6/28/2010	210	125	335			84.1	1.12
7/6/2010	210	125	335	6.77	195	70.2	0.683
7/12/2010	210	125	335			70.8	0.538
7/19/2010	210	125	335			78.7	0.218
7/26/2010	210	125	335			69.7	0.275
8/2/2010	210	125	335			70.3	0.355
8/9/2010	210	125	335	4.08	191	67.6	0.394
8/16/2010	210	125	335	4.08	207	66.9	0.373
8/23/2010	210	125	335			69.4	0.868
8/30/2010	210	125	335			60	0.676
9/7/2010	210	125	335	4.3	223	84.6	0.761
9/13/2010	210	125	335			76	0.6
9/20/2010	210	125	335			77.9	1.46
9/27/2010	210	125	335			80.9	1.42
10/4/2010	205	130	335	3.58	176	57.4	0.245
10/11/2010	205	130	335			49.8	0.928
10/18/2010	205	130	335			47.6	0.207
10/25/2010	205	130	335			49.9	<0.2
11/1/2010	205	130	335			40.8	0.121
11/8/2010	205	130	335	3.28	184	62.2	0.28
11/15/2010	205	130	335			72.5	0.426
11/22/2010	205	130	335			42	0.365
11/29/2010	205	130	335			46.6	0.33
12/6/2010	205	130	335	3.74	148	58.9	0.305
12/13/2010	205	130	335			11.5	0.228
12/20/2010	205	130	335			54.6	0.45
12/27/2010	205	130	335			52.1	0.392
1/3/2011	205	130	335	3.38	149	55.8	0.455
1/10/2011	205	130	335			45.8	0.443
1/17/2011	205	130	335			48.6	0.229
1/24/2011	205	130	335			50.6	0.259
1/31/2011	205	130	335				
2/7/2011	205	130	335				
2/14/2011	205	130	335				

Table A3-3. MPTP Plant Influent and Effluent Dioxin TEQ Concentrations

	Dioxin TEQ in Plant Influent (ug/l)			Dioxin TEQ in Plant Effluent (ug/l)
Date	NCRT	NHRT	COMBINED	
2/6/2006	0.85	0.21	2.776	1
8/21/2006	0.27	0.21	0.77	2.861
8/27/2007	0.81	0.087	--	0.31
8/26/2008	1.58	0.17	0.56	0.17
8/10/2009	3.915	0.62	1.801	0.18
8/16/2010	5.84	**11.21**	4.4	0.58 / 0.54

Notes:

* all values are expressed in pg/L

Cleanup level 1 x 10-5 µg/L = 10 pg/L

-- = Not sampled

Table A3-4. Treatment Plant Influent and Effluent PAHs and Chlorophenols

2010 Results

			Influent to MPTP Plant				
	Sample ID:		NCRT	NHRT	COMBINED		EFFLUENT
	Date		08-16-10	08-16-10	08-16-10		08-16-10
Compound	Cleanup Level ug/L		Conc ug/L	Conc ug/L	Conc ug/L		Conc ug/L
Napthalene	--		< 0.25	< 0.25	< 0.25		< 0.25
Acenaphthylene	--		< 0.25	< 0.25	< 0.25		< 0.25
Acenaphthene	--		< 0.25	< 0.25	< 0.25		< 0.25
Fluorene	--		< 0.25	0.20 J	< 0.25		< 0.25
Phenanthrene	--		< 0.25	< 0.25	< 0.25		< 0.25
Anthracene	--		< 0.25	< 0.25	< 0.25		< 0.25
Flouranthene	--		< 0.25	< 0.25	< 0.25		< 0.25
Pyrene	--		< 0.25	< 0.25	< 0.25		< 0.25
Benzo (a) anthracene	1.0		0.23 J	0.23 J	< 0.25		< 0.25
Chrysene	1.0		< 0.25	< 0.25	< 0.25		< 0.25
Benzo (b) flouranthene	0.2		< 0.25	< 0.25	< 0.25		< 0.25
Benzo (k) flouranthene	1.0		< 0.25	< 0.25	< 0.25		< 0.25
Benzo (a) pyrene	0.2		< 0.25	< 0.25	< 0.25		< 0.25
Indeno (1,2,3-cd) pyrene	1.0		< 0.25	< 0.25	< 0.25		< 0.25
Dibenzo (a,h) anthracene	0.2		< 0.25	< 0.25	< 0.25		< 0.25
Benzo (g,h,i) perylene	1.0		< 0.25	< 0.25	< 0.25		< 0.25
2-Chlorophenol	45		< 0.5	< 0.5	< 0.5		< 0.5
2,4-Dichlorophenol	27		< 0.5	< 0.5	< 0.5		< 0.5
2,4,6-Trichlorophenol	6.5		0.48 J	0.54	0.5		0.48 J
Pentachlorophenol	1.0		4.08	207	66.9		< 0.5
2,3,4,6-Tetrachlorophenol	--		< 0.5	7.16	2.79		< 0.5
4-Chloro-2-Methylphenol	--		< 0.5	< 0.5	< 0.5		< 0.5
4-Chloro-3-Methylphenol	--		< 0.5	< 0.5	< 0.5		< 0.5
4-Chlorophenol	--		< 0.5	< 0.5	< 0.5		< 0.5
2,4,5-Trichlorophenol	--		< 0.5	< 0.5	< 0.5		0.48 J

Notes:

ug/L =	Micrograms per liter
Conc =	Concentration
< 10 =	Not detected at the specified laboratory detection limit
-- =	No discharge cleanup levels

Table A3-4. Treatment Plant Influent and Effluent PAHs and Chlorophenols

2009 Results

		Influent to MPTP Plant			
	Sample ID:	NCRT	NHRT	COMBINED	EFFLUENT
	Date	08-10-09	08-10-09	08-10-09	08-10-09
Compound	Cleanup Level ug/L	Conc ug/L	Conc ug/L	Conc ug/L	Conc ug/L
Napthalene	--	0.08 J	9.7	1.76	< 0.25
Acenaphthylene	--	0.15 J	< 0.25	0.43	< 0.25
Acenaphthene	--	0.11 J	< 0.25	0.692	0.13 J
Fluorene	--	0.27	1.94	0.318	< 0.25
Phenanthrene	--	0.5	2.62	< 0.25	< 0.25
Anthracene	--	0.5	3.15	< 0.25	< 0.25
Flouranthene	--	0.5	0.15 J	< 0.25	< 0.25
Pyrene	--	0.5	0.15 J	< 0.25	< 0.25
Benzo (a) anthracene	1.0	0.08 J	< 0.25	< 0.25	< 0.25
Chrysene	1.0	< 0.25	< 0.25	< 0.25	< 0.25
Benzo (b) flouranthene	0.2	0.08 J	< 0.25	< 0.25	< 0.25
Benzo (k) flouranthene	1.0	< 0.25	< 0.25	< 0.25	< 0.25
Benzo (a) pyrene	0.2	< 0.25	< 0.25	< 0.25	< 0.25
Indeno (1,2,3-cd) pyrene	1.0	< 0.25	< 0.25	< 0.25	< 0.25
Dibenzo (a,h) anthracene	0.2	< 0.25	< 0.25	< 0.25	< 0.25
Benzo (g,h,i) perylene	1.0	< 0.25	< 0.25	< 0.25	< 0.25
2-Chlorophenol	45	< 0.5	< 0.5	< 0.5	< 0.5
2,4-Dichlorophenol	27	< 0.5	< 0.5	< 0.5	< 0.5
2,4,6-Trichlorophenol	6.5	< 0.5	< 0.5	< 0.5	< 0.5
Pentachlorophenol	1.0	4.1	236	72.8	< 0.5
2,3,4,6-Tetrachlorophenol	--	< 0.5	6.21	2.56	< 0.5
4-Chloro-2-Methylphenol	--	< 0.5	< 0.5	< 0.5	< 0.5
4-Chloro-3-Methylphenol	--	< 0.5	< 0.5	< 0.5	< 0.5
4-Chlorophenol	--	< 0.5	< 0.5	< 0.5	< 0.5
2,4,5-Trichlorophenol	--	< 0.5	< 0.5	< 0.5	< 0.5

Notes:

ug/L =	Micrograms per liter
Conc =	Concentration
< 10 =	Not detected at the specified laboratory detection limit
-- =	No discharge cleanup levels

Table A3-4. Treatment Plant Influent and Effluent PAHs and Chlorophenols

2008 Results

		Influent to MPTP Plant			
	Sample ID:	NCRT	NHRT	COMBINED	EFFLUENT
	Date	08-25-08	08-25-08	08-25-08	08-25-08
Compound	Cleanup Level ug/L	Conc ug/L	Conc ug/L	Conc ug/L	Conc ug/L
Napthalene	--	0.16	0.24	0.18	< 0.5
Acenaphthylene	--	6.9	6.4	7.6	< 0.5
Acenaphthene	--	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	--	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	--	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	--	< 0.5	< 0.5	< 0.5	< 0.5
Flouranthene	--	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	--	< 0.5	< 0.5	< 0.5	< 0.5
Benzo (a) anthracene	1.0	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	1.0	< 0.5	< 0.5	< 0.5	< 0.5
Benzo (b) flouranthene	0.2	< 0.5	< 0.5	< 0.5	< 0.5
Benzo (k) flouranthene	1.0	< 0.5	< 0.5	< 0.5	< 0.5
Benzo (a) pyrene	0.2	< 0.5	< 0.5	< 0.5	< 0.5
Indeno (1,2,3-cd) pyrene	1.0	< 0.5	< 0.5	< 0.5	< 0.5
Dibenzo (a,h) anthracene	0.2	< 0.5	< 0.5	< 0.5	< 0.5
Benzo (g,h,i) perylene	1.0	< 0.5	< 0.5	< 0.5	< 0.5
2-chlorophenol	45	< 0.5	< 0.5	< 0.5	< 0.5
2,4-dichlorophenol	27	< 0.5	< 0.5	< 0.5	< 0.5
2,4,6-trichlorophenol	6.5	< 0.5	< 0.5	< 0.5	< 0.5
2,3,4,6-tetrachlorophenol	--	< 0.5	5.15	1.65	< 0.5
4-Chloro-2-Methylphenol	--	< 0.5	< 0.5	< 0.5	< 0.5
4-Chloro-3-Methylphenol	--	< 0.5	< 0.5	< 0.5	< 0.5
4-Chlorophenol	--	< 0.5	< 0.5	< 0.5	< 0.5
2,4,5-trichlorophenol	--	< 0.5	< 0.5	< 0.5	< 0.5

Notes:

ug/L =	Micrograms per liter
Conc =	Concentration
< 10 =	Not detected at the specified laboratory detection limit
-- =	No discharge cleanup levels

Table A3-4. Treatment Plant Influent and Effluent PAHs and Chlorophenols

2007 Results

		Influent to MPTP Plant			
	Sample ID:	NCRT	NHRT	COMBINED	EFFLUENT
	Date	08-27-07	08-27-07	08-27-07	08-27-07
Compound	Cleanup Level ug/L	Conc ug/L	Conc ug/L	Conc ug/L	Conc ug/L
Napthalene	--	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	--	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthene	--	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	--	< 0.5	0.2	0.25	< 0.5
Phenanthrene	--	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	--	< 0.5	< 0.5	< 0.5	< 0.5
Flouranthene	--	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	--	0.12	< 0.5	< 0.5	0.12
Benzo (a) anthracene	1.0	0.28	0.25	0.26	0.25
Chrysene	1.0	< 0.5	< 0.5	< 0.5	< 0.5
Benzo (b) flouranthene	0.2	< 0.5	< 0.5	< 0.5	0.29
Benzo (k) flouranthene	1.0	< 0.5	< 0.5	< 0.5	< 0.5
Benzo (a) pyrene	0.2	< 0.5	< 0.5	< 0.5	< 0.5
Indeno (1,2,3-cd) pyrene	1.0	< 0.5	< 0.5	< 0.5	< 0.5
Dibenzo (a,h) anthracene	0.2	< 0.5	< 0.5	< 0.5	< 0.5
Benzo (g,h,i) perylene	1.0	< 0.5	< 0.5	< 0.5	< 0.5
2-chlorophenol	45	< 0.5	< 0.5	< 0.5	< 0.5
2,4-dichlorophenol	27	< 0.5	< 0.5	< 0.5	< 0.5
2,4,6-trichlorophenol	6.5	< 0.5	< 0.5	< 0.5	< 0.5
2,3,4,6-tetrachlorophenol	--	< 0.5	2.34	1.01	< 0.5
4-Chloro-2-Methylphenol	--	< 0.5	< 0.5	< 0.5	< 0.5
4-Chloro-3-Methylphenol	--	< 0.5	< 0.5	< 0.5	< 0.5
4-Chlorophenol	--	< 0.5	< 0.5	< 0.5	< 0.5
2,4,5-trichlorophenol	--	< 0.5	< 0.5	< 0.5	< 0.5

Notes:

ug/L =	Micrograms per liter
Conc =	Concentration
< 10 =	Not detected at the specified laboratory detection limit
-- =	No discharge cleanup levels

Table A3-4. Treatment Plant Influent and Effluent PAHs and Chlorophenols

2006 Results

		Influent to MPTP Plant			
	Sample ID:	NCRT	NHRT	COMBINED	EFFLUENT
	Date	08-21-06	08-21-06	08-21-06	08-21-06
Compound	Cleanup Level ug/L	Conc ug/L	Conc ug/L	Conc ug/L	Conc ug/L
Napthalene	--	< 0.2	< 0.2	< 0.2	< 0.2
Acenaphthylene	--	< 0.2	< 0.2	< 0.2	< 0.2
Acenaphthene	--	< 0.2	3.57	< 0.2	< 0.2
Fluorene	--	< 0.2	2.62	< 0.2	< 0.2
Phenanthrene	--	< 0.2	< 0.2	< 0.2	< 0.2
Anthracene	--	< 0.2	< 0.2	< 0.2	< 0.2
Flouranthene	--	< 0.2	< 0.2	< 0.2	< 0.2
Pyrene	--	< 0.2	< 0.2	< 0.2	< 0.2
Benzo (a) anthracene	1.0	< 0.2	< 0.2	< 0.2	< 0.2
Chrysene	1.0	< 0.2	< 0.2	< 0.2	< 0.2
Benzo (b) flouranthene	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Benzo (k) flouranthene	1.0	< 0.2	< 0.2	< 0.2	< 0.2
Benzo (a) pyrene	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Indeno (1,2,3-cd) pyrene	1.0	< 0.2	< 0.2	< 0.2	< 0.2
Dibenzo (a,h) anthracene	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Benzo (g,h,i) perylene	1.0	< 0.2	< 0.2	< 0.2	< 0.2
2-chlorophenol	45	< 10	< 10	< 10	< 10
2,4-dichlorophenol	27	< 10	< 10	< 10	< 10
2,4,6-trichlorophenol	6.5	< 10	< 10	< 10	< 10
pentachlorophenol	1	< 50	< 50	< 42	< 50
4-Chloro-3-Methylphenol	--	< 10	< 10	< 10	< 10
4-Chlorophenol	--	< 10	< 10	< 10	< 10
2,4,5-trichlorophenol	--	< 10	< 10	< 10	< 10

Notes:

ug/L =	Micrograms per liter
Conc =	Concentration
< 10 =	Not detected at the specified laboratory detection limit
-- =	No discharge cleanup levels

Table A3-5 Surface Water PCP Concentrations

DATE	SW-03	SW-05	SW-06	SW-09	SS-06A	HCC-01	HCC-01A	HCC-02
Cleanup Level	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1/9/2006	0.139	0.084	**2.03**	--	--	--	--	--
2/6/2006	0.081	0.038	**1.57**	--	--	--	--	--
3/6/2006	0.116	0.067	**1.32**	--	--	--	--	--
4/3/2006	0.07	0.533	0.693	--	--	--	--	--
5/1/2006	0.199	0.084	0.321	--	--	--	--	--
6/5/2006	0.067	0.086	0.147	--	--	--	--	--
7/10/2006	0.311	0.244	0.696	--	--	--	--	--
8/14/2006	0.507	0.705	0.63	--	--	--	--	--
9/13/2006	0.208	0.816	<0.1	--	--	--	--	--
10/9/2006	**1.81**	0.363	0.884	--	--	--	--	--
11/13/2006	0.175	**1.03**	**1.79**	--	--	--	--	--
12/4/2006	0.395	0.32	**1.52**	0.602	--	--	--	--
1/2/2007	0.545	0.278	**1.17**	0.173	--	--	--	--
2/6/2007	0.782	0.665	**2.08**	0.192	--	--	--	--
3/12/2007	0.503	0.363	0.829	0.137	--	--	--	--
4/9/2007	0.177	0.13	**1.18**	<0.1	--	--	--	--
5/7/2007	0.276	0.101	0.88	0.085	--	--	--	--
6/4/2007	0.297	0.191	0.834	0.081	--	--	--	--
7/6/2007	0.489	0.085	0.483	0.089	--	--	--	--
8/27/2007	0.291	0.104	**1**	0.058	--	--	--	--
9/14/2007	0.217	0.144	**1.31**	0.188	--	--	--	--
10/18/2007	0.486	0.093	**1.08**	0.537	--	--	--	--
11/12/2007	0.216	0.176	0.934	<0.1	--	--	--	--
12/10/2007	0.355	0.121	0.958	0.288	--	--	--	--
1/7/2008	0.508	0.098	0.584	<0.1	--	--	--	--
2/4/2008	0.454	0.189	0.226	0.246	--	--	--	--
3/3/2008	0.087	0.072	0.859	0.137	--	--	--	--
4/7/2008	0.087	0.214	0.738	0.184	--	--	--	--
5/12/2008	0.09	0.062	0.819	0.057	--	--	--	--
6/2/2008	0.121	0.057	0.995	0.062	--	--	--	--
7/9/2008	0.139	<0.1	0.597	<0.1	--	--	--	--
8/18/2008	--	--	--	--	0.098	--	--	--
8/25/2008	0.098	0.261	0.844	0.114	--	--	--	--
9/15/2008	0.34	0.188	0.733	0.102	--	--	--	--
10/13/2008	0.241	0.349	0.948	0.124	--	--	--	--
11/12/2008	0.214	<0.1	0.654	<0.1	--	--	--	--
12/8/2008	0.497	0.139	0.815	0.231	--	--	--	--
1/5/2009	0.222 / 0.266	0.062 J	**1.1**	0.064 J	--	--	--	--
2/2/2009	0.363	0.188	0.971	0.154	--	--	--	--
5/4/2009	0.152	0.061 / <0.1	0.708	<0.1	--	--	--	--
8/3/2009	<0.5	<0.5	0.52	<0.5	--	--	--	--
11/2/2009	0.131	<0.1	**2.73**	<0.1	--	--	--	--
11/30/2009	--	--	**2.21**	--	--	--	--	--
12/4/2009	0.293	<0.2	**1.98**	0.454	0.111	--	--	--
12/30/2009	<0.2	<0.2	**1.71**	<0.2	<0.2	--	--	--
1/27/2010	0.247	<0.2	**1.19**	<0.2	<0.2	<0.2	--	--
3/8/2010	--	--	0.813	--	--	<0.2	--	--
3/17/2010	--	--	0.586	--	--	0.274	--	--
3/22/2010	--	--	0.687	--	--	--	--	--
3/29/2010	--	--	**1.5**	--	--	--	--	--
4/5/2010	--	--	**2.42**	--	--	--	--	--
4/12/2010	<0.2	<0.2	**2.68**	<0.2	<0.2	<0.2	--	--
4/19/2010	--	--	**2.79**	--	--	--	--	--
4/26/2010	--	--	0.201	--	--	--	--	--
5/3/2010	0.161	<0.2	0.227 / 0.378	<0.2	<0.2	--	--	--
6/7/2010	0.19	<0.2	0.775	<0.2	<0.2	--	--	--
8/9/2010	**1.69**	<0.2	0.839	<0.2	<0.2	0.206	0.209	0.515
11/8/2010	0.171 J	0.186 J	**1.13**	<0.2	0.120 J	--	--	--

Notes:

ug/L = Micrograms per liter

PCP = Pentachlorophenol

MBMG = Montana Bureau of Mines and Geology laboratory

-- = Not sampled

Bold = Values exceed the cleanup level

Table A3-6 Surface Water Dioxin and Furan TEQs

Sample Location	SW03	SW05	SW06	SW09
Units	TEQ	TEQ	TEQ	TEQ
Laboratory	TAL	TAL	TAL	TAL
Method	8290	8290	8290	8290
Units	pg/L	pg/L	pg/L	pg/L
8/21/2006	0.068	0	0	0
8/26/2007	0	0.77	0.17	--
8/25/2008	0	0	0	0.051
8/10/2009	0	0	0	0
8/16/2010	0	0	0	0

Notes:

TAL	Test America Laboratories
TEQ	Toxicity equivalent quotient
--	Not sampled
Cleanup Level	1 x 10-5 µg/L = 10 pg/L

Table A3-7. Surface Water PAHs and Chlorophenols (other than PCP)

2010 (Detected Constituents)

Compound	Sample ID: / Date / Cleanup Level ug/L	SW-03 8/16/2010 Conc ug/L	SW-05 8/16/2010 Conc ug/L	SW-06 8/16/2010 Conc ug/L	SW-09 8/16/2010 Conc ug/L
2,4,6-trichlorophenol	6.5	0.568	0.774	0.699	<0.5

2009 (Detected Constituents)

No Detections

2008 (Detected Constituents)

Compound	Sample ID: / Date / Cleanup Level ug/L	SW-03 8/25/2008 Conc ug/L	SW-05 8/25/2008 Conc ug/L	SW-06 8/25/2008 Conc ug/L	SW-09 8/25/2008 Conc ug/L
Napthalene	--	0.41	0.41	0.56	0.23
Acenapthylene	--	10.4	<0.5	11.2	<0.5
Flouranthene	--	<0.5	<0.5	<0.5	0.61

2007 (Detected Constituents)

Compound	Sample ID: / Date / Cleanup Level ug/L	SW-03 8/27/2007 Conc ug/L	SW-05 8/27/2007 Conc ug/L	SW-06 8/27/2007 Conc ug/L	SW-09 8/27/2007 Conc ug/L
Benzo (a) anthracene	1.0	0.26 J	<0.5	0.25 J	<0.5
Benzo (k) fluoranthene	1.0	0.29 J	<0.5	<0.5	<0.5
Pyrene	--	0.13 J	<0.5	0.12 J	<0.5

2006 (Detected Constituents)

Compound	Sample ID: / Date / Cleanup Level ug/L	SW-03 8/21/2006 Conc ug/L	SW-05 8/21/2006 Conc ug/L	SW-06 8/21/2006 Conc ug/L	SW-09 8/21/2006 Conc ug/L
Acenaphthene	--	1.47	<0.2	<0.2	<0.2
Phenanthrene	--	1.33	<0.2	<0.2	<0.2
Benzo (k) flouranthene	1.0	0.2	<0.2	0.2	<0.2

Notes:

ug/L =	Micrograms per liter
Conc =	Concentration
< 10 =	Not detected at the specified laboratory detection limit
-- =	No discharge cleanup levels
J =	Estimated Value. The analyte was present but less than the RL.

Table A3-8. LTU Analytical Results for PCP, TPH, and PAH Prior to 2007 LTU Offload

Sample		11-Oct-05				8-Aug-06			
	PCP	Tot Ex TPH	Dioxin TEQ	B2PAH TEQ	PCP	Tot Ex DRO	DRO as Diesel	B2PAH TEQ
Cleanup levels	34	*	(0.20 ug/kg) TEQ	4.2 TEQ	34	*	*	4.2
Units	ppm	ppm	ppt	ppb	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Laboratory	Energy	Energy	STL	Energy	MBMG	MBMG	MBMG	MBMG
Method	8270C	8015M	8290	8270C	MAEPH	MAEPH	MAEPH	MAEPH
LTUZ01 0-18"	**66**	973	1643	<0.33	10.4	541	26	<0.5
LTUZ01 18-30"	**51**	718	--	<0.33	19.8	1015	45	0.0043
LTUZ01 Comp	--	--	--	--	--	--	--	--
LTUZ02 0-18"	**124**	2440	996	<0.33	16.1	384	21	<0.5
LTUZ02 18-30"	**143**	3200	--	<0.33	23.2	647	28	0.0012
LTUZ02 Comp	--	--	--	--	--	--	--	--
LTUZ03 0-18"	29	632	572	<0.33	7.5	209	13	<0.5
LTUZ03 18-30"	20	499	--	<0.33	10.1	382	18	0.001
LTUZ03 Comp	--	--	--	--	--	--	--	--
LTUZ04 0-18"	**62**	1160	670	<0.33	3.7	192	13	<0.5
LTUZ04 18-30"	**46**	1310	--	<0.33	5.5	108	9	<0.5
LTUZ04 Comp	--	--	--	--	--	--	--	--
LTUZ05 0-18"	22	603	960	<0.33	9.1	400	25	<0.5
LTUZ05 18"-30"	25	1110	--	<0.33	15.4	1350	47	0.0023
LTUZ05 Comp	--	--	--	--	--	--	--	--
LTUZ06 0-18"	**46**	2050	1018	<0.33	15.2	1080	37	<0.5
LTUZ06 18-30"	**47**	1590	--	<0.33	10.8	818	36	<0.5
LTUZ06 Comp	--	--	--	--	--	--	--	--
LTUZ07 0-18"	**59**	1730	820	<0.33	19.3	1440	44	0.0031
LTUZ07 18-30"	**91**	1990	--	<0.33	8.6	426	17	<0.5
LTUZ07 Comp	--	--	--	--	--	--	--	--
LTUZ08 0-18"	28	1850	642	<0.33	18.7	2370	75	0.0026
LTUZ08 18-30"	**42**	2150	--	<0.33	23.1	18160	67	0.0027
LTUZ08 Comp	--	--	--	--	--	--	--	--
LTUZ09 0-18"	6.8	233	385	<0.33	12.0	4550	100	<0.5
LTUZ09 18-30"	11	497	--	<0.33	25.6	1510	51	0.0028
LTUZ09 Comp	--	--	--	--	--	--	--	--
LTUZ10 0-18"	32	1930	984	<0.33	6.2	407	21	<0.5
LTUZ10 18-30"	**49**	1880	--	<0.33	10.9	797	36	0.0022
LTUZ10 Comp	--	--	--	--	--	--	--	--
Non-LTU 0-6" Background	--	--	--	--	--	--	--	--

Notes:

* =	No cleanup level defined by the MPTP ROD	STL =	Severn Trent Laboratories, Inc.
ppm =	Parts per million	-- =	Not analyzed
ppb =	Parts per billion	<0.33 =	Not detected at laboratory specified detection limit
PCP =	Pentachlorophenol	Bold =	Concentration greater than clenup level
MBMG =	Montana Bureau of Mines and Geology Laboratory		
Energy =	Energy Laboratories, Inc.		

NOTE: Previous LTU offload was in 2005 Prior to the 10/11/05 sampling

Table A3-9. LTU Analytical Results for PCP, TPH, and PAH After 2007 LTU Offload

Sample	2-Oct-07					2-Jul-08		2-Oct-08	8-Jul-09	14-Oct-10
	PCP	Tot Ex DRO	DRO as Diesel	B2PAH TEQ	Dioxin TEQ	PCP	Tot Ex DRO	PCP	PCP	PCP
Cleanup levels	34	*	*	4.2	(0.20 ug/kg) TEQ	34	*	34	34	34
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	ug/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Laboratory	MBMG	MBMG	MBMG	MBMG	TAL	MBMG	MBMG	MBMG	MBMG	MBMG
Method	8041A	MAEPH	MAEPH	8270	8290	8041A	MAEPH	8041A	8041A	8041A
LTUZ01 0-18"	20.7	281	14	<1.25	--	**82.10**	--	**61.9**	**42**	22.2
LTUZ01 18-30"	17.5	277	10	<1.25	--	**69.10**	--	**52.2**	**41.2**	20.8
LTUZ01 Comp	--	--	--	--	1826		--	--	**--**	
LTUZ02 0-18"	28.4	259	11	<1.25	--	**109**	--	**75.7**	**81.1**	**67.3**
LTUZ02 18-30"	**87.6**	280	59	<1.25	--	**124**	--	**160**	**162**	**64.4**
LTUZ02 Comp	--	--	--	--	8620		--	--	**--**	
LTUZ03 0-18"	**55.9**	328	17	<1.25	--	**187**	--	**79.5**	21.5	14.5
LTUZ03 18-30"	**153**	325	40	<1.25	--	**343**	--	**--**	**149**	16.6
LTUZ03 Comp	--	--	--	--	2554		--	--	**--**	--
LTUZ04 0-18"	15.9	375	4	<1.25	--	**156**	--	**36.2**	**46.9**	14.6
LTUZ04 18-30"	13.4	133	6	<1.25	--	**246**	--	**256**	**37.2**	14.5
LTUZ04 Comp	--	--	--	--	1554		--	--	**--**	--
LTUZ05 0-18"	18.3	220	7	<1.25	--	**49.1**	--	**63.3**	**42.6**	**34.0**
LTUZ05 18-30"	15.5	227	9	<1.25	--	**64.2**	--	**147**	**50.1**	**50.7**
LTUZ05 Comp	--	--	--	--	1160		--	--	**--**	--
LTUZ06 0-18"	21.8	205	6	<1.25	--	**40.6**	--	**50.5**	**63.9**	28.5
LTUZ06 18-30"	16.7	220	10	<1.25	--	32.1	--	**93.3**	**79**	31.6
LTUZ06 Comp	--	--	--	--	1869		--	--	--	--
LTUZ07 0-18"	18.9	330	16	<1.25	--	3.6	--	--	--	--
LTUZ07 18-30"	13.0	260	11	<1.25	--	32.6	--	--	--	--
LTUZ07 Comp	--	--	--	--	1039	--	--	--	--	--
LTUZ08 0-18"	13.1	183	5	<1.25	--	1.9	--	--	--	--
LTUZ08 18-30"	33.7	291	14	<1.25	--	4.7	--	--	--	--
LTUZ08 Comp	--	--	--	--	1518	--	--	--	--	--
LTUZ09 0-18"	9.26	122	5	<1.25	--	2.74	--	--	--	--
LTUZ09 18-30"	32.0	186	15	<1.25	--	2.3	--	--	--	--
LTUZ09 Comp	--	--	--	--	1030	--	--	--	--	--
LTUZ10 0-18"	15.4	148	--	<1.25	--	4.1	--	--	--	--
LTUZ10 18-30"	15.0	316	20	<1.25	--	4.1	--	--	--	--
LTUZ10 Comp	--	--	--	--	839	--	--	--	--	--
Non-LTU 0-6" Background	4.47	47	--	<1.25	3442	<0.63	--	--	--	0.802

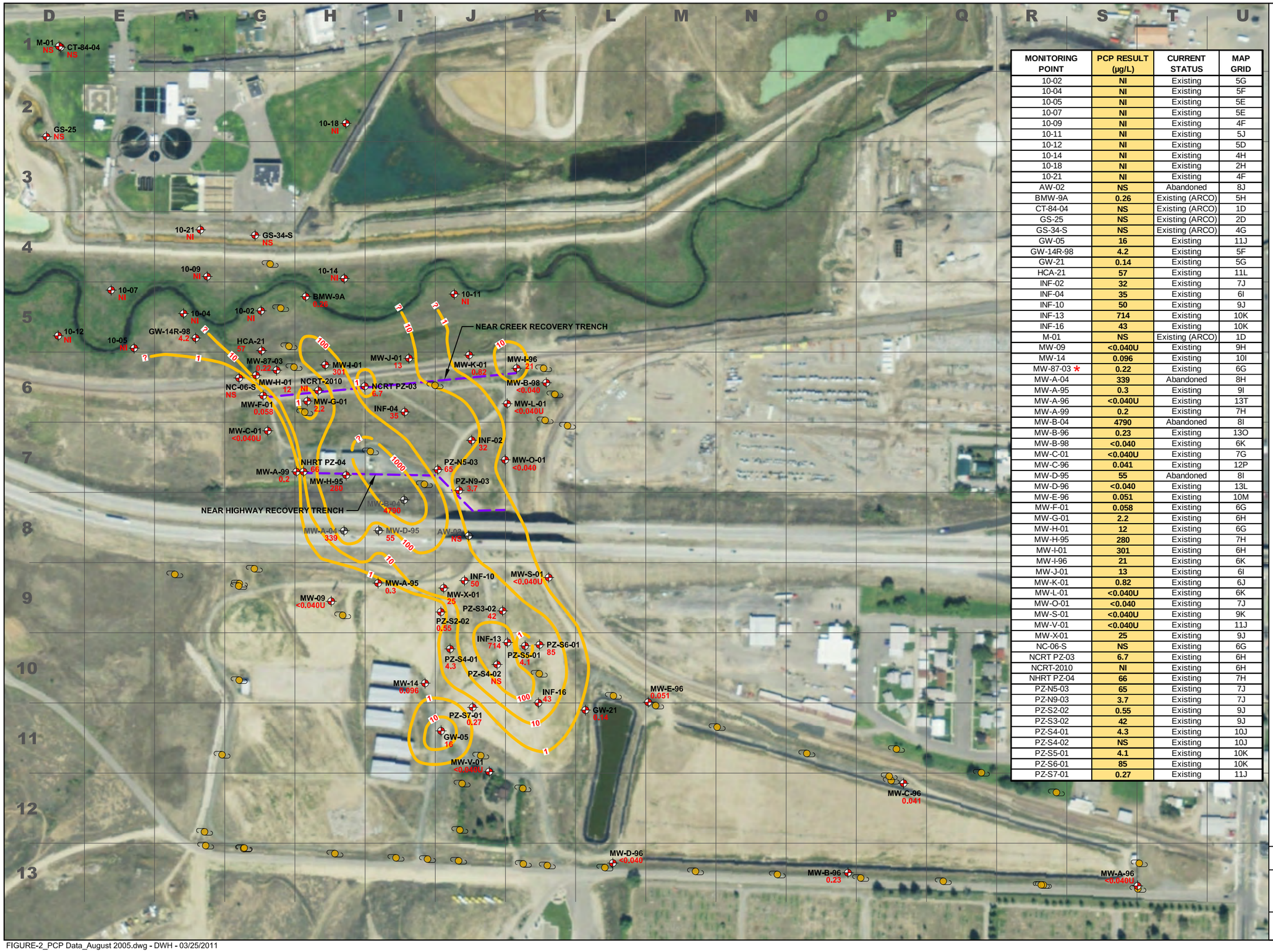
Notes:

* =	No cleanup level defined by the MPTP ROD	TAL =	Test America Laboratories / Severn Trent Laboratories, Inc.
ppm =	Parts per million	-- =	Not analyzed
ppb =	Parts per billion	<0.33 =	Not detected at laboratory specified detection limit
PCP =	Pentachlorophenol	Bold =	Concentration greater than cleanup level
MBMG =	Montana Bureau of Mines and Geology Laboratory		
Energy =	Energy Laboratories, Inc.		

NOTE: October 2007 sampling conducted after 2007 LTU offload and after addition of SSP soils for final treatment.

Attachment 4

PCP Plume Maps



MONITORING POINT	PCP RESULT (µg/L)	CURRENT STATUS	MAP GRID
10-02	NI	Existing	5G
10-04	NI	Existing	5F
10-05	NI	Existing	5E
10-07	NI	Existing	5E
10-09	NI	Existing	4F
10-11	NI	Existing	5J
10-12	NI	Existing	5D
10-14	NI	Existing	4H
10-18	NI	Existing	2H
10-21	NI	Existing	4F
AW-02	NS	Abandoned	8J
BMW-9A	0.26	Existing (ARCO)	5H
CT-84-04	NS	Existing (ARCO)	1D
GS-25	NS	Existing (ARCO)	2D
GS-34-S	NS	Existing (ARCO)	4G
GW-05	16	Existing	11J
GW-14R-98	4.2	Existing	5F
GW-21	0.14	Existing	5G
HCA-21	57	Existing	11L
INF-02	32	Existing	7J
INF-04	35	Existing	6I
INF-10	50	Existing	9J
INF-13	714	Existing	10K
INF-16	43	Existing	10K
M-01	NS	Existing (ARCO)	1D
MW-09	<0.040U	Existing	9H
MW-14	0.096	Existing	10I
MW-87-03 *	0.22	Existing	6G
MW-A-04	339	Abandoned	8H
MW-A-95	0.3	Existing	9I
MW-A-96	<0.040U	Existing	13T
MW-A-99	0.2	Existing	7H
MW-B-04	4790	Abandoned	8I
MW-B-96	0.23	Existing	13O
MW-B-98	<0.040	Existing	6K
MW-C-01	<0.040U	Existing	7G
MW-C-96	0.041	Existing	12P
MW-D-95	55	Abandoned	8I
MW-D-96	<0.040	Existing	13L
MW-E-96	0.051	Existing	10M
MW-F-01	0.058	Existing	6G
MW-G-01	2.2	Existing	6H
MW-H-01	12	Existing	6G
MW-H-95	280	Existing	7H
MW-I-01	301	Existing	6H
MW-I-96	21	Existing	6K
MW-J-01	13	Existing	6I
MW-K-01	0.82	Existing	6J
MW-L-01	<0.040U	Existing	6K
MW-O-01	<0.040	Existing	7J
MW-S-01	<0.040U	Existing	9K
MW-V-01	<0.040U	Existing	11J
MW-X-01	25	Existing	9J
NC-06-S	NS	Existing	6G
NCRT PZ-03	6.7	Existing	6H
NCRT-2010	NI	Existing	6H
NHRT PZ-04	66	Existing	7H
PZ-N5-03	65	Existing	7J
PZ-N9-03	3.7	Existing	7J
PZ-S2-02	0.55	Existing	9J
PZ-S3-02	42	Existing	9J
PZ-S4-01	4.3	Existing	10J
PZ-S4-02	NS	Existing	10J
PZ-S5-01	4.1	Existing	10K
PZ-S6-01	85	Existing	10K
PZ-S7-01	0.27	Existing	11J

TABLE LEGEND

µg/L	MICROGAMS PER LITER
J	ESTIMATED VALUE
NI	NOT INSTALLED AT THE TIME OF SAMPLING
NS	NOT SAMPLED
PCP	PENTACHLOROPHENOL
U	NOT DETECTED AT LIMIT SHOWN
*	DATUM APPEARS TO BE ANOMALOUS AND HAS NOT BEEN CONTOURED.

LEGEND

- MONITORING WELL
- MONITORING WELL (ABANDONED IN 2009)
- PCP ISOCONTOUR - DASHED WHERE INFERRED ? WHERE UNKNOWN
- UTILITY POLE

NOTE:
1) PCP ISOCONTOURS ARE INTERPRETED; OTHER INTERPRETATIONS ARE POSSIBLE.

AERIAL PHOTO SOURCE: USFSA/NAIP (2009)

150 0 150 300
SCALE IN FEET

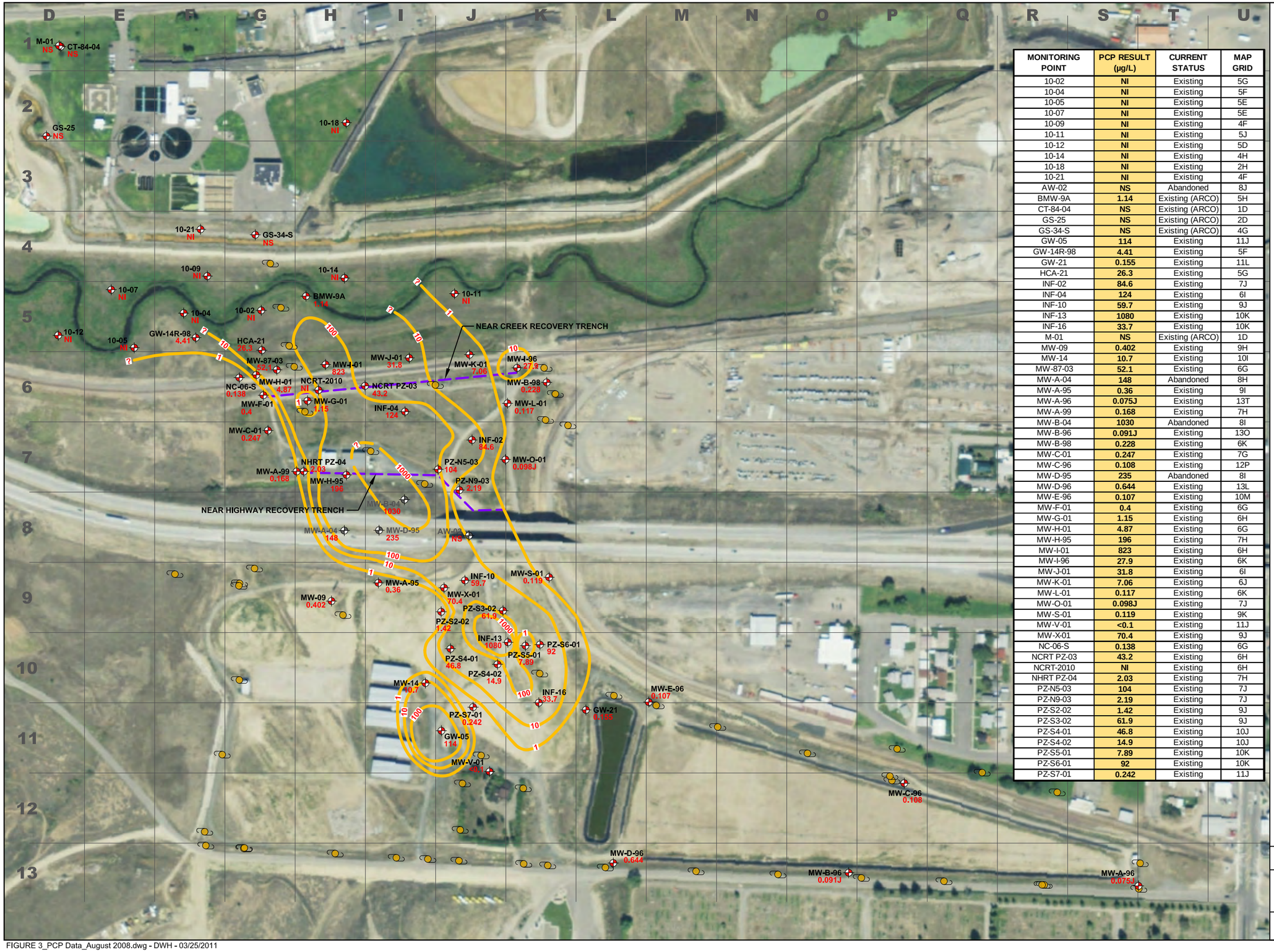
Montana Pole and Treating Plant
Butte/Silver Bow Montana

FIGURE 2
PCP DATA - AUGUST 2005

TETRA TECH EM, INC.

FIGURE-2_PCP Data_August 2005.dwg - DWH - 03/25/2011

From Final MPTP 4th Quarter Report (Tetra Tech, April 2010): Interpreted PCP Concentration Contours, August 2005



MONITORING POINT	PCP RESULT (µg/L)	CURRENT STATUS	MAP GRID
10-02	NI	Existing	5G
10-04	NI	Existing	5F
10-05	NI	Existing	5E
10-07	NI	Existing	5E
10-09	NI	Existing	4F
10-11	NI	Existing	5J
10-12	NI	Existing	5D
10-14	NI	Existing	4H
10-18	NI	Existing	2H
10-21	NI	Existing	4F
AW-02	NS	Abandoned	8J
BMW-9A	1.14	Existing (ARCO)	5H
CT-84-04	NS	Existing (ARCO)	1D
GS-25	NS	Existing (ARCO)	2D
GS-34-S	NS	Existing (ARCO)	4G
GW-05	114	Existing	11J
GW-14R-98	4.41	Existing	5F
GW-21	0.155	Existing	11L
HCA-21	26.3	Existing	5G
INF-02	84.6	Existing	7J
INF-04	124	Existing	6I
INF-10	59.7	Existing	9J
INF-13	1080	Existing	10K
INF-16	33.7	Existing	10K
M-01	NS	Existing (ARCO)	1D
MW-09	0.402	Existing	9H
MW-14	10.7	Existing	10I
MW-87-03	52.1	Existing	6G
MW-A-04	148	Abandoned	8H
MW-A-95	0.36	Existing	9I
MW-A-96	0.075J	Existing	13T
MW-A-99	0.168	Existing	7H
MW-B-04	1030	Abandoned	8I
MW-B-96	0.091J	Existing	13O
MW-B-98	0.228	Existing	6K
MW-C-01	0.247	Existing	7G
MW-C-96	0.108	Existing	12P
MW-D-95	235	Abandoned	8I
MW-D-96	0.644	Existing	13L
MW-E-96	0.107	Existing	10M
MW-F-01	0.4	Existing	6G
MW-G-01	1.15	Existing	6H
MW-H-01	4.87	Existing	6G
MW-H-95	196	Existing	7H
MW-I-01	823	Existing	6H
MW-I-96	27.9	Existing	6K
MW-J-01	31.8	Existing	6I
MW-K-01	7.06	Existing	6J
MW-L-01	0.117	Existing	6K
MW-O-01	0.098J	Existing	7J
MW-S-01	0.119	Existing	9K
MW-V-01	<0.1	Existing	11J
MW-X-01	70.4	Existing	9J
NC-06-S	0.138	Existing	6G
NCRT PZ-03	43.2	Existing	6H
NCRT-2010	NI	Existing	6H
NHRT PZ-04	2.03	Existing	7H
PZ-N5-03	104	Existing	7J
PZ-N9-03	2.19	Existing	7J
PZ-S2-02	1.42	Existing	9J
PZ-S3-02	61.9	Existing	9J
PZ-S4-01	46.8	Existing	10J
PZ-S4-02	14.9	Existing	10J
PZ-S5-01	7.89	Existing	10K
PZ-S6-01	92	Existing	10K
PZ-S7-01	0.242	Existing	11J

TABLE LEGEND

µg/L	MICROGAMS PER LITER
J	ESTIMATED VALUE
NI	NOT INSTALLED AT THE TIME OF SAMPLING
NS	NOT SAMPLED
PCP	PENTACHLOROPHENOL

LEGEND

- MONITORING WELL
- MONITORING WELL (ABANDONED IN 2009)
- PCP ISOCONTOUR - DASHED WHERE INFERRED ? WHERE UNKOWN
- UTILITY POLE

NOTE:
1) PCP ISOCONTOURS ARE INTERPRETED; OTHER INTERPRETATIONS ARE POSSIBLE.

AERIAL PHOTO SOURCE: USFSA/NAIP (2009)

N

150 0 150 300

SCALE IN FEET

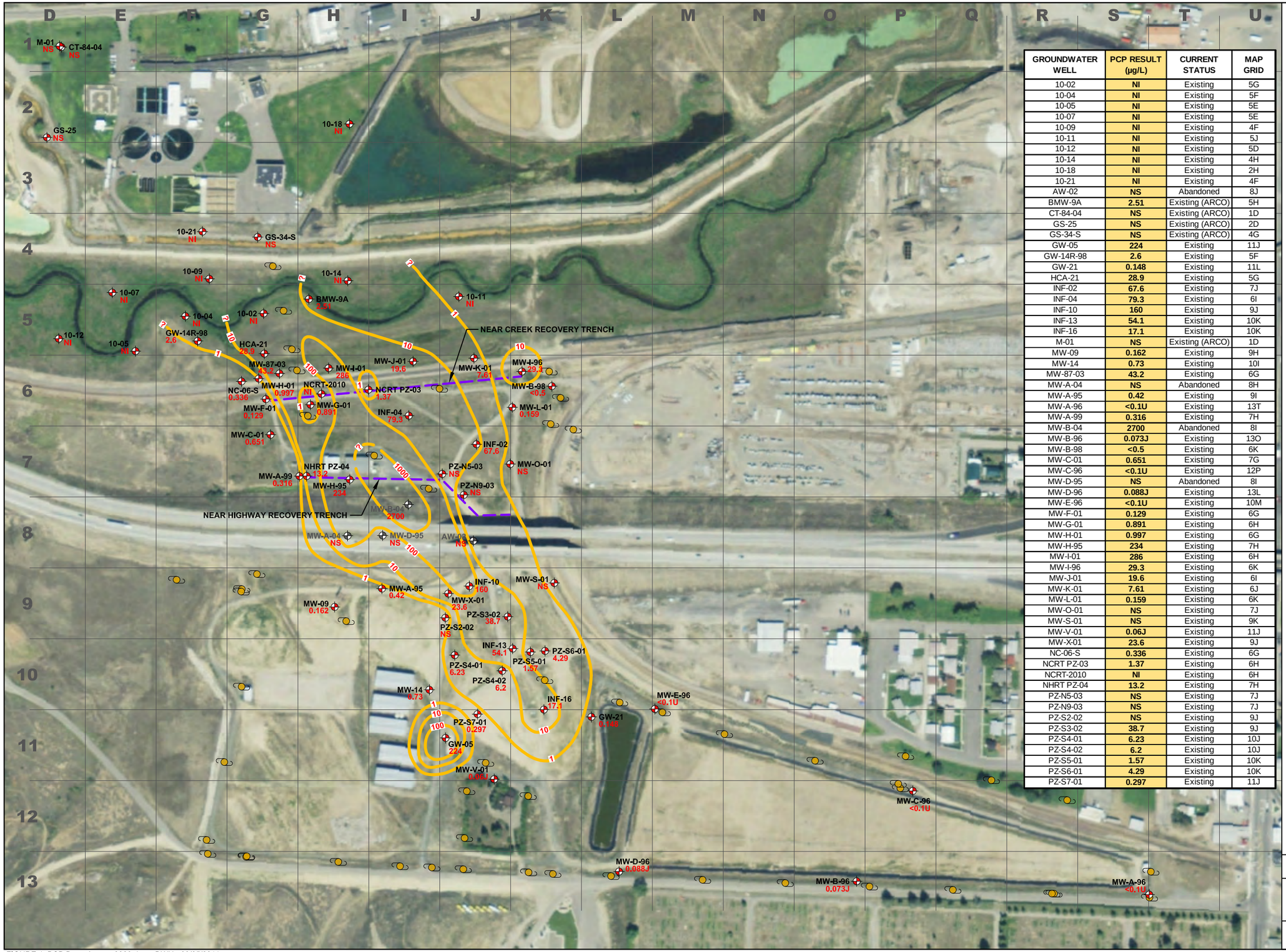
Montana Pole and Treating Plant
Butte/Silver Bow Montana

FIGURE 3
PCP DATA - AUGUST 2008

TETRA TECH EM, INC.

FIGURE 3_PCP Data_August 2008.dwg - DWH - 03/25/2011

From Final MPTP 4th Quarter Report (Tetra Tech, April 2010): Interpreted PCP Concentration Contours, August 2008



GROUNDWATER WELL	PCP RESULT (µg/L)	CURRENT STATUS	MAP GRID
10-02	NI	Existing	5G
10-04	NI	Existing	5F
10-05	NI	Existing	5E
10-07	NI	Existing	5E
10-09	NI	Existing	4F
10-11	NI	Existing	5J
10-12	NI	Existing	5D
10-14	NI	Existing	4H
10-18	NI	Existing	2H
10-21	NI	Existing	4F
AW-02	NS	Abandoned	8J
BMW-9A	2.51	Existing (ARCO)	5H
CT-84-04	NS	Existing (ARCO)	1D
GS-25	NS	Existing (ARCO)	2D
GS-34-S	NS	Existing (ARCO)	4G
GW-05	224	Existing	11J
GW-14R-98	2.6	Existing	5F
GW-21	0.148	Existing	11L
HCA-21	28.9	Existing	5G
INF-02	67.6	Existing	7J
INF-04	79.3	Existing	6I
INF-10	160	Existing	9J
INF-13	54.1	Existing	10K
INF-16	17.1	Existing	10K
M-01	NS	Existing (ARCO)	1D
MW-09	0.162	Existing	9H
MW-14	0.73	Existing	10I
MW-87-03	43.2	Existing	6G
MW-A-04	NS	Abandoned	8H
MW-A-95	0.42	Existing	9I
MW-A-96	<0.1U	Existing	13T
MW-A-99	0.316	Existing	7H
MW-B-04	2700	Abandoned	8I
MW-B-96	0.073J	Existing	13O
MW-B-98	<0.5	Existing	6K
MW-C-01	0.651	Existing	7G
MW-C-96	<0.1U	Existing	12P
MW-D-95	NS	Abandoned	8I
MW-D-96	0.088J	Existing	13L
MW-E-96	<0.1U	Existing	10M
MW-F-01	0.129	Existing	6G
MW-G-01	0.891	Existing	6H
MW-H-01	0.997	Existing	6G
MW-H-95	234	Existing	7H
MW-I-01	286	Existing	6H
MW-I-96	29.3	Existing	6K
MW-J-01	19.6	Existing	6I
MW-K-01	7.61	Existing	6J
MW-L-01	0.159	Existing	6K
MW-O-01	NS	Existing	7J
MW-S-01	NS	Existing	9K
MW-V-01	0.06J	Existing	11J
MW-X-01	23.6	Existing	9J
NC-06-S	0.336	Existing	6G
NCRT PZ-03	1.37	Existing	6H
NCRT-2010	NI	Existing	6H
NHRT PZ-04	13.2	Existing	7H
PZ-N5-03	NS	Existing	7J
PZ-N9-03	NS	Existing	7J
PZ-S2-02	NS	Existing	9J
PZ-S3-02	38.7	Existing	9J
PZ-S4-01	6.23	Existing	10J
PZ-S4-02	6.2	Existing	10J
PZ-S5-01	1.57	Existing	10K
PZ-S6-01	4.29	Existing	10K
PZ-S7-01	0.297	Existing	11J

TABLE LEGEND

µg/L	MICROGAMS PER LITER
J	ESTIMATED VALUE
NI	NOT INSTALLED AT THE TIME OF SAMPLING
NS	NOT SAMPLED
PCP	PENTACHLOROPHENOL
U	NOT DETECTED AT LIMIT SHOWN

LEGEND

- MONITORING WELL
- MONITORING WELL (ABANDONED IN 2009)
- PCP ISOCONTOUR - DASHED WHERE INFERRED ? WHERE UNKNOWN
- UTILITY POLE

NOTE:
1) PCP ISOCONTOURS ARE INTERPRETED; OTHER INTERPRETATIONS ARE POSSIBLE.

AERIAL PHOTO SOURCE: USFSA/NAIP (2009)

150 0 150 300
SCALE IN FEET

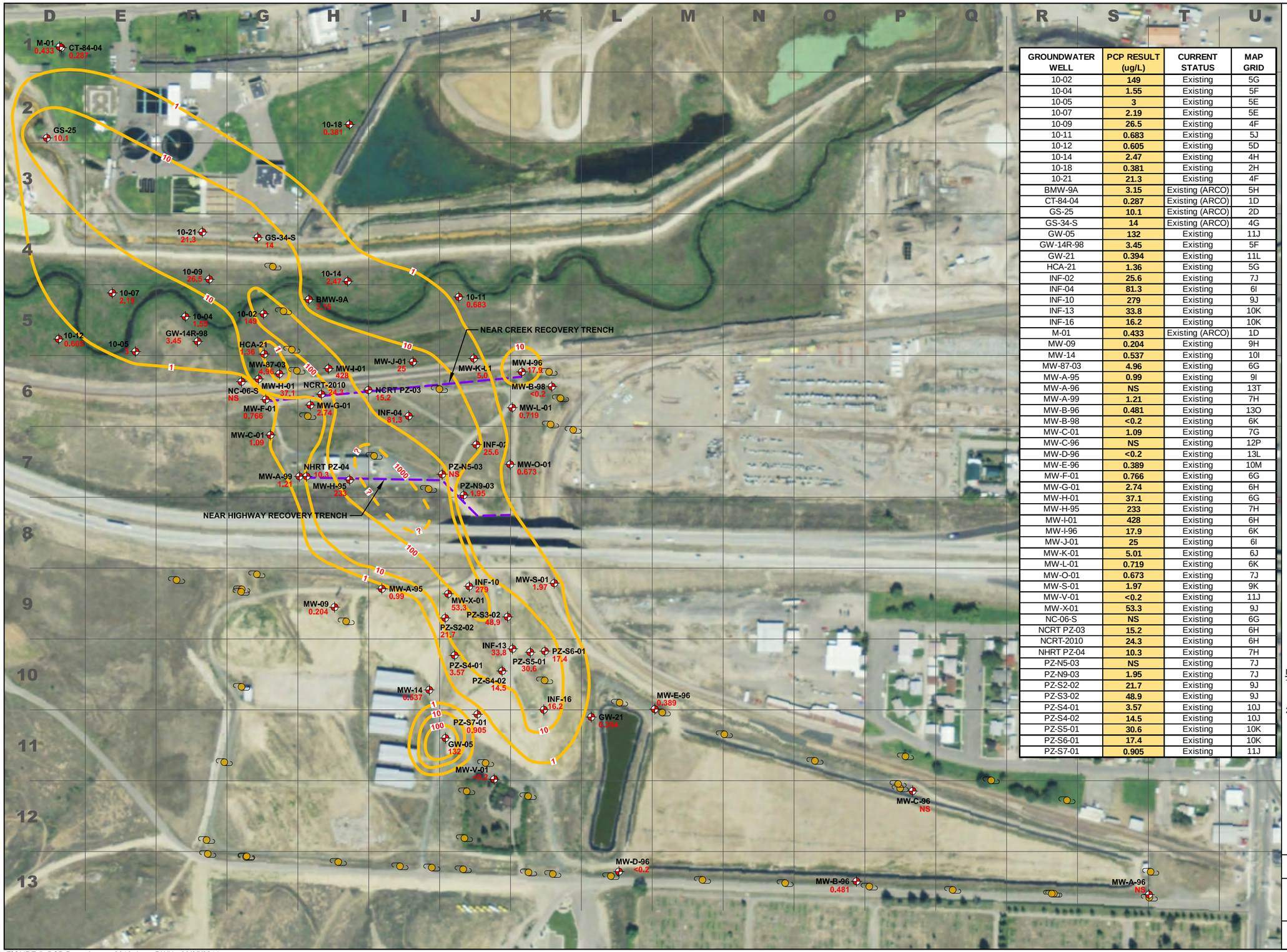
Montana Pole and Treating Plant
Butte/Silver Bow Montana

FIGURE 4
PCP DATA - AUGUST 2009

TETRA TECH EM, INC.

FIGURE 4_PCP Data_August 2009.dwg - DWH - 03/25/2011

From Final MPTP 4th Quarter Report (Tetra Tech, April 2010): Interpreted PCP Concentration Contours, August 2009 (Just Prior to Phase 1 WWTP Dewatering)



GROUNDWATER WELL	PCP RESULT (ug/L)	CURRENT STATUS	MAP GRID
10-02	149	Existing	5G
10-04	1.55	Existing	5F
10-05	3	Existing	5E
10-07	2.19	Existing	5E
10-09	26.5	Existing	4F
10-11	0.683	Existing	5J
10-12	0.605	Existing	5D
10-14	2.47	Existing	4H
10-18	0.381	Existing	2H
10-21	21.3	Existing	4F
BMW-9A	3.15	Existing (ARCO)	5H
CT-84-04	0.287	Existing (ARCO)	1D
GS-25	10.1	Existing (ARCO)	2D
GS-34-S	14	Existing (ARCO)	4G
GW-05	132	Existing	11J
GW-14R-98	3.45	Existing	5F
GW-21	0.394	Existing	11L
HCA-21	1.36	Existing	5G
INF-02	25.6	Existing	7J
INF-04	81.3	Existing	6I
INF-10	279	Existing	9J
INF-13	33.8	Existing	10K
INF-16	16.2	Existing	10K
M-01	0.433	Existing (ARCO)	1D
MW-09	0.204	Existing	9H
MW-14	0.537	Existing	10I
MW-87-03	4.96	Existing	6G
MW-A-95	0.99	Existing	9I
MW-A-96	NS	Existing	13T
MW-A-99	1.21	Existing	7H
MW-B-96	0.481	Existing	13O
MW-B-98	<0.2	Existing	6K
MW-C-01	1.09	Existing	7G
MW-C-96	NS	Existing	12P
MW-D-96	<0.2	Existing	13L
MW-E-96	0.389	Existing	10M
MW-F-01	0.766	Existing	6G
MW-G-01	2.74	Existing	6H
MW-H-01	37.1	Existing	6G
MW-H-95	233	Existing	7H
MW-I-01	428	Existing	6H
MW-I-96	17.9	Existing	6K
MW-J-01	25	Existing	6I
MW-K-01	5.01	Existing	6J
MW-L-01	0.719	Existing	6K
MW-O-01	0.673	Existing	7J
MW-S-01	1.97	Existing	9K
MW-V-01	<0.2	Existing	11J
MW-X-01	53.3	Existing	9J
NC-06-S	NS	Existing	6G
NCRT PZ-03	15.2	Existing	6H
NCRT-2010	24.3	Existing	6H
NHRT PZ-04	10.3	Existing	7H
PZ-N5-03	NS	Existing	7J
PZ-N9-03	1.95	Existing	7J
PZ-S2-02	21.7	Existing	9J
PZ-S3-02	48.9	Existing	9J
PZ-S4-01	3.57	Existing	10J
PZ-S4-02	14.5	Existing	10J
PZ-S5-01	30.6	Existing	10K
PZ-S6-01	17.4	Existing	10K
PZ-S7-01	0.905	Existing	11J

TABLE LEGEND

µg/L MICROGAMS PER LITER

PCP PENTACHLOROPHENOL

LEGEND

MONITORING WELL

PCP ISOCONTOUR - DASHED WHERE INFERRED
? WHERE UNKNOWN

UTILITY POLE

NOTES:

1) PCP ISOCONTOURS ARE INTERPRETED; OTHER INTERPRETATIONS ARE POSSIBLE.

2) MONITORING WELL MW-B-04 WAS ABANDONED. NO DATA AVAILABLE TO CONTOUR 1,000µg/L CONTOUR LINE. CONTOUR LINE INFERRED BASED ON HISTORIC DATA.

AERIAL PHOTO SOURCE: USFSA/NAIP (2009)

N

150 0 150 300

SCALE IN FEET

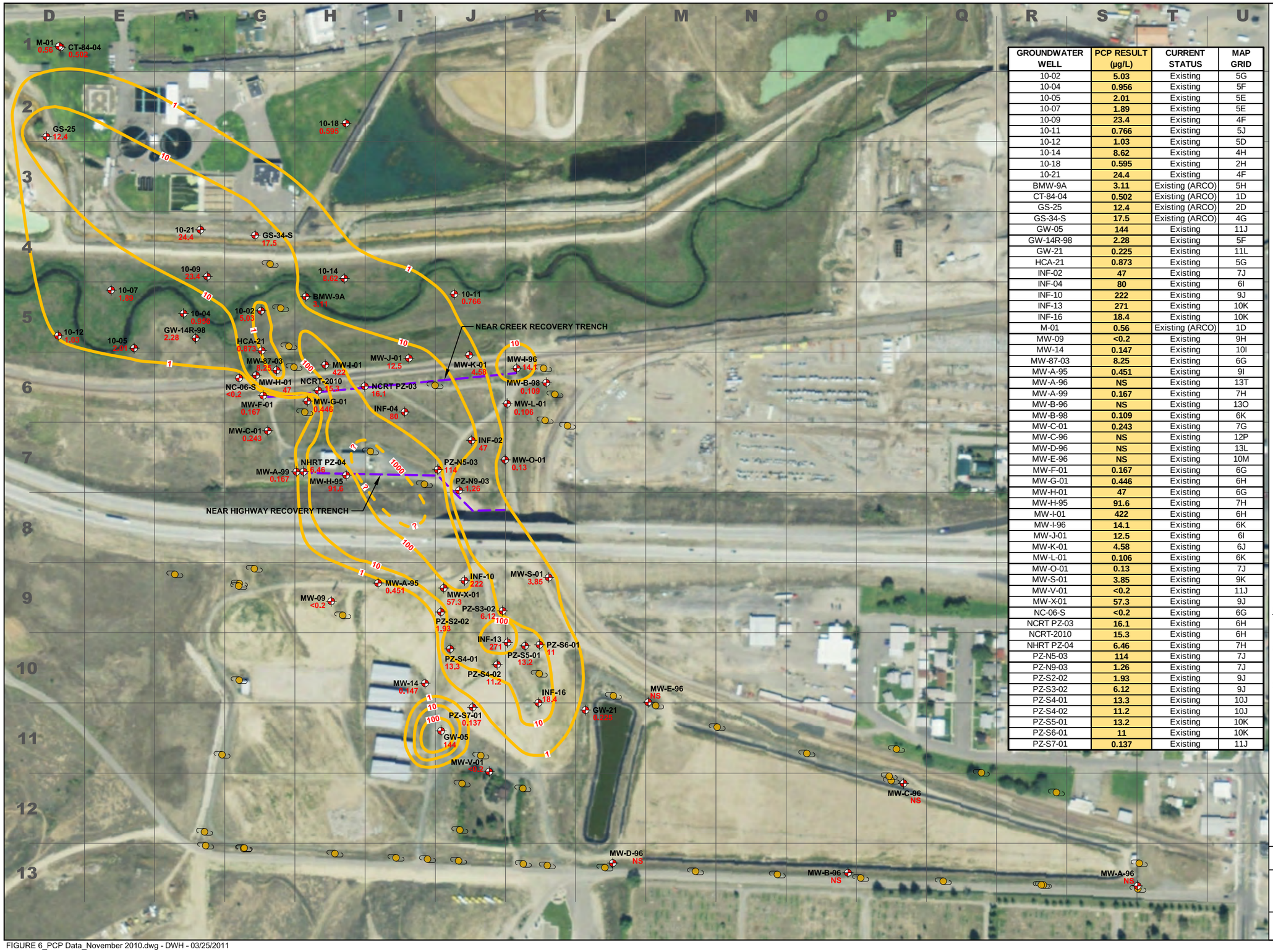
Montana Pole and Treating Plant
Butte/Silver Bow Montana

FIGURE 5
PCP DATA - AUGUST 2010

TETRA TECH EM, INC.

FIGURE 5_PCP Data_August 2010.dwg - DWH - 03/25/2011

From Final MPTP 4th Quarter Report (Tetra Tech, April 2010): Interpreted PCP Concentration Contours, August 2010 (After Phase 1 WWTP Dewatering)



GROUNDWATER WELL	PCP RESULT (µg/L)	CURRENT STATUS	MAP GRID
10-02	5.03	Existing	5G
10-04	0.956	Existing	5F
10-05	2.01	Existing	5E
10-07	1.89	Existing	5E
10-09	23.4	Existing	4F
10-11	0.766	Existing	5J
10-12	1.03	Existing	5D
10-14	8.62	Existing	4H
10-18	0.595	Existing	2H
10-21	24.4	Existing	4F
BMW-9A	3.11	Existing (ARCO)	5H
CT-84-04	0.502	Existing (ARCO)	1D
GS-25	12.4	Existing (ARCO)	2D
GS-34-S	17.5	Existing (ARCO)	4G
GW-05	144	Existing	11J
GW-14R-98	2.28	Existing	5F
GW-21	0.225	Existing	11L
HCA-21	0.873	Existing	5G
INF-02	47	Existing	7J
INF-04	80	Existing	6I
INF-10	222	Existing	9J
INF-13	271	Existing	10K
INF-16	18.4	Existing	10K
M-01	0.56	Existing (ARCO)	1D
MW-09	<0.2	Existing	9H
MW-14	0.147	Existing	10I
MW-87-03	8.25	Existing	6G
MW-A-95	0.451	Existing	9I
MW-A-96	NS	Existing	13T
MW-A-99	0.167	Existing	7H
MW-B-96	NS	Existing	13O
MW-B-98	0.109	Existing	6K
MW-C-01	0.243	Existing	7G
MW-C-96	NS	Existing	12P
MW-D-96	NS	Existing	13L
MW-E-96	NS	Existing	10M
MW-F-01	0.167	Existing	6G
MW-G-01	0.446	Existing	6H
MW-H-01	47	Existing	6G
MW-H-95	91.6	Existing	7H
MW-I-01	422	Existing	6H
MW-I-96	14.1	Existing	6K
MW-J-01	12.5	Existing	6I
MW-K-01	4.58	Existing	6J
MW-L-01	0.106	Existing	6K
MW-O-01	0.13	Existing	7J
MW-S-01	3.85	Existing	9K
MW-V-01	<0.2	Existing	11J
MW-X-01	57.3	Existing	9J
NC-06-S	<0.2	Existing	6G
NCRT PZ-03	16.1	Existing	6H
NCRT-2010	15.3	Existing	6H
NHRT PZ-04	6.46	Existing	7H
PZ-N5-03	114	Existing	7J
PZ-N9-03	1.26	Existing	7J
PZ-S2-02	1.93	Existing	9J
PZ-S3-02	6.12	Existing	9J
PZ-S4-01	13.3	Existing	10J
PZ-S4-02	11.2	Existing	10J
PZ-S5-01	13.2	Existing	10K
PZ-S6-01	11	Existing	10K
PZ-S7-01	0.137	Existing	11J

TABLE LEGEND

µg/L MICROGAMS PER LITER

PCP PENTACHLOROPHENOL

LEGEND

MONITORING WELL

PCP ISOCONTOUR - DASHED WHERE INFERRED
? WHERE UNKNOWN

UTILITY POLE

NOTES:

1) PCP ISOCONTOURS ARE INTERPRETED; OTHER INTERPRETATIONS ARE POSSIBLE.

2) MONITORING WELL MW-B-04 WAS ABANDONED. NO DATA AVAILABLE TO CONTOUR 1,000µg/L CONTOUR LINE. CONTOUR LINE INFERRED BASED ON HISTORIC DATA.

3) DURING THIS QUARTER A BEAVER DAM AND PONDED WATER MAY HAVE INFLUENCED GROUNDWATER LEVELS AND PCP CONCENTRATIONS IN THE VICININITY OF MONITORING WELLS 10-02, HCA-21, AND MW-87-03. THE BEAVER DAM WAS REMOVED ON DECEMBER 15, 2010.

AERIAL PHOTO SOURCE: USFSA/NAIP (2009)

N

150 0 150 300

SCALE IN FEET

Montana Pole and Treating Plant
Butte/Silver Bow Montana

FIGURE 6
PCP DATA - NOVEMBER 2010

TETRA TECH EM, INC.

FIGURE 6_PCP Data_November 2010.dwg - DWH - 03/25/2011

From Final MPTP 4th Quarter Report (Tetra Tech, April 2010): Interpreted PCP Concentration Contours, November 2010 (After Phase 1 WWTP Dewatering)

Attachment 5

Listing of Wells, Coordinates, and Elevations

Table A5-1. Montana Pole Treatment Plant Well Information

Well Name	Alias Names	Northing NAD83 FT	Easting NAD83 FT	Top of PVC Elevation NAVD88 FT	Top of Casing Elevation NAVD88 FT	Ground Elevation NAVD88 FT	Top of PVC Elevation NGVD29 FT	Top of Casing Elevation NGVD29 FT	Ground Elevation NGVD29 FT	Casing Diameter IN	Top of Screen NGVD29 FT	Bottom of Screen NGVD29 FT	Top of Screen FT BGS	Bottom of Screen FT BGS	Comments
10-01		651096	1193398	5436.78	5438.84	5435.55	5432.56	5434.62	5431.33	4	5416.3	5406.3	15.0	25.0	
10-02		651098	1193392	5436.12	5436.18	5433.43	5431.90	5431.96	5429.21	4	5426.2	5421.2	3.0	8.0	
10-03		651092	1193147	5435.62	5435.76	5432.77	5431.40	5431.54	5428.55	4	5417.0	5412.0	11.6	16.6	
10-04		651089	1193143	5435.16	5435.26	5432.85	5430.94	5431.04	5428.63	4	5423.4	5420.4	5.2	8.2	
10-05		650978	1192985	5436.37	5436.46	5433.24	5432.15	5432.24	5429.02	4	5421.6	5416.6	7.4	12.4	
10-06		651162	1192907	5435.25	5435.41	5432.35	5431.03	5431.19	5428.13	4	5419.1	5409.1	9.0	19.0	
10-07		651164	1192911	5435.09	5435.20	5432.07	5430.87	5430.98	5427.85	4	5424.9	5419.9	3.0	8.0	
10-08		651208	1193216	5435.48	5435.64	5432.81	5431.26	5431.42	5428.59	4	5416.1	5406.1	12.5	22.5	
10-09		651208	1193219	5435.51	5435.67	5432.76	5431.29	5431.45	5428.54	4	5419.2	5414.2	9.3	14.3	
10-10		651154	1194015	5438.75	5436.88	5433.54	5434.53	5432.66	5429.32	4	5414.8	5409.8	14.5	19.5	
10-11		651152	1194011	5437.58	5437.68	5435.46	5433.36	5433.46	5431.24	4	5426.2	5421.2	5.0	10.0	
10-12		651018	1192741	5434.89			5430.67		5428.67	4	5428.7	5419.0	0.0	9.7	
10-13		651207	1193662	5436.84	5436.95	5434.15	5432.62	5432.73	5429.93	4	5415.4	5405.4	14.5	24.5	
10-14		651202	1193658	5437.26	5437.42	5434.05	5433.04	5433.20	5429.83	4	5422.6	5417.6	7.2	12.2	
10-15		651091	1193401	5436.70	5436.78	5433.43	5432.48	5432.56	5429.21	4	5419.7	5414.7	9.5	14.5	
10-16		651710	1193671	5441.82	5442.50	5439.40	5437.60	5438.28	5435.18	6	5386.2	5381.2	49.0	54.0	
10-17		651705	1193667	5441.98	5442.77	5439.59	5437.76	5438.55	5435.37	6	5404.4	5399.4	31.0	36.0	
10-18		651699	1193664	5442.05	5442.42	5439.52	5437.83	5438.20	5435.30	6	5435.3	5431.3	0.0	4.0	
10-19		651358	1193213	5438.09	5438.56	5435.82	5433.87	5434.34	5431.60	6	5399.1	5394.1	32.5	37.5	
10-20		651358	1193205	5438.04	5438.64	5435.46	5433.82	5434.42	5431.24	6	5411.2	5406.2	20.0	25.0	
10-21		651358	1193197	5437.82	5438.54	5435.43	5433.60	5434.32	5431.21	6	5426.2	5416.2	5.0	15.0	
AW-02	AW2	650377	1194057	5452.27	5452.55	5449.91	5448.05	5448.33	5445.69	6	5435.0	5425.8	10.6	19.9	abandoned
BMW-9A		651144	1193535	5437.51	5436.55	5433.92	5433.29	5432.33	5429.70	8	5415.0	5405.0	14.7	24.7	
BMW-9B		651137	1193537	5436.28	5436.53	5433.97	5432.06	5432.31	5429.75	8	5386.0	5376.0	43.8	53.8	
Discharge Pipe		650908	1193355	5432.64			5428.42								
GS-18R		651009	1193549	5436.59	5436.56	5434.11	5432.37	5432.34	5429.89	8	5424.5	5414.5	5.4	15.4	
GS-22		650753	1192837	5440.24	5440.28	5437.69	5436.02	5436.06	5433.47	6	5428.9	5418.9	4.6	14.6	
GW-05	GW05	649752	1193969	5458.90	5458.76	5456.44	5454.68	5454.54	5452.22	6	5432.1	5422.1	20.2	30.2	
GW-08	GW8	649384	1194261	5465.12	5465.28	5463.49	5460.90	5461.06	5459.27	6	5437.0	5426.5	22.3	32.8	
GW-09	GW09	650271	1193340	5454.26	5454.69	5452.18	5450.04	5450.47	5447.96	6	5430.4	5420.4	17.5	27.5	
GW-10	GW10	650241	1194360	5451.15	5451.51	5448.17	5446.93	5447.29	5443.95	6	5425.0	5414.5	19.0	29.5	
GW-12	GW12	650726	1193254	5442.28	5442.54	5439.54	5438.06	5438.32	5435.32	6	5415.5	5405.0	19.8	30.3	
GW-13	GW13	650811	1194373	5444.89	5445.47	5442.95	5440.67	5441.25	5438.73	6	5417.9	5407.9	20.9	30.9	
GW-14R-98	GW14R	651011	1193182	5434.96	5435.85	5433.93	5430.74	5431.63	5429.71	8	5427.3	5417.3	2.4	12.4	
GW-17	GW17	651006	1194544	5444.89	5444.95	5442.13	5440.67	5440.73	5437.91	6	5430.9	5420.9	7.0	17.0	
GW-21	GW21	649818	1194432	5456.40	5456.38	5453.34	5452.18	5452.16	5449.12	6	5436.4	5425.9	12.7	23.2	
GW-22R-98	GW224	649359	1194428	5465.03	5465.16	5462.43	5460.81	5460.94	5458.21	8	5440.4	5430.4	17.8	27.8	
HCA-21		650971	1193394	5435.74	5435.85	5434.56	5431.52	5431.63	5430.34	8	5427.0	5423.3	3.4	7.0	
INF-01		650682	1194073	5444.46	5445.30	5443.06	5440.24	5441.08	5438.84	6	5427.4	5422.4	11.5	16.5	
INF-02		650683	1194067	5444.28	5445.13	5443.12	5440.06	5440.91	5438.90	6	5429.6	5424.6	9.3	14.3	
INF-03		650683	1194062	5444.32	5445.28	5443.31	5440.10	5441.06	5439.09	6	5421.5	5416.5	17.6	22.6	
INF-04		650774	1193852	5444.97	5445.51	5443.23	5440.75	5441.29	5439.01	6	5430.0	5425.0	9.0	14.0	
INF-05		650774	1193847	5445.07	5445.68	5443.29	5440.85	5441.46	5439.07	6	5425.1	5420.1	14.0	19.0	
INF-06		650774	1193842	5445.30	5445.64	5443.51	5441.08	5441.42	5439.29	6	5420.8	5415.8	18.5	23.5	
INF-07		650829	1193650	5443.78	5444.63	5442.10	5439.56	5440.41	5437.88	6	5421.8	5416.8	16.1	21.1	
INF-08		650828	1193643	5443.81	5444.61	5442.29	5439.59	5440.39	5438.07	6	5426.7	5421.7	11.4	16.4	

Table A5-1. Montana Pole Treatment Plant Well Information

Well Name	Alias Names	Northing NAD83 FT	Easting NAD83 FT	Top of PVC Elevation NAVD88 FT	Top of Casing Elevation NAVD88 FT	Ground Elevation NAVD88 FT	Top of PVC Elevation NGVD29 FT	Top of Casing Elevation NGVD29 FT	Ground Elevation NGVD29 FT	Casing Diameter IN	Top of Screen NGVD29 FT	Bottom of Screen NGVD29 FT	Top of Screen FT BGS	Bottom of Screen FT BGS	Comments
INF-09		650828	1193636	5443.81	5444.67	5442.33	5439.59	5440.45	5438.11	6	5431.3	5427.3	6.8	10.8	
INF-10		650233	1194044	5448.70	5450.19	5449.00	5444.48	5445.97	5444.78	8	5433.8	5428.8	11.0	16.0	
INF-11		650236	1194047	5449.44	5450.34	5449.01	5445.22	5446.12	5444.79	8	5428.5	5423.5	16.3	21.3	
INF-12		650239	1194050	5449.89	5450.51	5449.10	5445.67	5446.29	5444.88	8	5420.0	5415.0	24.9	29.9	
INF-13		650035	1194182	5455.35	5455.61	5453.70	5451.13	5451.39	5449.48	8	5435.4	5430.4	14.0	19.0	
INF-14		650036	1194185	5455.16	5455.48	5453.56	5450.94	5451.26	5449.34	8	5427.4	5422.4	21.9	26.9	
INF-15		650036	1194189	5453.41	5454.46	5453.44	5449.19	5450.24	5449.22	8	5418.5	5413.5	30.7	35.7	
INF-16		649842	1194281	5459.82	5459.97	5454.94	5455.60	5455.75	5450.72	6	5436.7	5431.7	14.0	19.0	
INF-17		649837	1194284	5459.35	5459.59	5454.75	5455.13	5455.37	5450.53	6	5428.4	5423.4	22.1	27.1	
INF-18		649833	1194287	5458.92	5459.15	5454.30	5454.70	5454.93	5450.08	6	5420.3	5415.3	29.8	34.8	
MANHOLE #2	NHRT MH#2	650574	1193955	5448.07	5448.10	5445.66	5443.85	5443.88	5441.44	10					
MP-04	MF-14	650785	1193447	5442.68	5442.78	5440.48	5438.46	5438.56	5436.26	8	5427.2	5417.2	9.0	19.0	
MW-01		650806	1193383	5442.61	5443.09	5440.76	5438.39	5438.87	5436.54	8	5431.4	5414.4	5.1	22.1	
MW-03		650886	1194185	5444.97	5445.41	5442.99	5440.75	5441.19	5438.77	8	5433.2	5417.2	5.5	21.5	
MW-09		650167	1193617	5454.76	5455.18	5453.88	5450.54	5450.96	5449.66	8	5437.2	5424.1	12.5	25.6	
MW-14		649904	1193917	5455.45	5455.55	5454.75	5451.23	5451.33	5450.53	8	5436.2	5424.2	14.3	26.3	
MW-87-3	MW-87-03; M-03-87	650908	1193442	5441.70	5441.84	5440.61	5437.48	5437.62	5436.39	8	5430.3	5420.3	6.1	16.1	
MW-A-01		650587	1193403	5444.06	5445.16	5443.77	5439.84	5440.94	5439.55	8	5434.2	5424.2	5.4	15.4	
MW-A-04	B4	650393	1193658	5485.04	5485.02	5485.83	5480.82	5480.80	5481.61	12					abandoned
MW-A-95	A95	650225	1193767	5451.25	5451.55	5449.17	5447.03	5447.33	5444.95	6	5439.2	5423.4	5.8	21.6	
MW-A-96	MW-A	649255	1196201	5468.25	5468.70	5467.45	5464.03	5464.48	5463.23	8	5445.1	5435.1	18.1	28.1	
MW-A-98	A98	650810	1193163	5439.70	5440.09	5437.78	5435.48	5435.87	5433.56	8	5427.8	5417.8	5.8	15.8	
MW-A-99	A99	650582	1193505	5445.39	5445.96	5443.77	5441.17	5441.74	5439.55	5	5430.8	5420.8	8.7	18.7	
MW-B-01		650635	1193500	5442.19	5443.17	5441.60	5437.97	5438.95	5437.38	8	5432.2	5422.2	5.2	15.2	
MW-B-04	B3	650492	1193850	5471.26	5471.30	5468.26	5467.04	5467.08	5464.04	6					abandoned
MW-B-95		650295	1194063	5450.90	5451.18	5449.51	5446.68	5446.96	5445.29	8	5436.6	5421.1	8.7	24.2	abandoned
MW-B-96	B	649297	1195273	5464.91	5465.01	5463.93	5460.69	5460.79	5459.71	8	5440.7	5430.7	19.1	29.1	
MW-B-98		650867	1194306	5443.77	5444.00	5441.63	5439.55	5439.78	5437.41	8	5433.6	5423.6	3.8	13.8	
MW-B-99	MW-99-B	650678	1193387	5442.71	5442.89	5440.56	5438.49	5438.67	5436.34	6	5432.7	5422.7	3.7	13.7	
MW-C-01		650713	1193413	5442.50	5443.09	5440.71	5438.28	5438.87	5436.49	8	5432.5	5422.5	4.0	14.0	
MW-C-04	B8	650273	1193986	5472.67	5472.76	5469.37	5468.45	5468.54	5465.15	6					abandoned
MW-C-96	MW-96-C	649584	1195451	5463.44	5463.90	5462.28	5459.22	5459.68	5458.06	8	5439.8	5429.8	18.3	28.3	
MW-CT-01	CT1	650620	1193295	5445.19	5445.12	5442.04	5440.97	5440.90	5437.82	8	5411.1	5411.1	26.7	26.7	
MW-CT-02	CT2	650616	1193291	5445.14	5445.46	5442.29	5440.92	5441.24	5438.07	8	5420.8	5420.8	17.2	17.2	
MW-D-01		650742	1193380	5442.04	5442.60	5439.90	5437.82	5438.38	5435.68	8	5432.1	5422.1	3.5	13.5	
MW-D-95		650394	1193769	5489.69	5489.57	5489.95	5485.47	5485.35	5485.73	12	5439.1	5421.1	46.7	64.7	abandoned
MW-D-96	D	649328	1194519	5464.29	5464.92	5464.55	5460.07	5460.70	5460.33	8	5440.0	5430.0	20.4	30.4	
MW-E-01		650819	1193286	5440.59	5440.74	5438.18	5436.37	5436.52	5433.96	8	5430.6	5420.6	3.4	13.4	
MW-E-96	96-E	649843	1194633	5458.66	5459.18	5457.33	5454.44	5454.96	5453.11	8	5434.4	5424.4	18.7	28.7	
MW-F-01		650826	1193399	5442.43	5443.38	5441.71	5438.21	5439.16	5437.49	8	5432.5	5422.5	5.0	15.0	
MW-F-95		650444	1194021	5452.19	5452.44	5451.24	5447.97	5448.22	5447.02	8	5436.6	5421.1	10.5	26.0	abandoned
MW-F-96	96-F	649366	1193672	5469.86	5470.47	5470.39	5465.64	5466.25	5466.17	12	5441.5	5431.5	24.7	34.7	
MW-G-01		650808	1193540	5443.26	5443.72	5441.57	5439.04	5439.50	5437.35	8	5433.4	5423.4	4.0	14.0	
MW-G-96	96-G	649618	1193255	5480.15	5480.54	5479.24	5475.93	5476.32	5475.02	8	5455.6	5445.6	19.4	29.4	
MW-H-01		650891	1193376	5440.65	5441.79	5439.36	5436.43	5437.57	5435.14	8	5430.7	5420.7	4.4	14.4	
MW-H-95		650571	1193665	5448.15	5448.53	5446.35	5443.93	5444.31	5442.13	8	5435.7	5420.2	6.4	21.9	

Table A5-1. Montana Pole Treatment Plant Well Information

Well Name	Alias Names	Northing NAD83 FT	Easting NAD83 FT	Top of PVC Elevation NAVD88 FT	Top of Casing Elevation NAVD88 FT	Ground Elevation NAVD88 FT	Top of PVC Elevation NGVD29 FT	Top of Casing Elevation NGVD29 FT	Ground Elevation NGVD29 FT	Casing Diameter IN	Top of Screen NGVD29 FT	Bottom of Screen NGVD29 FT	Top of Screen FT BGS	Bottom of Screen FT BGS	Comments
MW-H-96	96-H	650026	1193198	5462.80	5463.35	5461.13	5458.58	5459.13	5456.91	8	5440.6	5430.6	16.3	26.3	
MW-I-01		650925	1193598	5437.86	5438.00	5436.15	5433.64	5433.78	5431.93	8	5431.8	5421.8	0.1	10.1	
MW-I-96	MW-1-96	650914	1194211	5443.94	5444.49	5442.97	5439.72	5440.27	5438.75	8	5425.1	5419.7	13.6	19.1	
MW-J-01		650946	1193866	5439.37	5439.64	5437.97	5435.15	5435.42	5433.75	8	5433.1	5423.1	0.6	10.6	
MW-J-96	J	650709	1193489	5442.13	5442.70	5440.54	5437.91	5438.48	5436.32	8	5428.8	5410.0	7.5	26.3	
MW-K-01		650956	1194059	5439.63	5440.05	5438.11	5435.41	5435.83	5433.89	8	5433.5	5423.5	0.4	10.4	
MW-K-96	96-K	650890	1193257	5439.72	5440.36	5437.65	5435.50	5436.14	5433.43	8	5424.3	5410.3	9.2	23.2	
MW-L-01		650800	1194181	5444.36	5445.26	5444.29	5440.14	5441.04	5440.07	8	5434.5	5424.5	5.6	15.6	
MW-L-96	MW-96-L	650930	1193750	5438.26	5438.84	5436.09	5434.04	5434.62	5431.87	8	5420.2	5410.2	11.7	21.7	
MW-M-01		650796	1194261	5443.15	5444.18	5443.12	5438.93	5439.96	5438.90	8	5433.3	5423.3	5.6	15.6	
MW-M-96	MW-96-M	650949	1193980	5438.40	5438.86	5436.37	5434.18	5434.64	5432.15	8	5421.3	5411.3	10.8	20.8	
MW-N-01		650676	1194173	5445.51	5445.98	5444.45	5441.29	5441.76	5440.23	8	5435.6	5425.6	4.6	14.6	
MW-O-01		650620	1194174	5445.77	5446.43	5445.57	5441.55	5442.21	5441.35	8	5435.9	5425.9	5.4	15.4	
MW-P-01		650660	1194254	5446.59	5447.23	5445.34	5442.37	5443.01	5441.12	8	5436.7	5426.7	4.4	14.4	
MW-Q-01		650467	1194196	5454.18	5455.08	5453.41	5449.96	5450.86	5449.19	8	5434.3	5424.3	14.9	24.9	abandoned
MW-R-01		650379	1194247	5460.43	5460.59	5457.81	5456.21	5456.37	5453.59	8	5440.6	5425.6	13.0	28.0	abandoned
MW-S-01	MW-5-01	650243	1194314	5452.56	5453.43	5452.12	5448.34	5449.21	5447.90	8	5437.7	5427.7	10.2	20.2	
MW-S1	S1	650645	1193309	5443.17	5443.63	5440.94	5438.95	5439.41	5436.72	8	5422.1	5417.1	14.6	19.6	
MW-T-01		650138	1194369	5453.57	5454.79	5453.05	5449.35	5450.57	5448.83	8	5438.7	5428.7	10.1	20.1	
MW-U-01		649627	1194420	5457.41	5458.49	5456.97	5453.19	5454.27	5452.75	8	5437.5	5427.5	15.3	25.3	
MW-V-01		649621	1194123	5460.54	5461.14	5459.93	5456.32	5456.92	5455.71	6	5440.6	5425.6	15.1	30.1	
MW-W-01		650004	1193741	5452.49	5454.04	5452.24	5448.27	5449.82	5448.02	8	5432.6	5422.6	15.4	25.4	
MW-X-01		650210	1193977	5450.20	5450.67	5448.97	5445.98	5446.45	5444.75	8	5435.3	5425.3	9.5	19.5	
MW-Y-01		650205	1193968	5449.78	5450.26	5449.09	5445.56	5446.04	5444.87	8	5439.9	5429.9	5.0	15.0	
N-8-CO		650599	1194005	5445.69	5446.52	5444.11	5441.47	5442.30	5439.89	6					
NA-06-D	N-A-06-1D	650817	1193407	5444.03	5444.29	5441.40	5439.81	5440.07	5437.18	4			21.0	21.5	
NA-06-I	N-A-06-1I	650817	1193409	5444.00	5444.28	5441.32	5439.78	5440.06	5437.10	4	5421.0	5420.0	16.1	17.1	
NA-06-S	N-A-06-1S	650817	1193411	5444.05	5444.33	5441.32	5439.83	5440.11	5437.10	4	5426.0	5425.0	11.1	12.1	
NB-06-D	N-B-06-1D	650830	1193401	5443.96	5444.19	5441.27	5439.74	5439.97	5437.05	4	5416.0	5415.0	21.1	22.1	
NB-06-I	N-B-06-1I	650830	1193403	5443.93	5444.12	5441.06	5439.71	5439.90	5436.84	4	5421.0	5420.0	15.8	16.8	
NB-06-S	N-B-06-1S	650830	1193405	5443.97	5444.25	5441.25	5439.75	5440.03	5437.03	4	5426.0	5425.0	11.0	12.0	
NC-06-D	N-C-06-1D	650882	1193316	5441.00	5441.20	5438.43	5436.78	5436.98	5434.21	4	5415.0	5414.0	19.2	20.2	
NC-06-I	N-C-06-1I	650882	1193319	5441.19	5441.40	5438.40	5436.97	5437.18	5434.18	4	5420.0	5419.0	14.2	15.2	
NC-06-S	N-C-06-1S	650883	1193321	5441.27	5441.60	5438.53	5437.05	5437.38	5434.31	4	5425.0	5424.0	9.3	10.3	
NCRTPZ-01	NCRT PZ-01	650900	1194188	5442.34	5441.59	5442.69	5438.12	5437.37	5438.47	12	5421.7	5417.7	16.8	20.8	
NCRTPZ-02	NCRT PZ-02	650876	1193923	5442.03	5442.00	5441.72	5437.81	5437.78	5437.50	12					
NCRTPZ-03	NCRT PZ-03	650856	1193724	5442.46	5442.18	5442.51	5438.24	5437.96	5438.29	12					
NCRTPZ-04	NCRT PZ-04	650828	1193434	5441.19	5441.21	5440.67	5436.97	5436.99	5436.45	12	5422.7	5417.7	13.8	18.8	
NCTR-1-1-D		650843	1193529	5443.89	5444.13	5441.50	5439.67	5439.91	5437.28	4	5415.0	5414.0	22.3	23.3	
NCTR-1-1-I		650843	1193531	5444.12	5444.33	5441.62	5439.90	5440.11	5437.40	4	5420.0	5419.0	17.4	18.4	
NCTR-1-1-S		650843	1193533	5444.10	5444.26	5441.59	5439.88	5440.04	5437.37	4	5425.0	5424.0	12.4	13.4	
NCTR-1-2-D		650830	1193529	5444.34	5444.52	5441.66	5440.12	5440.30	5437.44	4	5415.0	5414.0	22.4	23.4	
NCTR-1-2-I		650830	1193532	5444.15	5444.23	5441.65	5439.93	5440.01	5437.43	4	5420.0	5419.0	17.4	18.4	
NCTR-1-2-S		650830	1193533	5444.38	5444.37	5441.65	5440.16	5440.15	5437.43	4	5425.0	5424.0	12.4	13.4	
NCTR-2-1-D		650856	1193610	5444.54	5444.82	5441.92	5440.32	5440.60	5437.70	4	5416.0	5415.0	21.7	22.7	
NCTR-2-1-I		650856	1193612	5444.51	5444.82	5442.00	5440.29	5440.60	5437.78	4	5420.0	5419.0	17.8	18.8	

Table A5-1. Montana Pole Treatment Plant Well Information

Well Name	Alias Names	Northing NAD83 FT	Easting NAD83 FT	Top of PVC Elevation NAVD88 FT	Top of Casing Elevation NAVD88 FT	Ground Elevation NAVD88 FT	Top of PVC Elevation NGVD29 FT	Top of Casing Elevation NGVD29 FT	Ground Elevation NGVD29 FT	Casing Diameter IN	Top of Screen NGVD29 FT	Bottom of Screen NGVD29 FT	Top of Screen FT BGS	Bottom of Screen FT BGS	Comments
NCTR-2-1-S		650856	1193614	5444.41	5444.83	5441.94	5440.19	5440.61	5437.72	4	5425.0	5424.0	12.7	13.7	
NCTR-2-2-D		650839	1193611	5444.57	5444.70	5441.86	5440.35	5440.48	5437.64	4	5418.0	5417.0	19.6	20.6	
NCTR-2-2-I		650839	1193613	5444.51	5444.75	5441.90	5440.29	5440.53	5437.68	4	5422.0	5421.0	15.7	16.7	
NCTR-2-2-S		650840	1193615	5444.52	5444.71	5441.95	5440.30	5440.49	5437.73	4	5426.0	5425.0	11.7	12.7	
NCTR-3-1-D		650876	1193823	5444.58	5444.91	5441.81	5440.36	5440.69	5437.59	4	5416.0	5415.0	21.6	22.6	
NCTR-3-1-I		650877	1193825	5444.59	5444.93	5441.93	5440.37	5440.71	5437.71	4	5421.0	5420.0	16.7	17.7	
NCTR-3-1-S		650877	1193827	5444.57	5444.87	5441.92	5440.35	5440.65	5437.70	4	5426.0	5425.0	11.7	12.7	
NCTR-3-2-D		650858	1193821	5444.50	5444.84	5441.86	5440.28	5440.62	5437.64	4	5416.0	5415.0	21.6	22.6	
NCTR-3-2-I		650858	1193823	5444.67	5444.90	5441.90	5440.45	5440.68	5437.68	4	5421.0	5420.0	16.7	17.7	
NCTR-3-2-S		650858	1193827	5444.52	5444.89	5441.97	5440.30	5440.67	5437.75	4	5427.0	5426.0	10.8	11.8	
ND-06-D	N-D-06-1D	650903	1193514	5441.19	5441.44	5438.46	5436.97	5437.22	5434.24	4	5413.0	5412.0	21.2	22.2	
ND-06-I	N-D-06-1I	650903	1193517	5441.25	5441.49	5438.53	5437.03	5437.27	5434.31	4	5419.0	5418.0	15.3	16.3	
ND-06-S	N-D-06-1S	650903	1193520	5441.26	5441.52	5438.53	5437.04	5437.30	5434.31	4	5424.0	5423.0	10.3	11.3	
NE-06-D	N-E-06-1D	650908	1193600	5439.79	5439.97	5436.88	5435.57	5435.75	5432.66	4	5415.0	5414.0	17.7	18.7	
NE-06-I	N-E-06-1I	650909	1193602	5439.72	5439.93	5436.85	5435.50	5435.71	5432.63	4	5417.0	5416.0	15.6	16.6	
NE-06-S	N-E-06-1S	650909	1193604	5439.75	5440.02	5436.89	5435.53	5435.80	5432.67	4			8.1	8.3	
NF-06-D	N-F-06-1D	650929	1193814	5439.87	5440.06	5437.08	5435.65	5435.84	5432.86	4	5413.0	5412.0	19.9	20.9	
NF-06-I	N-F-06-1I	650930	1193816	5439.90	5440.11	5437.07	5435.68	5435.89	5432.85	4	5419.0	5418.0	13.8	14.8	
NF-06-S	N-F-06-1S	650930	1193818	5439.91	5440.13	5437.03	5435.69	5435.91	5432.81	4	5425.0	5424.0	7.8	8.8	
NHRTPZ-04	NHRT PZ-04	650582	1193528	5444.48	5444.82	5444.85	5440.26	5440.60	5440.63	12					
PZ-1-CO		650811	1193720	5444.02	5444.99	5442.72	5439.80	5440.77	5438.50	6					
PZ-3-CO		650823	1193787	5444.03	5444.77	5442.69	5439.81	5440.55	5438.47	6					
PZ-5-CO		650617	1193929	5446.75	5447.59	5445.76	5442.53	5443.37	5441.54	6					
PZ-6-CO		650792	1194018	5444.34	5445.02	5442.77	5440.12	5440.80	5438.55	6					
PZ-7-CO		650737	1194011	5444.55	5445.29	5443.27	5440.33	5441.07	5439.05	6					
PZ-9-CO		650503	1194074	5449.06	5449.05	5445.51	5444.84	5444.83	5441.29	6					
PZ-N1-1	PZ-N1-01	650793	1193632	5443.46	5444.15	5442.82	5439.24	5439.93	5438.60	6					
PZ-N1-2	PZ-N1-02	650780	1193718	5444.81	5445.74	5443.55	5440.59	5441.52	5439.33	6					
PZ-N2-1	PZ-N2-01	650717	1193568	5444.31	5444.60	5441.95	5440.09	5440.38	5437.73	6					
PZ-N2-2	PZ-N2-02	650728	1193723	5446.08	5446.77	5444.94	5441.86	5442.55	5440.72	6					
PZ-N3-1	PZ-N3-01	650804	1193907	5444.58	5445.43	5443.41	5440.36	5441.21	5439.19	6					
PZ-N3-2	PZ-N3-02	650787	1193789	5444.77	5445.46	5443.46	5440.55	5441.24	5439.24	6					
PZ-N4-1	PZ-N4-01	650713	1193909	5446.41	5447.05	5445.29	5442.19	5442.83	5441.07	6					
PZ-N4-2	PZ-N4-02	650733	1193790	5446.26	5447.19	5445.40	5442.04	5442.97	5441.18	6					
PZ-N4-CO		650736	1193901	5445.70	5446.60	5444.96	5441.48	5442.38	5440.74	6					
PZ-N5-1	PZ-N5-01	650648	1193930	5446.95	5447.65	5445.61	5442.73	5443.43	5441.39	6					
PZ-N5-2	PZ-N5-02	650640	1193846	5447.03	5447.76	5446.00	5442.81	5443.54	5441.78	6					
PZ-N5-3	PZ-N5-03; N5-PZ03	650589	1193958	5446.45	5447.30	5444.54	5442.23	5443.08	5440.32	6	5431.1	5421.1	9.3	19.3	
PZ-N6-1	PZ-N6-01	650810	1194003	5444.14	5444.86	5442.68	5439.92	5440.64	5438.46	6					
PZ-N6-2	PZ-N6-02	650798	1194078	5443.16	5444.03	5442.52	5438.94	5439.81	5438.30	6					
PZ-N7-1	PZ-N7-01	650722	1194124	5444.80	5445.57	5443.09	5440.58	5441.35	5438.87	6					
PZ-N7-2	PZ-N7-02	650703	1193988	5445.25	5446.01	5444.36	5441.03	5441.79	5440.14	6					
PZ-N8-1	PZ-N8-01	650638	1193990	5445.54	5446.51	5444.38	5441.32	5442.29	5440.16	6					
PZ-N8-2	PZ-N8-02	650622	1194122	5445.32	5446.04	5443.76	5441.10	5441.82	5439.54	6					
PZ-N9-1	PZ-N9-01	650521	1194056	5445.91	5447.56	5444.77	5441.69	5443.34	5440.55	6					
PZ-N9-2	PZ-N9-02	650510	1194130	5447.35	5447.49	5444.62	5443.13	5443.27	5440.40	6					

Table A5-1. Montana Pole Treatment Plant Well Information

Well Name	Alias Names	Northing NAD83 FT	Easting NAD83 FT	Top of PVC Elevation NAVD88 FT	Top of Casing Elevation NAVD88 FT	Ground Elevation NAVD88 FT	Top of PVC Elevation NGVD29 FT	Top of Casing Elevation NGVD29 FT	Ground Elevation NGVD29 FT	Casing Diameter IN	Top of Screen NGVD29 FT	Bottom of Screen NGVD29 FT	Top of Screen FT BGS	Bottom of Screen FT BGS	Comments
PZ-N9-3	PZ-N9-03; N9-PZ03	650522	1194027	5448.66	5448.97	5445.83	5444.44	5444.75	5441.61	6	5427.6	5417.6	14.0	24.0	
PZ-S1-01	S101	650168	1193796	5454.60	5454.66	5451.54	5450.38	5450.44	5447.32	6					
PZ-S1-02	S102	650142	1193916	5453.89	5453.76	5450.42	5449.67	5449.54	5446.20	6					
PZ-S1-03	S103	649988	1193926	5455.00	5455.11	5452.18	5450.78	5450.89	5447.96	6					
PZ-S1-04	S104	650107	1193781	5455.50	5455.42	5451.96	5451.28	5451.20	5447.74	6					
PZ-S2-01	S201	650232	1194088	5450.82	5451.02	5449.32	5446.60	5446.80	5445.10	6					
PZ-S2-02	S202	650133	1193968	5451.46	5451.56	5447.82	5447.24	5447.34	5443.60	6					
PZ-S2-03	S203	650071	1194125	5454.91	5455.03	5452.29	5450.69	5450.81	5448.07	6					
PZ-S3-01	S301	650265	1194171	5451.87	5452.09	5449.80	5447.65	5447.87	5445.58	6					abandoned
PZ-S3-02	S302	650136	1194166	5455.55	5455.69	5452.32	5451.33	5451.47	5448.10	6					
PZ-S3-03	S303	650075	1194319	5455.04	5455.03	5452.40	5450.82	5450.81	5448.18	6					
PZ-S3-04	S304	650248	1194219	5454.45		5448.88	5450.23		5444.66	4					
PZ-S3-05	S305	650267	1194166	5453.03		5449.77	5448.81		5445.55	4					
PZ-S4-01	S401	650014	1193998	5453.28	5453.36	5450.01	5449.06	5449.14	5445.79	6					
PZ-S4-02	S402	649964	1194148	5455.69	5456.63	5453.55	5451.47	5452.41	5449.33	6					
PZ-S4-03	S403	649841	1194075	5459.00	5458.82	5455.31	5454.78	5454.60	5451.09	6					
PZ-S5-01	S501	650024	1194238	5456.08	5456.19	5453.56	5451.86	5451.97	5449.34	6					
PZ-S5-02	S502	649928	1194194	5456.67	5456.71	5453.26	5452.45	5452.49	5449.04	6					
PZ-S5-03	S503	649866	1194246	5460.62	5460.69	5456.38	5456.40	5456.47	5452.16	6					
PZ-S6-01	S601	650028	1194284	5455.90	5456.25	5453.79	5451.68	5452.03	5449.57	6					
PZ-S6-02	S602	649940	1194279	5456.15	5456.73	5453.90	5451.93	5452.51	5449.68	6					
PZ-S6-03	S603	649860	1194394	5458.48	5458.75	5454.69	5454.26	5454.53	5450.47	6					
PZ-S7-01	S701	649827	1194070	5459.19	5459.21	5455.75	5454.97	5454.99	5451.53	6					
PZ-S7-02	S702	649811	1194250	5459.76	5459.94	5455.38	5455.54	5455.72	5451.16	6					
PZ-S7-03	S703	649710	1194246	5460.66	5460.82	5457.32	5456.44	5456.60	5453.10	6					
PZ-S8-01	S801	649819	1194393	5458.24	5458.29	5454.86	5454.02	5454.07	5450.64	6					
PZ-S8-02	S802	649716	1194301	5458.61	5458.80	5456.31	5454.39	5454.58	5452.09	6					
PZ-S8-03	S803	649631	1194346	5459.74	5459.99	5457.64	5455.52	5455.77	5453.42	6					

Table A5-2. Off-Site Well Information

Well Name	Northing NAD83 FT	Easting NAD83 FT	Measuring Point Elevation NGVD29 FT	Screened Interval FT	Top of Screen FT BGS	Bottom of Screen FT BGS	Elevation Top of Screen NGVD29 FT	Elevation Bottom of Screen NGVD29 FT	Aquifer Screened
AMC-06	654385	1205161	5489.60	53-63	53	63	5434.60	5424.60	Alluvium
AMC-12	653444	1203350	5479.65	35-45	35	45	5442.65	5432.65	Alluvium
AMC-13	652053	1203027	5475.45	47-55	47	55	5426.45	5418.45	Alluvium
AMC-23	651533	1198901	5448.25	19-29	19	29	5427.25	5417.25	Alluvium
AMC-24	650908	1198982	5452.01	13-23	13	23	5437.01	5427.01	Alluvium
AMC-24B	650909	1198990	5451.77	40.5-50.5	40.5	50.5	5409.27	5399.27	Alluvium
AMW-01	653284	1201807	5465.40	3-13	3	13	5460.40	5450.40	Alluvium
AMW-01B	653300	1201822	5465.38	33-43	33	43	5430.38	5420.38	Alluvium
AMW-01C	653292	1201814	5465.38	87-97	87	97	5376.38	5366.38	Alluvium
AMW-02	651598	1196998	5448.35	10-20	10	20	5436.35	5426.35	Alluvium
AMW-08	654315	1203321	5496.05	30-45	30	45	5464.05	5449.05	Alluvium
AMW-11	650816	1197600	5445.60	4-14	4	14	5439.60	5429.60	Alluvium
AMW-12	651119	1200739	5460.50	7-22	7	22	5451.50	5436.50	Alluvium
AMW-13	650633	1198110	5450.76	5-15	5	15	5443.76	5433.76	Alluvium
AMW-13B	650646	1198100	5450.79	27-28.5	27	28.5	5421.79	5420.29	Alluvium
BMW-01A	650960	1192703	5430.14	22-32	22	32	5406.14	5396.14	
BMW-02A	651941	1191155	5423.31	13-19	13	19	5408.31	5402.31	Alluvium
BMW-02B	651937	1191140	5423.14	45-55	45	55	5376.14	5366.14	Bedrock
BMW-02D	651910	1191149	5423.01	186-196	186	196	5235.01	5225.01	Bedrock
BMW-03A	651982	1190741	5419.06	14-19	14	19	5403.06	5398.06	Weathered Bedrock
BMW-03B	651997	1190737	5419.02	36-50	36	50	5381.02	5367.02	Bedrock
BMW-04B	652115	1190812	5419.34	27-37	27	37	5390.34	5380.34	Bedrock
BMW-05A	651117	1191758	5434.95	5-8	5	8	5427.95	5424.95	Alluvium
BMW-05B	651127	1191742	5436.09	37-57	37	57	5397.09	5377.09	Bedrock
BMW-06B	652469	1190858	5426.20	59-79	59	79	5365.20	5345.20	Bedrock
BMW-08A	652059	1194702	5445.48	5-11	5	11	5438.48	5432.48	Alluvium
BMW-13B	651413	1192895	5428.84	45-65	45	65	5381.84	5361.84	Bedrock
BPS07-01A	651664	1203626	5475.07	12-22	12	22	5461.07	5451.07	Alluvium
BPS07-01B	651677	1203626	5474.96	29-39	29	39	5443.96	5433.96	Alluvium
BPS07-03A	651151	1198229	5448.57	9-19	9	19	5437.57	5427.57	Alluvium
BPS07-05A	649883	1201801	5459.00	9-19	9	19	5448.00	5438.00	Alluvium
BPS07-05B	649884	1201790	5458.41	68-78	68	78	5388.41	5378.41	Alluvium
BPS07-07	651173	1197527	5444.33	7-17	7	17	5435.33	5425.33	Alluvium

Table A5-2. Off-Site Well Information

Well Name	Northing NAD83 FT	Easting NAD83 FT	Measuring Point Elevation NGVD29 FT	Screened Interval FT	Top of Screen FT BGS	Bottom of Screen FT BGS	Elevation Top of Screen NGVD29 FT	Elevation Bottom of Screen NGVD29 FT	Aquifer Screened
BPS07-08A	651927	1196284	5446.31	9-19	9	19	5435.31	5425.31	Alluvium
BPS07-09A	651947	1195666	5444.70	10.4-20.4	10.4	20.4	5432.30	5422.30	Alluvium
BPS07-11A	652881	1202376	5468.83	14-24	14	24	5452.83	5442.83	Alluvium
BPS07-11B	652882	1202365	5468.62	35-45, 39-49	35	45	5431.62	5421.62	Alluvium
BPS07-13A	651642	1196255	5459.41	23-33	23	33	5434.41	5424.41	Alluvium
BPS07-14A	651799	1195643	5456.94	15-25	15	25	5439.94	5429.94	Waste/Slag
BPS07-15A	651689	1195951	5455.22	15-35	15	35	5438.22	5418.22	Waste/Slag
BPS07-16A	650001	1200086	5452.17	9-19	9	19	5441.17	5431.17	Alluvium
BPS07-16B	650016	1200086	5452.36	30-40	30	40	5420.36	5410.36	Alluvium
BPS07-17A	652093	1190547	5425.48	9-19	9	19	5414.48	5404.48	Alluvium
BPS07-18A	652111	1190443	5425.97	9-19	9	19	5414.97	5404.97	Alluvium
BPS07-18B	652114	1190427	5426.22	32-42	32	42	5392.22	5382.22	Bedrock
BPS07-21	651089	1197902	5453.16	13-23	13	23	5438.16	5428.16	Alluvium
BPS07-22	651262	1197908	5447.04	7-17	7	17	5438.04	5428.04	Alluvium
BPS07-23	651324	1197538	5446.69	7-17	7	17	5437.69	5427.69	Alluvium
BT-98-02	650476	1200255	5456.74	14-19	14	19	5440.74	5435.74	Alluvium
BT-98-02B	650481	1200136	5455.00	32-42	32	42	5421.00	5411.00	Alluvium
CT-84-1	651693	1193697	5440.61	11-16	11	16	5427.61	5422.61	Alluvium
CT-94-1	651128	1192376	5427.94	11-24	11	24	5414.94	5401.94	Alluvium
FP98-1	651472	1195210	5438.10	4-6	4	6	5432.10	5430.10	Alluvium
FP98-2	651574	1195030	5438.03	3-18	3	18	5433.03	5418.03	Alluvium
FP98-3	651121	1195161	5441.15	3-5	3	5	5436.15	5434.15	Alluvium
FP98-4	651063	1194512	5437.08	5-15	5	15	5430.08	5420.08	Alluvium
FP98-5	651312	1194489	5435.18	5-15	5	15	5428.18	5418.18	Alluvium
FP98-6	651619	1191607	5425.64	5-15	5	15	5418.64	5408.64	Alluvium
FP98-7	651417	1191590	5427.29	5-15	5	15	5420.29	5410.29	Alluvium
FP98-8	651662	1191044	5426.35	2.25-4.25	2.25	4.25	5422.10	5420.10	Alluvium
FP98-9	651846	1191122	5422.76	5-15	5	15	5415.76	5405.76	Alluvium
GS-08	651618	1200372	5457.18	127-145	127	145	5328.18	5310.18	Alluvium
GS-09	651614	1200379	5457.67	60-75	60	75	5395.67	5380.67	Alluvium
GS-11	651610	1200373	5457.38	8-18	8	18	5447.38	5437.38	Alluvium
GS-12	651901	1194639	5442.71	19-29	19	29	5421.71	5411.71	Alluvium
GS-13A	651972	1195558	5439.65	8-18	8	18	5429.65	5419.65	Alluvium

Table A5-2. Off-Site Well Information

Well Name	Northing NAD83 FT	Easting NAD83 FT	Measuring Point Elevation NGVD29 FT	Screened Interval FT	Top of Screen FT BGS	Bottom of Screen FT BGS	Elevation Top of Screen NGVD29 FT	Elevation Bottom of Screen NGVD29 FT	Aquifer Screened
GS-13B	651976	1195540	5437.70	24-28,31-32	24	32	5411.70	5403.70	Alluvium
GS-16	651697	1194070	5437.11	11-16	11	16	5424.11	5419.11	Alluvium
GS-17DR	651315	1194113	5440.00	18-28	18	28	5420.00	5410.00	Alluvium
GS-19	651481	1194387	5441.72	13-18	13	18	5426.72	5421.72	Alluvium
GS-20	652209	1194568	5450.69	18-23	18	23	5430.69	5425.69	Alluvium
GS-23	651199	1191651	5437.14	14-19	14	19	5421.14	5416.14	Alluvium
GS-24D	651674	1193368	5433.57	9-14	9	14	5422.57	5417.57	Alluvium
GS-25	651656	1192704	5427.87	4-9	4	9	5421.87	5416.87	Alluvium
GS-25C	651648	1192721	5429.59	84-94	84	94	5343.59	5333.59	Weathered Bedrock
GS-25D	651669	1192710	5428.74	166-176	166	176	5260.74	5250.74	Bedrock
GS-26	652248	1190765	5418.55	9-14	9	14	5407.55	5402.55	Alluvium
GS-28	650317	1198608	5446.28	6-11	6	11	5438.28	5433.28	Alluvium
GS-29SR	651277	1196900	5444.57	8-13	8	13	5434.57	5429.57	Alluvium
GS-30D	651783	1200332	5456.22	28.5-38.5	28.5	38.5	5425.72	5415.72	Alluvium
GS-30S	651778	1200333	5456.55	14-20	14	20	5440.55	5434.55	Alluvium
GS-31D	651284	1200401	5451.75	29-39	29	39	5420.75	5410.75	Alluvium
GS-31S	651287	1200397	5451.72	15-20	15	20	5434.72	5429.72	Alluvium
GS-32D	651937	1200209	5450.71	27-37	27	37	5421.71	5411.71	Alluvium
GS-32S	651939	1200205	5449.94	27-37	27	37	5420.94	5410.94	Alluvium
GS-34D	651340	1193373	5433.00	21.2-31.2	21.2	31.2	5409.80	5399.80	
GS-34S	651340	1193373	5433.43	12-17	12	17	5419.43	5414.43	Alluvium
GS-40R	654152	1203901	5481.38	52-62	52	62	5427.38	5417.38	Alluvium
GS-41D	654000	1202636	5491.52	51-61	51	61	5438.52	5428.52	Alluvium
GS-41S	653995	1202622	5492.04	34-39	34	39	5456.04	5451.04	Alluvium
GS-42D	653584	1202217	5471.32	47-57	47	57	5422.32	5412.32	Alluvium
GS-42S	653593	1202213	5471.46	13-18	13	18	5456.46	5451.46	Alluvium
GS-44D	652518	1203257	5478.41	47.3-57.3	47.3	57.3	5429.11	5419.11	Alluvium
GS-44DR	652518	1203257	5478.41	50-60	50	60	5426.41	5416.41	Alluvium
GS-44S	652515	1203244	5478.24	20-25	20	25	5456.24	5451.24	Alluvium
GS-46D	652828	1204595	5486.03	51-61	51	61	5433.03	5423.03	Alluvium
GS-46S	652819	1204594	5486.18	25-30	25	30	5459.18	5454.18	Alluvium
GW-06R	651248	1192710	5430.34	10-20	10	20	5418.34	5408.34	Alluvium
HCA-B1	652241	1190738	5423.31	40-50	40	50	5381.31	5371.31	Bedrock

Table A5-2. Off-Site Well Information

Well Name	Northing NAD83 FT	Easting NAD83 FT	Measuring Point Elevation NGVD29 FT	Screened Interval FT	Top of Screen FT BGS	Bottom of Screen FT BGS	Elevation Top of Screen NGVD29 FT	Elevation Bottom of Screen NGVD29 FT	Aquifer Screened
HCA-B2	652103	1190550	5425.83	25-35	25	35	5398.83	5388.83	Bedrock
HCA-MG1	652215	1194628	5456.75	17-27	17	27	5437.75	5427.75	Alluvium
M-01	651946	1192744	5429.34	5-8	5	8	5422.34	5419.34	Alluvium
MF-01	651209	1196922	5443.67						Alluvium
MF-02									Alluvium
MF-03	651631	1198487	5447.91	13-18	13	18	5432.91	5427.91	Alluvium
MF-05	653019	1200866	5467.24	12-17	12	17	5453.24	5448.24	Alluvium
MF-07	652461	1200840	5458.84	13-18	13	18	5443.84	5438.84	Alluvium
MF-08	651492	1199559	5449.61	9-14	9	14	5438.61	5433.61	Alluvium
MF-09	651542	1200555	5457.25	11-16	11	16	5444.25	5439.25	Alluvium
MF-10	651174	1199602	5452.32	12-17	12	17	5438.32	5433.32	Alluvium
MF-11	651754	1201144	5459.31	10-15	10	15	5447.31	5442.31	Alluvium
MSD-01A	652751	1201704	5463.15	6-16	6	16	5455.15	5445.15	Alluvium
MSD-01B	652771	1201714	5462.90	40-45	40	45	5420.90	5415.90	Alluvium
MSD-01C	652766	1201712	5463.07	110-115	110	115	5351.07	5346.07	Alluvium
MSD-02A	652538	1201168	5458.25	Shallow					Alluvium
MSD-02B	652542	1201168	5461.19	35-45	35	45	5424.19	5414.19	Alluvium
MSD-03	651963	1200703	5456.94	40-50	40	45	5414.94	5409.94	Alluvium
MSD-04	651764	1201144	5459.35	45-55	45	55	5412.35	5402.35	Alluvium
MSD-05	651778	1200321	5457.09	50-55	50	55	5405.09	5400.09	Alluvium
MSD-HCC									Drain Rock
MW-03-MPC				3-13	3	13			Alluvium
MW2-CGSB3	652300	1197966	5463.64	17-27	17	27	5444.64	5434.64	Alluvium
NE-2	652290	1192175	5432.39	15-20	15	20	5415.39	5410.39	Weathered Bedrock
NW-3	652413	1190869	5425.62	9-14	9	14	5414.62	5409.62	Alluvium
NW-4	652296	1190918	5422.20	10-20	10	20	5410.20	5400.20	Alluvium
Pump 1	651680	1193041							
Pump 2	651527	1193071							
Pump 3	651707	1192910							
S-2	651028	1192058	5435.91	25-28	25	28	5408.91	5405.91	Alluvium
S-5	651409	1191248	5437.25	16-23	16	23	5419.25	5412.25	Weathered Bedrock

Table A5-3. Surface Water Monitoring Locations

Name	GWIC ID	Northing NAD83 FT	Easting NAD83 FT
A1	249066	651835	1192171
A2	249067	651931	1191682
A3	249068	652055	1191177
B3	249072	651730	1192122
BRW-00		651765	1195013
BRW-01E		651527	1194383
BRW-01W		651447	1193703
C3	249097	651537	1192046
D2	249254	651761	1191567
D3	249114	651965	1191126
D4	249086	652105	1190838
HCC-01	249136	651324	1193745
HCC-01A	249137	651325	1193018
HCC-01B	249138	651330	1192930
HCC-02	249139	651784	1192636
HCC-02A	249140	651363	1192776
HCC-03	249141	651893	1192241
HCC-03A	249142	651937	1192151
HCC-04	249143	652070	1191787
HCC-04A	249144	652092	1191737
HCC-05	249145	652278	1191249
HCC-05A	249146	652299	1191204
HCC-06	249147	652340	1191045
HCC-06A	249148	652349	1191006
HCC-07 (SW-06)	249149	652186	1190717
MSDCL-02A		652973	1201551
MSDCL-03A		652756	1201294
MSDCL-04A		652455	1200955
MSDCL-05A		652095	1200542
MSDCL-06A		651768	1200170
MSDCL-07A		651490	1199818
MSDCL-09A		651359	1199234
MSDCL-10A		651192	1198299
MSDSG-02		650307	1198679
MSDSG-03		649943	1199309
MSDSG-04		649220	1198374
MSDSG-05		650054	1199016
SS-01	123163	647349	1204428
SS-04	127593	651041	1197356
SS-05	127536	651484	1196594
SS-05.6		651870	1195719
SS-05.7	249185	651872	1195679
SS-05.9	249186	651835	1195582
SS-05A	249187	651693	1195315

Table A5-3. Surface Water Monitoring Locations

Name	GWIC ID	Northing NAD83 FT	Easting NAD83 FT
SS-05B	249188	651532	1195128
SS-05D (SW-09)	222610	651208	1194231
SS-06A	217884	651140	1193381
SS-06G	249189	651955	1190610
SS-06GR	249190	651989	1190519
SS-06GR2	250012	651967	1190586
SS-07 (SW-03)	4930	652039	1190390
SW-05	164317	651068	1192329

*Notes: SW-03 is same as SS-07
SW-06 is same as HCC-07
SW-09 is same as SS-05D

Table A5-4. Measuring Point Elevation Information

Well	2009 Survey Top of PVC Elevation NGVD29 FT	Measuring Point Elevation Provided by Tom Bowler NGVD29 FT									Difference (PVC - Most Recent Measuring Point)
		1993	1998	1999	2000	2001	2001A	2004	2006	2007	
AW-02	5448.05				5447.87						0.18
BMW-9A	**5433.29**							**5432.38**			**0.91**
BMW-9B	5432.06							5431.86			0.20
Discharge Pipe	5428.42							5428.23			0.19
GS-18R	**5432.37**				**5431.85**						**0.52**
GS-22	5436.02				5435.81						0.21
GW-05	5454.68				5454.45						0.23
GW-08	5460.90				5460.68						0.22
GW-09	5450.04					5449.83					0.21
GW-10	5446.93				5446.65						0.28
GW-12	5438.06				5437.84						0.22
GW-13	5440.67				5440.48						0.19
GW-14R-98	5430.74				5430.51						0.23
GW-17	5440.67				5440.41						0.26
GW-21	5452.18				5452.02						0.16
GW-22R-98	5460.81				5460.60						0.21
HCA-21	5431.52				5431.31						0.21
INF-01	5440.24		5437.79	5440.80	5440.05						0.19
INF-02	5440.06		5437.40	5440.40	5439.86						0.20
INF-03	5440.10		5437.72	5440.70	5439.91						0.19
INF-04	5440.75		5435.66	5438.70	5440.57						0.18
INF-05	5440.85		5435.89	5438.90	5440.67						0.18
INF-06	5441.08		5436.22	5439.20	5440.90						0.18
INF-07	5439.56				5439.38						0.18
INF-08	5439.59				5439.41						0.18
INF-09	5439.59				5439.41						0.18
INF-10	5444.48					5444.3					0.21
INF-11	5445.22					5445.0					0.20
INF-12	5445.67					5445.5					0.21
INF-13	5451.13					5450.9					0.19

Table A5-4. Measuring Point Elevation Information

Well	2009 Survey Top of PVC Elevation NGVD29 FT	Measuring Point Elevation Provided by Tom Bowler NGVD29 FT									Difference (PVC - Most Recent Measuring Point)
		1993	1998	1999	2000	2001	2001A	2004	2006	2007	
INF-14	5450.94					5450.8					0.19
INF-15	5449.19					5449.0					0.19
INF-16	5455.60					5451.2				5455.4	0.21
INF-17	5455.13					5451.0				5454.9	0.19
INF-18	5454.70					5450.9				5454.5	0.19
MANHOLE #2	5443.85				5443.65						0.20
MP-04	5438.46	5436.21			5438.26						0.20
MW-01	5438.39	5435.20			5438.17						0.22
MW-03	5440.75		5438.19		5438.57	5440.59					0.15
MW-09	5450.54					5450.33					0.21
MW-14	5451.23				5451.03						0.20
MW-87-3	5437.48				5437.27						0.21
MW-A-01	5439.84					5439.66					0.18
MW-A-04	5480.82							5480.7			0.16
MW-A-95	5447.03				5446.83						0.19
MW-A-96	5464.03				5463.82						0.21
MW-A-98	5435.48				5435.26						0.22
MW-A-99	5441.17				5440.95						0.22
MW-B-01	5437.97					5437.72					0.25
MW-B-04	5467.04							5466.8			0.21
MW-B-95	5446.68				5446.47						0.21
MW-B-96	5460.69				5460.48						0.21
MW-B-98	5439.55				5439.32						0.23
MW-B-99	5438.49		5439.96			5438.31					0.18
MW-C-01	5438.28					5438.03					0.25
MW-C-04	5468.45							5468.3			0.15
MW-C-96	5459.22				5459.01						0.21
MW-CT-01	5440.97				5440.80						0.17
MW-CT-02	5440.92				5440.77						0.15
MW-D-01	5437.82					5437.63					0.19

Table A5-4. Measuring Point Elevation Information

Well	2009 Survey Top of PVC Elevation NGVD29 FT	Measuring Point Elevation Provided by Tom Bowler NGVD29 FT									Difference (PVC - Most Recent Measuring Point)
		1993	1998	1999	2000	2001	2001A	2004	2006	2007	
MW-D-95	**5485.47**				**5485.57**						**-0.10**
MW-D-96	5460.07				5459.86						0.21
MW-E-01	5436.37					5436.10					0.27
MW-E-96	5454.44				5454.23						0.21
MW-F-01	5438.21					5438.02					0.19
MW-F-95	5447.97				5447.79						0.18
MW-F-96	5465.64				5465.49						0.15
MW-G-01	5439.04					5438.87					0.17
MW-G-96	5475.93				5475.71						0.22
MW-H-01	5436.43					5436.22					0.21
MW-H-95	5443.93				5443.72						0.21
MW-H-96	5458.58				5458.36						0.22
MW-I-01	**5433.64**					**5433.27**					**0.37**
MW-I-96	5439.72				5439.51						0.21
MW-J-01	5435.15					5434.91					0.24
MW-J-96	5437.91				5437.70						0.21
MW-K-01	5435.41					5435.20					0.21
MW-K-96	5435.50				5435.28						0.22
MW-L-01	5440.14					5440.0					0.14
MW-L-96	**5434.04**				**5433.02**						**1.02**
MW-M-01	5438.93					5438.8					0.17
MW-M-96	**5434.18**				**5433.79**						**0.39**
MW-N-01	5441.29					5441.1					0.15
MW-O-01	5441.55					5441.4					0.15
MW-P-01	5442.37					5442.2					0.15
MW-Q-01	5449.96					5449.8					0.13
MW-R-01	5456.21					5456.08					0.13
MW-S-01	5448.34					5448.19					0.15
MW-S1	5438.95					5438.87					0.08
MW-T-01	5449.35					5449.18					0.17

Table A5-4. Measuring Point Elevation Information

Well	2009 Survey Top of PVC Elevation NGVD29 FT	Measuring Point Elevation Provided by Tom Bowler NGVD29 FT									Difference (PVC - Most Recent Measuring Point)
		1993	1998	1999	2000	2001	2001A	2004	2006	2007	
MW-U-01	5453.19					5453					0.19
MW-V-01	5456.32					5456.14					0.18
MW-W-01	5448.27					5448.1					0.17
MW-X-01	5445.98					5445.78					0.20
MW-Y-01	5445.56					5445.38					0.18
NA-06-D	5439.81								5439.61		0.20
NA-06-I	5439.78								5439.58		0.20
NA-06-S	5439.83								5439.63		0.20
NB-06-D	5439.74								5439.54		0.20
NB-06-I	5439.71								5439.51		0.20
NB-06-S	5439.75								5439.54		0.20
NC-06-D	5436.78								5436.59		0.19
NC-06-I	5436.97								5436.77		0.20
NC-06-S	5437.05								5436.84		0.21
NCRTPZ-01	5438.12				5437.91						0.21
NCRTPZ-02	5437.81				5437.60						0.21
NCRTPZ-03	**5438.24**				**5437.75**						**0.49**
NCRTPZ-04	5436.97				5436.80						0.17
NCTR-1-1-D	5439.67								5439.48		0.19
NCTR-1-1-I	5439.90								5439.71		0.19
NCTR-1-1-S	5439.88								5439.69		0.19
NCTR-1-2-D	5440.12								5439.92		0.20
NCTR-1-2-I	5439.93								5439.74		0.19
NCTR-1-2-S	5440.16								5439.96		0.20
NCTR-2-1-D	5440.32								5440.12		0.20
NCTR-2-1-I	5440.29								5440.09		0.20
NCTR-2-1-S	5440.19								5439.98		0.21
NCTR-2-2-D	5440.35								5440.15		0.20
NCTR-2-2-I	5440.29								5440.08		0.20
NCTR-2-2-S	5440.30								5440.09		0.20

Table A5-4. Measuring Point Elevation Information

Well	2009 Survey Top of PVC Elevation NGVD29 FT	Measuring Point Elevation Provided by Tom Bowler NGVD29 FT									Difference (PVC - Most Recent Measuring Point)
		1993	1998	1999	2000	2001	2001A	2004	2006	2007	
NCTR-3-1-D	5440.36								5440.13		0.23
NCTR-3-1-I	5440.37								5440.15		0.22
NCTR-3-1-S	5440.35								5440.13		0.22
NCTR-3-2-D	5440.28								5440.05		0.23
NCTR-3-2-I	5440.45								5440.22		0.23
NCTR-3-2-S	5440.30								5440.07		0.23
ND-06-D	5436.97								5436.78		0.20
ND-06-I	5437.03								5436.84		0.19
ND-06-S	5437.04								5436.84		0.20
NE-06-D	5435.57								5435.39		0.19
NE-06-I	5435.50								5435.30		0.20
NE-06-S	5435.53								5435.34		0.19
NF-06-D	5435.65								5435.41		0.25
NF-06-I	5435.68								5435.42		0.26
NF-06-S	5435.69								5435.43		0.26
NHRTPZ-04	5440.26				5440.09						0.17
PZ-N1-1	5439.24				5439.05						0.19
PZ-N1-2	5440.59				5440.39						0.20
PZ-N2-1	5440.09				5439.91						0.18
PZ-N2-2	5441.86				5441.67						0.19
PZ-N3-1	5440.36				5440.16						0.20
PZ-N3-2	5440.55				5440.36						0.19
PZ-N4-1	5442.19				5442.00						0.19
PZ-N4-2	5442.04				5441.86						0.18
PZ-N5-1	5442.73				5442.54						0.19
PZ-N5-2	5442.81				5442.63						0.18
PZ-N5-3	5442.23				5442.02						0.21
PZ-N6-1	5439.92				5439.72						0.20
PZ-N6-2	5438.94				5438.75						0.18
PZ-N7-1	5440.58				5440.34						0.24

Table A5-4. Measuring Point Elevation Information

Well	2009 Survey Top of PVC Elevation NGVD29 FT	Measuring Point Elevation Provided by Tom Bowler NGVD29 FT									Difference (PVC - Most Recent Measuring Point)
		1993	1998	1999	2000	2001	2001A	2004	2006	2007	
PZ-N7-2	5441.03				5440.84						0.19
PZ-N8-1	5441.32				5441.12						0.20
PZ-N8-2	5441.10				5440.95						0.15
PZ-N9-1	5441.69				5441.52						0.17
PZ-N9-2	5443.13				5442.94						0.19
PZ-N9-3	5444.44				5444.27						0.17
PZ-S1-01	5450.38					5445.56				5450.20	0.18
PZ-S1-02	5449.67					5444.58				5449.48	0.19
PZ-S1-03	5450.78					5441.84				5450.60	0.18
PZ-S1-04	5451.28									5451.13	0.15
PZ-S2-01	5446.60					5446.45					0.14
PZ-S2-02	5447.24					5444.30				5447.06	0.18
PZ-S2-03	5450.69					5450.51					0.18
PZ-S3-01	5447.65					5447.51				5447.40	0.25
PZ-S3-02	5451.33					5451.12					0.21
PZ-S3-03	5450.82					5450.71					0.11
PZ-S3-04	5450.23									5450.04	0.19
PZ-S3-05	5448.81									5448.62	0.19
PZ-S4-01	5449.06					5443.95	5443.05	5448.87			0.19
PZ-S4-02	5451.47					5451.31					0.16
PZ-S4-03	5454.78					5441.13	5445.43	5452.59		5454.59	0.19
PZ-S5-01	5451.86					5445.15	5451.71				0.15
PZ-S5-02	5452.45					5451.87	5452.41			5452.26	0.19
PZ-S5-03	5456.40					5451.50				5456.22	0.18
PZ-S6-01	5451.68					5445.52	5451.50				0.18
PZ-S6-02	**5451.93**					**5451.76**				**5453.75**	**-1.82**
PZ-S6-03	5454.26					5449.99	5451.77			5454.08	0.18
PZ-S7-01	5454.97					5441.54	5442.89	5452.40		5454.78	0.19
PZ-S7-02	5455.54					5451.56				5455.34	0.20
PZ-S7-03	5456.44					5454.03				5456.26	0.18

Table A5-4. Measuring Point Elevation Information

Well	2009 Survey Top of PVC Elevation NGVD29 FT	Measuring Point Elevation Provided by Tom Bowler NGVD29 FT									Difference (PVC - Most Recent Measuring Point)
		1993	1998	1999	2000	2001	2001A	2004	2006	2007	
PZ-S8-01	5454.02					5450.80	5451.67			5453.83	0.19
PZ-S8-02	5454.39					5454.41	5454.22				0.17
PZ-S8-03	5455.52					5455.12	5455.33				0.19

Attachment 6

Final Order: Controlled Ground Water Area No. 76G-30043832

BEFORE THE DEPARTMENT OF
NATURAL RESOURCES AND CONSERVATION
OF THE STATE OF MONTANA

* * * * * * * * *

IN THE MATTER OF BUTTE ALLUVIAL AND	**)**	
BEDROCK PETITION FOR CONTROLLED	**)**	**FINAL ORDER**
GROUND WATER AREA NO. 76G-30043832	**)**	

* * * * * * * * *

Pursuant to the Montana Water Use Act, §§ 85-2-506 and 507 MCA (2007)[1], and to the provisions of the Montana Administrative Procedures Act, and after notice required by law, a hearing was held on May 11, 2009, in Butte, Montana at the Montana Tech of the University of Montana, Cooper Lounge in the Student Union Building. The hearing was held to determine if the Montana Department of Natural Resources and Conservation (DNRC) shall order a specific area in question to be a controlled ground water area, a temporary controlled ground water area pending further study, or reject the petition for a controlled ground water area submitted by the Butte Silver Bow Health Department. The Department has considered all evidence submitted and all testimony given concerning the petition.

PARTIES

Providing oral testimony at the hearing in support of the petition were Elizabeth Erickson of Water & Environmental Technologies, Dan Powers of the Butte Silver Bow Health Department, Lisa DeWitt of the Montana Department of Environmental Quality, Sara Sparks of the U.S. Environmental Protection Agency (EPA), and Joe Griffin of the Montana Department of Environmental Quality. No person appeared at the hearing to provide evidence or testimony in opposition to the petition. No individuals or organizations submitted written comments or testimony regarding the proposed controlled ground water designation prior to the hearing.

EXHIBITS

No exhibits were offered at the hearing. Petition documents and DNRC processing documents (e.g., Environmental Assessment) are already a part of the record and are not labeled as exhibits. The entire record consists of the Department's file and the audio files of the

hearing testimony. Based on the record for this matter, the Hearing Examiner makes the following:

FINDINGS OF FACT

1. A Petition for Controlled Ground Water Area (Petition) was received by the DNRC on October 27, 2008. The Petition was submitted by the Butte Silver Bow County Health Department and signed by Rick Larson of the Butte Silver Bow County Health Department. (DNRC File)

2. The Petition alleges that the ground water aquifers (bedrock and alluvial) within the proposed Butte Alluvial and Bedrock Controlled Ground Water Area (BABCGWA) have been impacted by over a century of mining and associated activity. The Petition seeks ground water restrictions to meet the requirements of the Records of Decision or Consent Decrees for the Butte Priority Soils Operable Unit (BPSOU), Butte Mine Flooding Operable Unit (BMFOU) and the Montana Pole and Treatment Plant NPL Site (MPTP). These Units are part of the Butte portion of the Silver Bow Creek/Butte Area NPL (National Priorities List) under the Federal Superfund Program. The entire Butte portion of the Silver Bow Creek/Butte Area NPL along with the MPTP NPL would fall within the proposed BABCGWA. (Petition)

3. The Petitioner requests that the Department establish a controlled ground water area pursuant to § 85-2-506(2)(e) and (g), MCA alleging that excessive ground water withdrawals would cause contaminant migration and that the water quality in portions of the alluvial and bedrock aquifers impacted from and underlying the BPSOU, BMFOU and MPTP are not suitable for a specific use as defined by 85-2-102(2)(a), MCA (2005) (currently 85-2-102(4)(a))(2009). (Petition)

4. The Petition proposes that:

   (a): new ground water wells will only be permitted within the BABCGWA after review and approval of the Butte-Silver Bow Board of Health acting as the Butte Silver Bow Water Quality District office, the USEPA and MDEQ, in compliance with the provisions below. Superfund or other environmental monitoring/treatment wells necessary for environmental cleanup purposes are allowed within the BABCGWA.

   (b): an existing well used for irrigation or industrial use may be replaced at the well owner's expense, but only if the replacement irrigation well meets the criteria stated in

1 All citations are to the Mont. Code Annotated 2007 unless otherwise noted.

(e) below.

(c): all wells used as drinking water supply for human consumption within the BABCGWA for which monitoring results establish that the MDEQ-7 (the Montana DEQ numeric water quality standards) ground water human health standards for arsenic, lead, cadmium, copper, and/or zinc, are exceeded, will cease being used for such purposes. The water user will then be provided (by the Settling Defendants under BMFOU and BPSOU consent decrees) with an approved drinking water source as determined by the Butte-Silver Bow Water Quality District until a verification sample is collected and analyzed. The process to determine if the well meets the above requirements are as follows: If the MDEQ-7 ground water human health standards for arsenic, lead, cadmium, copper and/or zinc are exceeded during an approved sampling event, the well will be re-tested for verification. If the verification sample also exceeds, the well will cease being used for such purposes.

(d): the boundaries and provisions of this BABCGWA may be amended, with the express written approval of the DNRC, USEPA, and MDEQ, if the ground water quality improves or if degradation of ground water expands.

(e): Irrigation/Industrial Use Exemption – The Butte Silver Bow Water Quality District, in conjunction with USEPA and MDEQ, may approve new or replacement wells within the BABCGWA for limited irrigation or industrial use. Any proposed new well owner must supply data indicating that the uses will not be detrimental to the environment or to human health. If the Butte Silver Bow Water Quality District sets criteria for irrigation use, any proposed irrigation well must meet those criteria by presenting representative data.

(Petition)

5. The proposed BABCGWA consists generally of lands within the cities of Butte and Walkerville, Montana. The proposed area is in all of the following land descriptions: all of Sections 17 & 18, T3N, R7W; all of Section 13, T3N, R8W; all of the SW¼ Section 16, N½ Section 19, NW¼ Section 7, S½ Section 7, SW¼ Section 8, T3N, R7W; all of E½ Section 12, and N½ Section 24, T3N, R8W. The area is also in portions of NW¼ & SE¼ Section 16, S½ Section 19, N½ Section 20, N½ Section 21, SW¼ Section 6, NE¼ Section 7, N½ Section 8, and SE¼ Section 8, T3N, R7W; SE¼ Section 8, SW¼ Section 9, SE¼ Section 11, W½ Section 12, E½ Section 14, S½ Section 1, N½ Section 23, S½ Section 23, S½ Section 24, NW¼ Section 25, NE¼ Section 26, T3N R8W, all in Silver Bow County. The alluvial portion of the proposed BABCGWA comprises approximately 8.11 square miles with maximum vertical depths of over

300 feet in the northeast thinning to less than 10 feet at the western edge. The bedrock portion of the proposed BABCGWA covers approximately 6.75 square miles with a maximum vertical depth of approximately 1500 feet above mean sea level (msl). A copy of the Petition that includes a detailed map showing the proposed boundaries of the area and a list of land parcels within the area is available from the DNRC, Water Resources Regional Office, 1424 9th Ave. in Helena, MT or on the internet at: http://dnrc.mt.gov/wrd/. (Petition, Department File)

6. Pursuant to § 85-2-506(4), MCA, notice of the Petition for a Butte Alluvial and Bedrock Controlled Ground Water Area was published in the Montana Standard, a newspaper of general circulation within the county within which the proposed controlled ground water area is located, on March 17, March 24, and March 31, 2009, setting forth the Petitioner, the purpose of the Petition, the legal description of the proposed ground water area, and the time, place, and purpose of a hearing on the Petition. Additionally, DNRC served notice by first class mail on approximately 44 individuals, businesses, and public agencies that the DNRC determined might be interested in or affected by the proposed controlled ground water area. The notice advised that all interested persons may present relevant evidence or testimony at the hearing, either in person or by attorney, in support of or in opposition to the granting of the Petition as proposed. (Department File)

7. The Petition consists primarily of a document and attachments titled "Petition for a Butte Alluvial and Bedrock Controlled Ground Water Area, October 2008" prepared by Water & Environmental Technologies in Butte, Montana. The Petition includes an introduction which describes the history of the site and the on-going efforts under the Superfund program, the geology and hydrogeology of the alluvial aquifer, the geology and hydrogeology of the bedrock aquifer, a description of the proposed BABCGWA boundary, the existing water quality of the alluvial and bedrock aquifers, the existing wells in the proposed BABCGWA boundary, and a list of proposed ground water controls. (Petition)

8. To facilitate mining activities, the bedrock aquifer ground water level was lowered approximately 4200 feet from pre-mining conditions. With the cessation of mining activities in 1982, pumping of the system was no longer necessary and the underground mines and Berkeley Pit began to flood. Due to the presence of oxygen and water during and after mining the naturally occurring sulfide minerals began to oxidize resulting in acidic conditions and the release of sulfides, metals and arsenic into the bedrock aquifer. The alluvial aquifer was adversely impacted by the deposition of mine wastes in the Silver Bow Creek drainage and from

smelting operations located along the creek. Again, the exposure of the mine waste to oxygen and water resulted in acidic conditions and the subsequent release of metals and arsenic into the Silver Bow Creek and the shallow aquifer. In addition, the lower (western) end of the proposed BABCGWA was the location of the Montana Pole and Treatment Plant which utilized organic and hydrocarbon compounds in the process. Some of those compounds escaped during the process which subsequently impacted the alluvium of Silver Bow Creek in the vicinity of the plant. (Petition)

9. The Petition provides evidence that the alluvial ground water within the proposed BABCGWA is contaminated with arsenic, cadmium, copper, zinc and lead as shown on Figure 6 and Table IA of the Petition at levels that exceed the maximum contaminant level (mcl) under MDEQ-7. In addition, the Petition shows that the MPTP at the lower (western) end of the proposed BABCGWA is contaminated with PCP (pentachlorophenol) and to some degree with chlorophenols, PAH (polycyclic aromatic hydrocarbons), DRO (diesel range organics), and Dioxin/Furans. (Petition Figure 6, Table IA, Table IB)

10. The Petition provides evidence that the bedrock ground water within the proposed BABCGWA is contaminated with arsenic, cadmium, copper, zinc and lead as shown on Figure 6 and Table IA. The Hearing Examiner notes that the MBMG GWIC database shows that wells throughout the proposed BABCGWA, within both the alluvial and bedrock aquifers, show extremely high levels of trace elements such as aluminum, cobalt, lithium, nickel, selenium, strontium, and uranium. (Petition, MBMG GWIC)

11. EPA and MDEQ have granted Technical Impracticability Waivers for both the BPSOU and the BMFOU because it is impracticable from an engineering standpoint to comply with the MCL's for ground water in these areas. This means that for the bedrock aquifer the proposed remedy for the east (Berkeley Pit) side of the proposed BABCGWA is to use the pit as a hydraulic sink which will prevent any further migration of the contaminated bedrock ground water from impacting Silver Bow Creek and the associated alluvial aquifer. For the east side of the bedrock aquifer, the proposed remedy is to prevent the rise of ground water levels above 5435 msl. This is accomplished by pumping water from either wells or from the Travona Shaft and again preventing water from entering the Silver Bow Creek drainage and alluvium. Since it is impossible or infeasible to actually attain the MCL's for the bedrock aquifer the strategy is one of containment. (Petition)

12. As for the alluvial aquifer, it is also covered by the Technical Impracticability waiver for

the BSPOU. In the Record of Decision for the BSPOU, the USEPA concludes that "[a] controlled ground water area shall be established for the alluvial aquifer to prevent domestic use of this water and to prevent any well development that would exacerbate or spread existing contamination." (Petition)

13. Testimony at the hearing established that the proposed BABCGWA is compatible with and meets the requirements of the Record of Decision and/or Consent Decrees for the BPSOU, the BMFOU and the MPTP. (Hearing Record)

14. Based on the information in the Petition and testimony presented at the hearing, the Department finds the water in the underlying alluvial and bedrock aquifers within the proposed BABCGWA is not suitable as a domestic water source and finds that uncontrolled ground water withdrawal from the alluvial and bedrock aquifers within the proposed boundary is not consistent with the scope and intent of the ROD and/or Consent Decrees for the BPSOU, the BMFOU, and the MPTP. (Petition, Hearing Record)

15. Based on the information in the Petition and testimony presented at the hearing, the Department finds that the public health, safety, or welfare requires a corrective control be adopted. (Petition, Hearing Record)

Based upon the foregoing Findings of Fact, the Hearing Examiner makes the following:

CONCLUSIONS OF LAW

1. The Department has jurisdiction over the parties and over the subject matter herein. The Department may establish a CGWA where the following statutory criteria are met:

> The department shall order declare the area in question to be a controlled ground water area if the department finds on the basis of the hearing that;
> (a) the public health safety, or welfare requires a corrective control to be adopted; and …
> (b)(iii) the facts alleged in the petition, as required by 85-2-502(2) are true.

(85-2-506 and 507, MCA (2007))

2. As a public health agency the Petitioner has standing to petition the Department for a CGWA. The Department gave proper notice pursuant to §85-2-506(4), MCA, (2007) of the hearing and substantive procedural requirements of law or rule have been complied with. (Finding of Fact 6)

3. There is sufficient evidence to designate a controlled ground water area which includes

both the alluvial and bedrock ground water aquifers within the proposed BABCGWA described generally as: all of Sections 17 & 18, T3N, R7W; all of Section 13, T3N, R8W; all of the SW¼ Section 16, N½ Section 19, NW¼ Section 7, S½ Section 7, SW¼ Section 8, T3N, R7W; all of E½ Section 12, and N½ Section 24, T3N, R8W. The area is also in portions of NW¼ & SE¼ Section 16, S½ Section 19, N½ Section 20, N½ Section 21, SW¼ Section 6, NE¼ Section 7, N½ Section 8, and SE¼ Section 8, T3N, R7W; SE¼ Section 8, SW¼ Section 9, SE¼ Section 11, W½ Section 12, E½ Section 14, S½ Section 1, N½ Section 23, S½ Section 23, S½ Section 24, NW¼ Section 25, NE¼ Section 26, T3N R8W, all in Silver Bow County. The attached map (Figure 1) is a small scale map of the outside perimeter of the proposed BABCGWA. A copy of the Petition that includes a detailed map (Petition file Figure 6) showing the proposed boundaries of the area and a list of land parcels within the area is available from the DNRC, Water Resources Regional Office, 1424 9th Ave. in Helena, MT or on the internet at: http://dnrc.mt.gov/wrd/. (Findings of Fact 2, 3, 5, 7 – 15)

4. There is sufficient evidence to support a closure of the alluvial and bedrock aquifers within the proposed BABCGWA to further domestic use based upon public health considerations as conditioned in the Petition and regulation of all other beneficial water uses as provided in the proposed controls in the Petition. The Department finds that the public health, safety, or welfare requires a corrective control to be adopted and that the facts alleged in the petition are true. (Findings of Fact 2, 3, 7 – 15; 85-2-506(2)(e) and (g))

Based upon the foregoing Findings of Fact and Conclusions of Law, the Hearing Examiner makes the following:

ORDER

1. A controlled ground water area is **DESIGNATED** for the alluvial and bedrock aquifers within the Butte Alluvial and Bedrock Controlled Ground Water Area in the general area consisting of all of Sections 17 & 18, T3N, R7W; all of Section 13, T3N, R8W; all of the SW¼ Section 16, N½ Section 19, NW¼ Section 7, S½ Section 7, SW¼ Section 8, T3N, R7W; all of E½ Section 12, and N½ Section 24, T3N, R8W. The area is also in portions of NW¼ & SE¼ Section 16, S½ Section 19, N½ Section 20, N½ Section 21, SW¼ Section 6, NE¼ Section 7, N½ Section 8, and SE¼ Section 8, T3N, R7W; SE¼ Section 8, SW¼ Section 9, SE¼ Section 11, W½ Section 12, E½ Section 14, S½ Section 1, N½ Section 23, S½ Section 23, S½ Section 24, NW¼ Section 25, NE¼ Section 26, T3N R8W, all in Silver

Bow County. The attached map (Figure 1) is a small scale map of the outside perimeter of the proposed BABCGWA. A copy of the Petition that includes a detailed map (Petition file Figure 6) showing the proposed boundaries of the area and a list of land parcels within the area is available from the DNRC, Water Resources Regional Office, 1424 9th Ave. in Helena, MT or on the internet at: http://dnrc.mt.gov/wrd/.

2. New ground water wells will only be allowed within the BABCGWA after review and approval of the Butte-Silver Bow Board of Health acting as the Butte Silver Bow Water Quality District office, the USEPA and MDEQ, in compliance with the provisions below and in compliance with 85-2-311 or -306, MCA (2009). Superfund or other environmental monitoring/treatment wells necessary for environmental cleanup purposes are allowed within the BABCGWA in compliance with applicable statutory criteria.

3. An existing well used for irrigation or industrial use may be replaced at the well owner's expense, but only if the replacement irrigation well meets the criteria stated in provision 6, below and complies with applicable statutory requirements.

4. All wells used as drinking water supply for human consumption within the BABCGWA for which monitoring results establish that the MDEQ-7 ground water human health standards for arsenic, lead, cadmium, copper, and/or zinc, are exceeded, will cease being used for such purposes. The process to determine if the well meets the above requirements are as follows: If the MDEQ-7 ground water human health standards for arsenic, lead, cadmium, copper and/or zinc are exceeded during an approved sampling event, the well will be re-tested for verification. If the verification sample also exceeds the standards, the well will cease being used for such purposes. It is the Department's understanding from the Petitioner that Settling Defendants under the BMFOU and BPSOU consent decrees will supply those with contaminated wells with an approved drinking water source as determined by the Butte-Silver Bow Water Quality District.

5. The boundaries and provisions of this BABCGWA may be amended in accordance with § 85-2-506, MCA (2009), with the express written approval of the DNRC, USEPA, and MDEQ, if the ground water quality improves or if degradation of ground water expands.

6. Irrigation/Industrial Use Exemption – The Butte Silver Bow Water Quality District, in conjunction with USEPA and MDEQ, may approve new or replacement wells within the BABCGWA for limited irrigation or industrial use. Any new or replacement well must comply with the requirements of MCA Title 85, Chapter 2,

Parts 3 and 4 as applicable. Any proposed new well owner must supply data to the Butte Silver Bow Water Quality District indicating that the uses will not be detrimental to the environment or to human health. If the Butte Silver Bow Water Quality District sets criteria for irrigation use, any proposed irrigation well must meet those criteria by presenting representative data.

NOTICE

If all administrative remedies have been exhausted, this Final Order may be appealed by a party in accordance with the Montana Administrative Procedure Act (Title 2, Chapter 4, Mont. Code Ann.) by filing a petition in the appropriate court within 30 days after service of the order.

If a petition for judicial review is filed and a party to the proceeding elects to have a written transcript prepared as part of the record of the administrative hearing for certification to the reviewing district court, the requesting party must make arrangements for preparation and payment of the written transcript. If no request is made, the Department will transmit only a copy of the audio recording of the oral proceedings to the district court.

DATED this 30th day of October 2009.

/Original signed by David A Vogler/

David A. Vogler, Hearing Examiner
Department of Natural Resources
and Conservation
Water Resources Division
P.O. Box 201601
Helena, Montana 59620-1601
(406) 444-6835

LEGEND:

- BABCGA Boundary
- Old Butte Landfill CGA Boundary
- Mine

SCALE IN FEET

2000 0 2000

N W E S

T3N R8W R7W

Missoula
Lexington
EAST CAMP
Mountain Con.
Kelley
Steward
Anselmo
Berkeley Pit
Belmont
Emma
Travona
Ophir
Orphan Boy
MT Tech
Orphan Girl
WEST CAMP
Lower Area One
MPTP Superfund Site
Old Butte Landfill/Clark Tailings CGA
KOA
BSB County Shop
Civic Center

Oro Fino Gulch Rd
Walkerville Dr
Moulton Reservoir Rd
Daly St
Missoula Ave
N Main St
Empire St
Park St
Galena St
Mercury St
Excelsior Ave
Platinum St
Iron St
Main St
Montana St
Second St
Front St
Utah Ave
Shields Ave
Farrell St
Texas Ave
Grand Ave
Centennial Ave
George St
Cobban St
Harrison Ave
Oregon Ave
Farragut Ave
Sheridan Ave
Continental Dr
Amherst Ave
Dewey Blvd
Floral Blvd
Lexington Ave
Grove Gulch Creek
Blacktail Creek
Metro Storm Drain
Silver Bow Creek

7 8 11 12 16 17 18 19 20 21 23 24

BSBHD_M06-b2
DATE: 10/20/08

FIGURE 1

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

BABCGA SITE MAP

C:\drafting\Drafting\Dwgs\BSBHD\BSBHD-M06\BSBHD_M06-b2.dwg, SiteMap, 10/20/2008 3:06:38 PM

Attachment 7

EPA Review of Risk Assessment Assumptions and Cleanup Levels

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

28 February 2011

MEMORANDUM

SUBJECT: Comments Applicable to the 5 Year Review of the Montana Pole NPL Site

FROM: Susan Griffin, PhD, DABT
Senior Toxicologist

TO: Roger Hoogerheide
Remedial Project Manager

The purpose of this memorandum is to identify revisions to EPA risk assessment guidances which have occurred since the 1993 human health risk assessment was written for the Montana Pole NPL Site and how those revisions impact the conclusions of that risk assessment. Since 1993, a number of EPA risk assessment guidances on estimating exposure and the exposure point concentration term have been updated and revised. Toxicity values for a number of chemicals listed as contaminants of concern in the 1993 risk assessment have also been updated. If the 1993 risk assessment were revised to include this newer information, the quantitative risk estimates may increase slightly (or decrease slightly depending on the contaminant). However, the overall conclusions of unacceptable risk and the basis for site remediation would not change. The rationale for this statement is discussed below.

Contaminants of Concern

Based on the sampling data summarized in the February 1993 Baseline Risk Assessment for the Montana Pole NPL Site, the contaminants of concern were correctly identified for soil, sediment, groundwater, and surface water. A conservative risk-based screen was used to identify the analytes to be further investigated in a baseline risk assessment.

Exposure Assessment

EPA's Superfund risk assessment guidances have been updated and revised since 1993. For example, EPA's 2009 Inhalation Risk Assessment Guidance recommends calculating inhalation exposure based on an inhalation dose (e.g., ug/m^3) rather than a daily air intake (e.g., mg/kg-day). Other newer guidances propose different exposure assumptions than those used in the 1993 risk assessment. For example, the 1993 risk assessment used a soil adherence factor of 1.45 mg/cm^2 and EPA's 2004 Dermal Risk Assessment Guidance recommends 0.07 and 0.2 mg/cm^2 for assessing dermal exposure to residential and industrial receptors, respectively. This would reduce daily intake from dermal exposure. EPA's 2004 guidance recommends a dermal absorption factor of 3% for dioxins, 13% for

PAHs and 25% for pentachlorophenol. The 1993 assessment used an absorption factor of 10% for all organics and 1% for all inorganics and dioxins/ furans. Use of the current dermal absorption factors would increase dermal exposure. Although there were a number of examples where use of more current guidance would either slightly increase or decrease the overall exposure assessment, I didn't see anything which would significantly affect the calculations of exposure or final conclusions of the 1993 assessment.

Exposure Point Concentration Term

The exposure point concentrations terms were calculated in accordance with EPA Superfund guidance. The issue of estimating a credible concentration term from highly skewed data (pentachlorophenol) also arose in this assessment, much like the Idaho Pole risk assessment. In this situation the data was not log transformed prior to calculating the upper 95 % upper confidence limit on the arithmetic mean. Current EPA guidance has been expanded to include methodologies for estimating upper confidence limits on both parametric and non-parametric data and would be better suited to these types of data sets. If the exposure point concentration term for PCP were re-calculated using the newer guidance, it would probably not change significantly from the original concentration term.

Toxicity Assessment

Some of the oral cancer slope factors have changed since the 1993 risk assessment. In Table 6-1, the oral cancer slope factor shown for pentachlorophenol is 1.2E-01. The most recent oral slope factor on IRIS is 4.0E-01. Use of the most recent slope factor would result in a slightly increased risk estimate (approximately 3 fold). The slope factors shown for 2,3,7,8-TCDD and benzo[a]pyrene are current. However, the slope factors listed in Table 6-3 for a number of carcinogenic PAHs based on a toxicity equivalence factor approach are outdated. For example, Table 6-3 shows an oral slope factor of 7.3E-02 for benzo[a]anthracene. The Regional Screening Levels tables show a slope factor of 7.3E-01. This is a 10 fold difference. A number of the PAH slope factors could be updated. But I mention benzo[a]anthracene since it seems to have the highest concentrations of any of the PAHs measured in soil and groundwater (Tables 5-14 and 5-15). Application of the most recent toxicity data would increase the risk estimates for pentachlorophenol and the PAHs somewhat. However, the conclusions of the 1993 assessment would not change.

The toxicity equivalency factors (TEFs) used to evaluate the dioxin and furan congeners have been updated since the 1992 assessment. The most recent TEFs can be found at http://www.epa.gov/raf/files/tefs-for-dioxin-epa-00-r-10-005-final.pdf. The TEF for pentachlorinated dibenzo-p-dioxins increased from 0.5 to 1.0. The TEFs for 1,2,3,7,8- and 3,4,7,8-pentachlorinated dibenzofurans increased from 0.05 and 0.5 to 0.03 and 0.3, respectively. The TEF for octachlorinated dibenzo-p-dioxins and dibenzofurans decreased from 0.001 to 0.0003. Since the levels of pentachlorinated dioxins and furans appear to be very low at this site (Tables 5-14 and 5-15) use of the new TEFs would not be expected to have a significant impact on the toxicity assessment for dioxin.

Risk Conclusions and Cleanup Levels

If the 1993 human health risk assessment were updated to use the more current cancer and non-cancer toxicity values and TEF data, the risks estimated would slightly increase for pentachlorophenol and PAHs and stay the same for dioxins/furans. The overall conclusions regarding unacceptable risks presented in Chapter 6 would not change.

In a recent email dated 2/17/2011, you mentioned that a soil cleanup level of 2000 ppt was established for the Montana Pole NPL site based on recreational exposure. Since a recreational scenario was not evaluated in the 1993 human health risk assessment, I can't comment on the exposure or toxicity assumptions used to derive this value. However, as noted above, the use of the newer dioxin/ furan TEFs would be expected to have a very marginal impact on calculations of risk or the derivation of a cleanup levels.

Attachment 8

Interview Summary Forms, Letters Received, and Summary of Community Meeting 3/24/11

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Comments and Questions

Community Meeting, March 24, 2011, 7 – 9 p.m. Boulevard Volunteer Fire Hall

Meeting Purpose:
CTEC held the meeting for DEQ/EPA to talk about Five-Year Review, and to take comments and questions for Five-Year Review consideration.

Trees
- Concern that what killed the trees that were planted in one area may be unhealthful to nearby residents (impacting the protectiveness for public health and safety)
- Irrigation issue. Why did you stop irrigating?

Dust Control Fence
- The dust control fence should be more substantial. It says in the document. Why is it just a cyclone fence that doesn't stop dust?

LTU location
- We feel like guinea pigs. LTU was experimental.
- Why did you ever put it there? The LTU is too close to residents.
- Upset about location.
- When will it be done?

Odors
- They're not as bad as when they first started; I lived here since 1990.
- The odors can make people sick; it's not in their head or imagination. Odors are physiological and some people are sensitive to them. That's not right.

Previous 5-year Review
- Can't understand it and I'm an engineer, did permitting and environmental consulting, etc. It should be in plain language this time.
- I want the report delivered to each resident and easier to understand/explained better.

Future ICs
- How long are the agencies responsible if someone does get sick in the future?
- What restrictions would you have?
- We've been subjected to a double-standard and a poor ROD.

Remedy
- How do you know you're getting it all?
- Will this be protective? Is the Water Treatment Plant working well?
- I question whether the remedy is protective.

- This is not being cleaned up so people can live on it. That's a bad idea. You have people living right near it. I live 90 paces away. Others live 60 paces away. I want it cleaned up better.
- There are a lot of unanswered questions. You're responsibility is to ensure us there's protection. The technology is not good to leave waste in place.
- I'm unhappy, you never get us answers. We ask questions and you never answer us. You just say you don't know. Well find out. I don't know how you can sleep at night.
- My wife has cancer.
- Is there any way we can make the cleanup to residential levels?
- Citizens should hold the government accountable; the Five-Year Review and something new allows for reopening the ROD. Public concerns were not addressed for the LTU location or the ROD, which are grounds for showing the remedy is inadequate and reopening the ROD.
- Why wasn't a buyout of the neighborhood considered? It should have been.
- Is the RR still active?

Caps

- Caps are historically a problem. Given the track record of caps, they're a bad idea. They don't work.
- I would not want my kid to work there with the history of cap failure, as a nurse I know health effects.
- Dioxin at Love Canal, Agent Orange effects, etc.
- The agency should be responsible for the caps.

Dewatering at Waste Water Treatment Plant

- Someone asked about it.

Five Year Review

- You're giving this a perfunctory review; the agency is reviewing itself.

New Technology

- Any new technology?

Property and Future Owner

- Who owns the property? Who had liability?

How much money?

- Residents said they want to be benefactors of the remaining money. They said they deserve it because of all that they've put up with over the years.

Redevelopment of Site/Beneficial Re-use

- County commissioner gave brief presentation proposing a County Fairgrounds be located there.
- We are concerned about the future of the Site. Don't like fairgrounds idea; most is dirt and dust.

- Suggestion of walking trail, riparian corridor, Greenway Trail.
- Suggestion of fire training facility.
- Asked if residents would be willing to take part in a planning committee if one was formed? Audience expressed interest in starting a resident-based planning committee perhaps coordinated by Rick Appleman of CTEC.

Other

- Going to organize the neighborhood to address Montana Pole issues.

(Notes taken and compiled by Mary Ann Dunwell)

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Interview Questions
February/March 2011

Person interviewed: Rick Appleman, CTEC's MT Pole Sub-committee Chair
Date interviewed: 2-23-11 (Telephone Interview)
Contact information: (406) 496-4448, rappleman@mtech.edu

1. **What do you know about the environmental cleanup being done at the Montana Pole Federal Superfund Site?**

A long time ago, I got involved when it was free-product recovery. It was a mess out there. After the first 5-year review, I became less involved. At the second 5-year review I was not so involved. I've been coming up to speed and now I'm very involved as Chair of CTEC's MT Pole subcommittee.

2. **What do you think about the environmental cleanup being done at the Montana Pole Superfund Site project? Please include any opportunities for improvement as well as what's being done well.**

The free-product phase is done. The LTU is decomposing; the Penta numbers are going down. Sometimes the data confused me. Soil dioxin is still a problem, not gone down as much as I'd have liked, but it's probably not surprising. (What happening with the white rot fungi?)
The WTP groundwater treatment is fancy and turns out good low product. I think well of all these. I also wonder about the dewatering effects.

3. **What effects do you believe Montana Pole Site activities have had on the surrounding community?**

The locals have had to deal with construction noise, odors, dust. I don't know these folks and don't know if they have health concerns. They were closest downwind as far as the killing of things (microbes working). The bigger problem is the asphalt plant. They think it's all MT Pole.

Others farther away don't really know much about MT Pole.

4. **Are there any community concerns that you are aware of regarding the Montana Pole Superfund Site? If yes, what are they and when were they? Do they still exist?**

Not really.

5. **What other comments or suggestions do you have about the effectiveness of cleanup at Montana Pole?**

Will have to treat the water for a long time.

Wonder why there are still some hot spots. Residual product. Do you wait? Levels should keep heading down. May take a very long time. It's hard to know about the remaining product. If there's too much residual sticking it'll take a long time for WTP to bring down levels.

The issue of the Dioxin/Furans. Concentrations of DF seem huge. They are a concern.

In 2006 Five-Year Review the units in that document are problematic. Be consistent and consistent with the ROD.

6. **How would you like to receive information or be involved in the Superfund process for Montana Pole?**

I'm receiving enough information. Email is a good way. The Consent Decree made it tough because information is privileged.
Put a GIS map on the website with layers.

7. **Do you have ideas for beneficial reuse of the MT Pole Site and what are your thoughts on redevelopment**?

Because dioxins are still high and not down too deep my preference would be a lot of pavement, industrial site, keep anyone from digging down.
It's next to the freeway so it's noisy. Perhaps a park at the LTU. Not fairgrounds though. That's just not a good idea for fairgrounds. If you had open space what depth would you need to have dioxin deep enough down to be protective?

8. **Do you have other comments about Montana Pole for this Five-Year Review?**

A modification to the Controlled Groundwater Area is probably in order to take into account dewatering activities. It's very confusing and complex as to what's happening with the dewatering at the WWTP. If someone's going to drill a well they need permission. If you put in a dewatering well you should also need permission. Model ahead of time.

I think people are tired of Superfund.

Interviewers: Lisa DeWitt and Mary Ann Dunwell

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Interview Questions
February/March 2011

Person interviewed: Scott Payne, Kirk Engineering and Natural Resources, Inc., CTEC Technical Advisor
Date interviewed: 2-23-11 (Telephone Interview)
Contact information: (406) 842-7224, scott_payne@kirkenr.com

1. **What do you know about the environmental cleanup being done at the Montana Pole Federal Superfund Site?**

Quite a bit. Working on this, reviewing various documents for 11 years. I've seen the Site transformed quite a bit.

2. **What do you think about the environmental cleanup being done at the Montana Pole Superfund Site project? Please include any opportunities for improvement as well as what's being done well.**

It's greatly improved over what was there to begin with. Progress good. It's complex, multi-layered.
The effect is good for human health. The Remedy is making it safer for humans and the environment.

3. **What effects do you believe Montana Pole Site activities have had on the surrounding community?**

From the exposure potential for humans, this is a vast improvement. As things are removed, hauled away or capped. It's been good for dermal contact.
The groundwater pumping system is good. The majority of the contaminants are removed or contained.
Air quality I've heard a lot about five years ago. DEQ did a good job of talking to folks. Hard to say what's effecting residents. The odors? The air didn't smell natural. Others sources can also impact them. Has been addressed as well as possible. You'll never make everyone happy, but it's better.

4. **Are there any community concerns that you are aware of regarding the Montana Pole Superfund Site? If yes, what are they and when were they? Do they still exist?**

Re-use. Now's the time to think about re-use as the soil is cleaned up and winds down over the next few years. Re-use has a lot of potential. Efforts might be too late in two years. Components will be located spatially and if there's pre-planning it'll be easier now rather than later with any design. The ball is not totally dropped. They have a committee that met two weeks ago. Can now

start to reach out and start asking questions. Have an open dialogue on re-use. Janet Kornish is the facilitator. Would benefit the community. Rick Appleman committee.

5. **What other comments or suggestions do you have about the effectiveness of cleanup at Montana Pole?**

It was a slow process. Don't think it's the wrong remedy. Not much product recovery with groundwater treatment. It's sad it takes so long. Disappointing about the number of gallons of product removed. You're doing the best you possibly can. There are issues with dewatering. The remedy's okay.

6. **How would you like to receive information or be involved in the Superfund process for Montana Pole?**

Doing fine at receiving information. Good flyers.

7. **Do you have ideas for beneficial reuse of the MT Pole Site and what are your thoughts on redevelopment?**

Need to let groundwater cleanup keep going.
As far as the surface, fairgrounds probably not the best use of the Site. Hopefully there will be green grasses and aesthetically pleasing. The Butte community should have input.

8. **Do you have other comments about Montana Pole for this Five-Year Review?**

The left over buildings are a draw to re-use.
It's coming along.

Interviewers: Lisa DeWitt and Mary Ann Dunwell

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Interview Questions
February/March 2011

Person interviewed:
Janice Hogan, CTEC TAG (Tech Assistance Group) Coordinator

Date interviewed: 2-28-11

Contact information:
(406) 723-6247, buttectec@hotmail.com 27 W. Park Street, Butte, MT 59703

1. **What do you know about the environmental cleanup being done at the Montana Pole Federal Superfund Site?**

I've been to meetings where overall discussions are presented, so I know generally what is going on with water treatment and the land treatment unit (LTU).

2. **What do you think about the environmental cleanup being done at the Montana Pole Superfund Site project? Please include any opportunities for improvement as well as what's being done well.**

- Because of the Site cleanup, contamination is greatly reduced, the situation much better than it was (in the beginning).
- I feel that those who are actually doing the cleanup know better and will let people know if there's a problem.

3. **What effects do you believe Montana Pole Site activities have had on the surrounding community?**

- Positive impact. Odor was a problem before but not now. The Site certainly looks better.
- The thing about Montana Pole, I didn't know so much about it and I'm from here. It's not as high profile as the Berkeley Pit.

4. **Are there any community concerns that you are aware of regarding the Montana Pole Superfund Site? If yes, what are they and when were they? Do they still exist?**

It's not well known in Butte, even exactly where it is.

5. **What other comments or suggestions do you have about the effectiveness of cleanup at Montana Pole?**

   - The amount of waste left in place is a concern for the future. It it's left there it could come back as a problem.
   - I assume and hope that public health is protected.

6. **How would you like to receive information or be involved in the Superfund process for Montana Pole?**

   - I like email, brochures, simple postcards, PSAs.
   - If CTEC can help with general public involvement we will because people stop by, come in to our office.
   - We're looking at putting a few video clips on our website.

7. **Do you have ideas for beneficial reuse of the MT Pole Site and what are your thoughts on redevelopment?**

   - I hear various ideas. A lot of people want to know if we can put a fairgrounds at the Site, would it be protective. If not, you need to tell us so we know, give us a recommendation from DEQ/EPA. There is a need to know this information.
   - Perhaps a carousel.
   - I'm unclear about what we can actually do.
   - The County will want to know.

8. **Do you have other comments about Montana Pole for this Five-Year Review?**

I will be interested in the results of the Five-Year Review.
I'd like another tour of the Site.
We need to do short video clips to put on CTEC website; it's being revised.

Interviewers: Lisa DeWitt, Mary Ann Dunwell

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Interview Questions
February/March 2011

Person interviewed: Leland Greb, CTEC Member
Date interviewed: 2-28-11
Contact information:
(406) 310- 1598, 782-3719, lelandgreb@bresnan.net; PO Box 565, Butte, MT 59703

1. **What do you know about the environmental cleanup being done at the Montana Pole Federal Superfund Site?**

It was a sloppy treatment plant, they used diesel and made a mess. They didn't care about the PCPs. All that I read is that PCPs are not good even in small doses. So many years of contamination, so may be need totally cleaned up like the dioxin. There are PCPs, diesel and other chemicals. I don't know what kinds of interactions there can be with peoples' health, like a doctor looks at medicines when combined. I've been involved in the Superfund since the 90s.

2. **What do you think about the environmental cleanup being done at the Montana Pole Superfund Site project? Please include any opportunities for improvement as well as what's being done well.**

There were many years of contamination so it will take a long time to clean up. It's hard to know what minute quantities are there that may interact to cause problems. Cleanup is slow. A lot is being done "proforma" (perfunctory or as a formality). Sandy Stash of ARCo has been involved and reported on it for "Round Town Review," which was an independent newspaper and shut down.

3. **What effects do you believe Montana Pole Site activities have had on the surrounding community?**

When it got hot and dry people always smelled things. During the spraying of the irrigation system you could smell it. Odor from treatment was bad. It's been less over the last five years. Some are still discouraged, however. Residents say no one tells us anything. When Sandy Stash was here, said wanted it cleaned up and get out. Did a survey in '95 or '96.

4. **Are there any community concerns that you are aware of regarding the Montana Pole Superfund Site? If yes, what are they and when were they? Do they still exist?**

No one says anything unless they are tooting their own horn. Major issue is that EPA and previous DEQ didn't go out of their way to share information. Information wasn't forthcoming; even in the past five years. We need more information. People want to know and they want to be involved in decision-making; not just during a 30 or 40-day comment period. The bad perception

is left over from before. It carries over to now. Things are improved (with communication) but it still needs to involve the public.

5. **What other comments or suggestions do you have about the effectiveness of cleanup at Montana Pole?**

People in Butte look at all of it, they look at the mess in Butte, they see the "Pit," Priority Soils, etc. It's hard to get a picture of what is going on overall. Projects are "stove piped" and that's bad; everyone should be up on all sites in Butte. For instance the Pole plant is on a floodplain; contamination doesn't stop.

6. **How would you like to receive information or be involved in the Superfund process for Montana Pole?**

I'd like to have information presented at a 9th grade level, especially information meant for the public. We need information in a form that people can understand. Translate it from technical to plain language. Provide information on a continual basis, like in water bill inserts.
News media also good way. Carmen Winslow, Associate Editor of Montana Standard; Gerry O'Brien; Laura Staples of KXLF-TV.

7. **Do you have ideas for beneficial reuse of the MT Pole Site and what are your thoughts on redevelopment?**

It should be put into Butte-Silver Bow's hands. BSB should retain control. Would be a good place for light industrial. Don't use the sheds; they're contaminated. Asphalt contaminated. We need education up front, for instance what laws do we need to follow? (ICs). There are problems with sustainable funding. The community questions the lack of commitment to the community where project people don't live here. You live in Helena.

8. **Do you have other comments about Montana Pole for this Five-Year Review?**

Put an effort into educating Paul Babb (County Administrator) and the commissioners; educate up front on ICs.
There's a problem with funding/ look at sustainable, planned funding
It's important for people to be housed here (DEQ and EPA staff); there's not much of a (perceived) commitment if you can't live here among us.
All Butte sites should be a priority. Don't make it proforma or just checked off a list. CTEC doesn't want this proforma. This discourages a lot of people.
For news media, use the resources that are available. (Leland sent an email of contact info for Carmen Winslow to do informational series in the paper)

Interviewers: Lisa DeWitt and Mary Ann Dunwell

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Interview Questions
February/March 2011

Person interviewed: John Ray, Ph.D., CTEC Board Member, MT Tech Professor of Speech
Date interviewed: 2-28-11
Contact information: speechray@in-tch.com

1. **What do you know about the environmental cleanup being done at the Montana Pole Federal Superfund Site?**

The last thing I read was the 8-page fact sheet last year. When this first started I followed more closely. Fire hall meetings were packed to discuss incineration. Also when the odor issue came up I got involved. There was a public meeting.

2. **What do you think about the environmental cleanup being done at the Montana Pole Superfund Site project? Please include any opportunities for improvement as well as what's being done well.**

Seems to be progressing well. Concerns are ICs, caps given the dioxins toxicity, odor problem may resurface, eventual re-use, want to get to contamination under the interstate. Would like to see this addressed in the Five-Year Review.
Citizen input was ignored in the recent Butte Five-Year Review. Don't want that here.

3. **What effects do you believe Montana Pole Site activities have had on the surrounding community?**

Concern over dewatering.
The OUs don't talk to each other.
Used to be a more acute kind of problem with contamination, now better. Pretty awful dioxins with toxicity higher than elsewhere in Butte.

4. **Are there any community concerns that you are aware of regarding the Montana Pole Superfund Site? If yes, what are they and when were they? Do they still exist?**

Future use.
Concerns over information not being shared across sites and OUs.

5. **What other comments or suggestions do you have about the effectiveness of cleanup at Montana Pole?**

Based on what I've read things seem to be progressing according to plan. LTU seems to be working.
Potential bias of Five-Year Review concerns me. Get someone not biased to conduct the review.

6. **How would you like to receive information or be involved in the Superfund process for Montana Pole?**

Would like to see a story in the MT Standard newspaper prior to the community meeting.
Get a story in the Standard, Justin Post, about the Five-Year Review. Robin Jordan at the Butte Weekly. Jack Handley's radio talk show. Focus, a 30-minute talk show with Laura Staples at KXLF-TV.
To give information have an open house with little booths: future land use booth, odors booth, one on one setting.
CTEC could be useful if did more community outreach. They're better than 5-6 years ago.

7. **Do you have ideas for beneficial reuse of the MT Pole Site and what are your thoughts on redevelopment?**

The public should be involved. Work with the County for future use.
Suggest to form ad hoc of interested community members to look at future use.
Use locals and work directly with locals.
BSB would have to be involved too. Include the neighborhood's commissioner.

8. **Do you have other comments about Montana Pole for this Five-Year Review?**

Address the bias of the Five-Year Review; have a third party do it.
When I read the 5-year review from the overall Butte Site recently, the public input was not addressed.
The more specific response to a 5-year review the better, not just someone listening but incorporate suggestions.
For instance, I gave 12 problems with caps. You need to address each point not just gloss over.
Do not like lumping issues.
Concern about toxin under the interstate. Answer the issue specifically. Validate the comments; i.e. why caps aren't relevant.
My view of a 5-year review is supposed to be a comprehensive review.
Don't make it just perfunctory. It needs to be meaningful.

Please note: Dr. Ray has also submitted emails about his major concerns and a proposal to reopen the ROD to allow cleanup to higher, residential standard. (See emails dated 2-17-11, 2-22-11, 2-24-11, and 3-25-11)

Interviewers: Lisa DeWitt and Mary Ann Dunwell

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Interview Questions
February/March 2011

Person interviewed:
Tom Malloy, Reclamation Manager, Butte-Silver Bow County Planning Department
Date interviewed: 2-28-11
Contact information:
(406) 497-6257, tmalloy@bsb.mt.gov, 155 West Granite St., Butte, MT 59701

1. **What do you know about the environmental cleanup being done at the Montana Pole Federal Superfund Site?**

I know quite a bit because of my position with the county. I know more than most.

2. **What do you think about the environmental cleanup being done at the Montana Pole Superfund Site project? Please include any opportunities for improvement as well as what's being done well.**

- Cleanup has changed over the last 6 months due to dewatering. Have been told there are Penta hits to the North of Silver Bow Creek and to the North of MSD, Metro.
- Appears there is confusion as to what contamination got where and when. Was the Remedial Investigation (RI) extensive enough?
- I question the ROD going back to the 90s. Confusion which came first, the chicken or the egg? Was there enough RI data to come up with the ROD? Should they have gone to peat layer or beyond? Goes back to the ROD, who settled and who didn't. The data sets coming out don't look good.

3. **What effects do you believe Montana Pole Site activities have had on the surrounding community?**

- Back in the 90s, there were many public meetings; concerns about odors. Odor issue seems to have subsided.
- Disappointed to hear that there will need to be more soils placed on the LTU, will extend the life of the facility.
- The County wants hands on the Site ASAP.

4. **Are there any community concerns that you are aware of regarding the Montana Pole Superfund Site? If yes, what are they and when were they? Do they still exist?**

Delay in beneficial reuse of the property.

5. **What other comments or suggestions do you have about the effectiveness of cleanup at Montana Pole?**

In the early days of Federal Superfund, we looked at incineration. We should re-examine that in the ROD to see if the assumptions, time, etc. are still valid. Incineration had many legal/technical problems then. Could a portable system be brought about now? Would it be viable now? Is the technology perfected?

6. **How would you like to receive information or be involved in the Superfund process for Montana Pole?**

Based on the new data, perhaps quarterly by updates, meetings, mailings. More updates, meetings would be appropriate.

7. **Do you have ideas for beneficial reuse of the MT Pole Site and what are your thoughts on redevelopment?**

There are a bunch of ideas being discussed:

- County Fairgrounds-the five metal sheds, pole barns as exhibit buildings, good for 4H
- Rodeo grounds
- Carousel because of good access from highway
- Splash park because of good access again

I'll be involved. We've already started. The Montana Tech class looked at redevelopment. Jon Sesso (BSB Planner) has been involved. Lot of community leaders are involved.
We just don't know **when** it will be available.
We'll need to have restrictive land use requirements put in place.

8. **Do you have other comments about Montana Pole for this Five-Year Review?**

All I can say is "good luck," with all the stuff I'm hearing about the depth of hits (Penta).
Hits from the LAO lagoons. Maybe this is not as confined as we thought.

Interviewers: Lisa DeWitt, Mary Ann Dunwell

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Interview Questions
February/March 2011

Person interviewed:
Dave Palmer, Chair of the Council of Commissioners, Fair Board, Butte-Silver Bow

Date interviewed: 2/28/11

Contact information: (406) 490-3964, dave.palmer@sjh-mt.org

1. **What do you know about the environmental cleanup being done at the Montana Pole Federal Superfund Site?**

   - I know a little about pole treating fluid, Penta, soaking into the ground.
   - Cleanup is a slow process and a long process. But it's better to do it slow and right than having to do it over.

2. **What do you think about the environmental cleanup being done at the Montana Pole Superfund Site project? Please include any opportunities for improvement as well as what's being done well.**

   - I think it's going well as it gets close to the end. It looks like the soil treatment is going well.
   - Good to see soil stockpiled from the highway project for Montana Pole use. The bridges are putting out material, which plays well into the equation.

3. **What effects do you believe Montana Pole Site activities have had on the surrounding community?**

   - The Boulevard neighborhood complained about the odors. I haven't heard any comments lately though. More than five years ago.
   - Other than that there's not too much of an effect.

4. **Are there any community concerns that you are aware of regarding the Montana Pole Superfund Site? If yes, what are they and when were they? Do they still exist?**

There are impacts from Butte-Silver Bow work; the dewatering is causing a problem in the groundwater.

5. **What other comments or suggestions do you have about the effectiveness of cleanup at Montana Pole?**

I hope we are on track and the chosen method is working and doing the job.

6. **How would you like to receive information or be involved in the Superfund process for Montana Pole?**

I get information through the County and Department heads and Jon Sesso (County Planner). The current information is adequate.

7. **Do you have ideas for beneficial reuse of the MT Pole Site and what are your thoughts on redevelopment?**

    - Fairgrounds, a good multi-use; I've been pushing for fairgrounds. BSB doesn't have a fairgrounds. This could be a permanent home, especially with the quanset huts out there; the multi-use facility.
    - Maybe use an MSU architecture student to help with the design.

8. **Do you have other comments about Montana Pole for this Five-Year Review?**

It's coming along now. Hopefully, the eventual use is in sight.

Interviewers: Lisa DeWitt, Mary Ann Dunwell

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Interview Questions
February/March 2011

Person interviewed: Tom Bowler, Site Operations Manager
Date interviewed: 3-16-11
Contact information: (406) 723-7247, Tom.Bowler@tetratech.com

1. **What do you know about the environmental cleanup being done at the Montana Pole Federal Superfund Site?**

I know just about everything because I've been here since 1995 as Site Operations Manager. Plus, I used to play here as a 16-year-old kid and tear around the Site. I've seen a remarkable improvement. It was a moonscape before.

2. **What do you think about the environmental cleanup being done at the Montana Pole Superfund Site project? Please include any opportunities for improvement as well as what's being done well.**
   - The general trend is in a good direction, things have gone pretty well with very few problems.
   - One of the problems is the Controlled Groundwater Area needs to be followed and enforced by everyone. The Butte-Silver Bow dewatering is causing delay. It's not making us "dead in the water" but is keeping us from maximizing our effort.
   - Other delays are inevitable like the highway work delays cleanup a little. Inevitable, like changing operating contractors.

3. **What effects do you believe Montana Pole Site activities have had on the surrounding community?**
   - Makes community more attractive to residents and developers
   - Biggest effect has been the odor, even in the last five years, although it's really diminished
   - Also, they don't like big industrial equipment used for cleanup going through the area
   - I think the community is basically unconcerned about the day to day operations though.
   - We're making this a better community by cleaning up the Site. Unfortunately there not much you can see being done on a day to day basis (with the LTU)
   - Wildlife are coming back. Recently there was a herd of 15 deer on the Site, a doe is having a fawn, there are foxes, snakes, frogs, fish, an owl, raptors, osprey, beavers. This has been in recent years, within the last five years. Fish were noticed eight years ago, but other wildlife in last five.
   - Duck & geese too; broods of ducks had ducklings; they weren't here before because it used to look like the surface of the moon.

4. **Are there any community concerns that you are aware of regarding the Montana Pole Superfund Site? If yes, what are they and when were they? Do they still exist?**
   - Economic impacts are a big concern; people are more concerned about that than the environment or health concerns.

- They're afraid this (Superfund) will degrade property values; however, there are no vacancies, no vacant houses
- Lot of interest to claim property when this is done; good economic potential
- Neighbors are worried about what kind of development will happen here. They want trees and a park it seems.

5. **What other comments or suggestions do you have about the effectiveness of cleanup at Montana Pole?**
   - We can't do a lot more than we're doing. We're constrained with remediation by geography, highway and aquifer.
   - Possibly can reduce costs and simplify now because of where we are in the remedial process. For instance, in the groundwater the free oil is not so much as problem as it was before.
   - Basic water treatment is going well.
   - Can further reduce the remedial footprint as this cleans up. For instance, reinject treated water system; we can reduce that area and free up an area to return to the public (for beneficial use).

6. **How would you like to receive information or be involved in the Superfund process for Montana Pole?**

N/A

7. **Do you have ideas for beneficial reuse of the MT Pole Site and what are your thoughts on redevelopment?**
   - My personal view is the South side should be developed commercial; the North side should be a park with access to Silver Bow Creek; it's right next to the creek.
   - Want to get it done and move forward and turn it over to add value to the community
   - We clean 177 million gallons a year and make it beneficial; before, the water killed everything.

8. **Do you have other comments about Montana Pole for this Five-Year Review?**
   - I feel it's a major improvement, especially being a life-long resident of the community.
   - When I see wildlife in a stream that couldn't even support an insect, we've made a great improvement.
   - Also with revegetation, plants are growing. Before, nothing would grow here. Knapweed wouldn't even grow!

Interviewers: Mary Ann Dunwell, Lisa DeWitt

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Interview Questions
February/March 2011

Person interviewed: Rick Larson, Operations Manager, Utilities Division, Butte-Silver Bow City/County Government, Department of Public Works
Date interviewed: 3-23-11
Contact information: (406) 497-6518, 490-1997 cell, ricklarson@bsb.mt.gov, 126 W. Granite, Butte, MT 59701

1. **What do you know about the environmental cleanup being done at the Montana Pole Federal Superfund Site?**

In 1982, I got an anonymous phone call tipping me off to pollution at the Site; I called the Bureau of Mines; I went down there and was up to my thighs in this tar-like substance; I got Kevin Kirley involved (then at DHES). I asked the plant operator about any leaks and was told there aren't leaks; he said every year we open up the valves and release the Penta into the creek (Silver Bow Creek), doing this since 1946. Oil streamed up. The Coast Guard and EPA did the initial cleanup in the mid 80s. The Penta is historic in the peat layer.

Now as Utilities Manager, I have to improve the Waste Water Treatment Plant (WWTP) across the creek and do a Phase 2 upgrade according to the AOC. I thought the sheet piling wall at Montana Pole was still there to contain the hazardous material. The ROD on page 46 allows dewatering on the North side of the plant. Why did you take the wall out? It would have stopped the spread. You should have notified us that you took out the wall. We thought there was a contained hazardous waste site when we started dewatering. We don't want to pollute as we dewater. That's why we're doing the upgrade to stop pollution of nitrates. Building a wall again could be a solution.

I thought the Controlled Groundwater Area was to prevent the drilling of domestic wells so people don't drink the water, not to keep us from dewatering at the WWTP. This comes from my public health background.

The technical report that DEQ gave us indicates the waste in place is a source of Penta contamination in the creek. And that there was Penta on our side of the creek before dewatering, even before the WWTP was built.

We'll come up with a technical letter to DEQ. The technical memo will be done by April 13th and then we'll submit it to DEQ to allow us to move forward with Phase 2. It's bad that ratepayers will have to pay.

I admit our communications were poor with DEQ.

2. **What do you think about the environmental cleanup being done at the Montana Pole Superfund Site project? Please include any opportunities for improvement as well as what's being done well.**

It's a tremendous job but not well done. It was reported in 1982, it should be done by now. It should have gone into ICs by now. And be finalized. I understand there's almost as much money as ARCo turned over.

3. **What effects do you believe Montana Pole Site activities have had on the surrounding community?**

The most disturbing to me is that it's not a contained and controlled hazardous waste site. You need to get it contained. The issue with MT Pole and WWTP is going to cost community members money. BSB will have to charge ratepayers money to fix the problem of Penta spreading.

People still believe that the Boulevard residents are suffering health effects from organic air pollution and the LTU. It's causing emotional effects to the people.

4. **Are there any community concerns that you are aware of regarding the Montana Pole Superfund Site? If yes, what are they and when were they? Do they still exist?**

- Why didn't you remove the contamination under the highway and poles?
- Do you still have funding left? Spend the money and be done with this cleanup.
- BSB's major concern with the dewatering issue is that we could be named a PRP (Potentially Responsible Party) for the Penta contamination. That's why we don't like that one sentence in the fact sheet. There was migration of Penta before we dewatered and it's even happening now when we're not dewatering.
- The fact that Montana Pole is there is slowing down the WWTP upgrade.

5. **What other comments or suggestions do you have about the effectiveness of cleanup at Montana Pole?**

It's not effective; it's a failure because there's still migration off site after 30 years. Again, the Penta on the North side existed before dewatering at WWTP. We're not dewatering now and there's still migration. The Remedy is not effective.

6. **How would you like to receive information or be involved in the Superfund process for Montana Pole?**

I would like to be involved in all communication and I'll make every attempt to participate in effective communication with all parties.

7. **Do you have ideas for beneficial reuse of the MT Pole Site and what are your thoughts on redevelopment?**

This should be up to the people who live there to decide. I don't like the idea of fairgrounds. The County has a saddle club/rodeo grounds already. That's a good place for fairgrounds. Not at the Pole Site.

8. Do you have other comments about Montana Pole for this Five-Year Review?

No.

Interviewer: Mary Ann Dunwell

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Interview Questions
February/March 2011

Person interviewed: Ed Fisher, Boulevard neighborhood resident
Date interviewed: 3-24-11
Contact information: (406) 782-2917

1. **What do you know about the environmental cleanup being done at the Montana Pole Federal Superfund Site?**

Took the contaminated soil and then let nature take care of it. You're trying to correct the water and put it through the water treatment plant.
This end (south) was all storage (during plant operation) not pole treating.

2. **What do you think about the environmental cleanup being done at the Montana Pole Superfund Site project? Please include any opportunities for improvement as well as what's being done well.**

When it was first started, I was told by officials that this was only the 2nd time an LTU was ever done. I didn't like being a guinea pig. I could've hauled off the stuff in coffee cans by now, cheaper and faster than the LTU. It's all contaminated on one end then why did you put it on the other end where residents are? Why? EPA is protecting the job and not the people.

3. **What effects do you believe Montana Pole Site activities have had on the surrounding community?**

The irrigation system failed on the trees. I'm concerned that might have been the soil that killed them. Why did they cut the trees down? I don't think they know what killed them. The odor is better than it was before five years ago. It hasn't been that bad recently. For years, we put up with odor and dust blowing. The last five years has been better.

4. **Are there any community concerns that you are aware of regarding the Montana Pole Superfund Site? If yes, what are they and when were they? Do they still exist?**

Who know what's in the air? Young kids live in the neighborhood now. Used to be just elderly. Now there are younger people and I'm concerned about their health.
But in the past, I believe the Everett was having health problems when you tilled the soil at the LTU. This was more than five years ago, not since. He has since passed.

5. **What other comments or suggestions do you have about the effectiveness of cleanup at Montana Pole?**

I'm just glad it's down to the final steps. It's good. I'll fight tooth and nail against any LTU.

6. **How would you like to receive information or be involved in the Superfund process for Montana Pole?**

Mail or deliver flyers.

7. **Do you have ideas for beneficial reuse of the MT Pole Site and what are your thoughts on redevelopment?**

Fire training center for the County with a tower and area to do exercises.
There's not much else can do with it other than plant grass that someone would have to maintain.
I'd like a committee to decide.

8. **Do you have other comments about Montana Pole for this Five-Year Review?**

I wish you gave us an opportunity to decide on things.

Interviewer: Mary Ann Dunwell

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Interview Questions
February/March 2011

Person interviewed: Elizabeth Erickson, Water & Environmental Technologies, Butte Restoration Alliance, CTEC, and NRD Council Butte Area
Date interviewed: 3-25-11
Contact information: (406) 782-5220, 723-1523, 490-3135, eerickson@wet-llc.com, 480 East Park Street, Ste. 200, Butte, MT 59701

1. **What do you know about the environmental cleanup being done at the Montana Pole Federal Superfund Site?**

Way too much. As past President of CTEC and as a contractor for BSB, I've reviewed a lot of documents. Done lot of work for agencies. Also involved in Butte Restoration Alliance.

2. **What do you think about the environmental cleanup being done at the Montana Pole Superfund Site project? Please include any opportunities for improvement as well as what's being done well.**

Compared to where it started, it's great now. I'm amazed at the improvement. A lot of good progress has been made. Human exposures close to eliminated. No more oil going into the creek. Even though things aren't perfect, it's better than 20 years ago.
There are issues to look at though. After looking at the data, I believe an inadequate RI was done and that PCP exists on the North of Silver Bow Creek. Is contaminated at the WWTP. There wasn't complete removal on the other side of the creek. Penta is over there. They assumed that SB Creek was a hydraulic barrier. Did we look well enough at DNAPL? I think we need to look at contamination lower in the aquifer. Go deeper.
It looks like we need more investigation. Look a little deeper, do an investigation and monitor deeper.
See Tetra Tech report and MBMG additional drilling.

3. **What effects do you believe Montana Pole Site activities have had on the surrounding community?**

There's a Superfund Stigma. The title does stigmatize the community throughout Butte. Thinking now to future reuse and working through that stigma.

4. **Are there any community concerns that you are aware of regarding the Montana Pole Superfund Site? If yes, what are they and when were they? Do they still exist?**

Location of the LTU. Odors were previously a problem. Trees. The future.

5. **What other comments or suggestions do you have about the effectiveness of cleanup at Montana Pole?**

- Make changes to account for changes in the LAO.
- The pumping changes proposed are not likely to do enough to prevent PCP movement.
- Put sheet piling back. Look at other fixes and scenarios.
- Put interception wells between WWTP and MT Pole. The model shows that connection could be broken.
- If there's contamination north of the creek, it's not going to help the WWTP area; it would help the Montana Pole Site though.
- We (BSB) don't want to have to treat stuff that comes out of the Superfund Site. It doesn't make sense for us (BSB) to have to treat it again. It should be treated inside the SF Site.
- I feel that this should be taken care of by MT Pole funds, not a taxpayer responsibility.
- It's a bad situation. I would not want to treat PCPs using BSB money. Butte is in a bad economy, much worse than the rest of Montana. Butte is an economically depressed community.

6. How would you like to receive information or be involved in the Superfund process for Montana Pole?

I'm involved in CTEC. For CTEC, email.
For the community, door to door or mailing.

7. Do you have ideas for beneficial reuse of the MT Pole Site and what are your thoughts on redevelopment?

- Not a water park, when people in Butte have trouble putting food on the table. It wouldn't work here economically.
- Not fairgrounds; not sure that's the best idea.
- There are lots of ideas out there. Part of the Greenway trail would be good, there would be a way to work around the Railroad.
- A fire training facility is a good idea.
- Perhaps have an interpretive center. This would be the first NPL Deletion in Butte. Could be a big event.
- Stream access would be good, a park, multi-use.
- Whatever it is it's got to come from the community and residents.

8. Do you have other comments about Montana Pole for this Five-Year Review?

- If we can get the WWTP upgrade done we can do away with the dead zone in Silver Bow Creek. It would be great.
- It's tough to beat the Butte stigma. Things do change for the better though.
- Renewal of community spirit, resurgence is needed. It's coming, I have hope.

Interviewers: Lisa DeWitt and Mary Ann Dunwell

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Interview Questions
February/March 2011

Person interviewed:
Bill and Dee Fisher
Date interviewed: 3-28-11
Contact information:
(406) 723-3121

1. **What do you know about the environmental cleanup being done at the Montana Pole Federal Superfund Site?**

Only what we have been told at the public meetings. We have attended 4 meetings over the last years.

2. **What do you think about the environmental cleanup being done at the Montana Pole Superfund Site project? Please include any opportunities for improvement as well as what's being done well.**

   After attending the 5 Year Review meeting it appears it could and should be done better. The site should be cleaned to more than industrial standard, no matter what the zoning.

3. **What effects do you believe Montana Pole Site activities have had on the surrounding community?**

   - Too much dust
   - Too strong odor

4. **Are there any community concerns that you are aware of regarding the Montana Pole Superfund Site? If yes, what are they and when were they? Do they still exist?**

Is the dust and smell hazardous to us?

5. **What other comments or suggestions do you have about the effectiveness of cleanup at Montana Pole?**

The people involved in the clean-up are doing the best they can. But at times they appear ill-informed or we are not getting the whole story at these meetings.

6. **How would you like to receive information or be involved in the Superfund process for Montana Pole?**

By mail: 1912 So. Franklin, Butte, Montana, 59701

7. **Do you have ideas for beneficial reuse of the MT Pole Site and what are your thoughts on redevelopment?**

Not at this time.

8. **Do you have other comments about Montana Pole for this Five-Year Review?**

Why was Butte-Silver Bow given one million dollars? And what is the intended use of this money?

Interviewers: (Written comments submitted)

Montana Pole and Treatment Plant Federal Superfund Site
Five-Year Review Community Interview Questions
February/March 2011

Person interviewed:
Charles W. Greene & Susan E. Natiello (spouse)
Date interviewed: Attended the 3rd 5 Year Review Meeting (3/24) (no personal interview)

Contact information:
1919 S. Washington, Butte, MT 59701. (406) 498-0885
suechas@bresnan.net

1. **What do you know about the environmental cleanup being done at the Montana Pole Federal Superfund Site?**

I read the 2nd 5 Year Review report and I have lived at this address since 1990. I am somewhat knowledgeable of the project and I asked a lot of questions during the meeting that were not answered to my satisfaction or to the satisfaction of the other community residents in attendance!

2. **What do you think about the environmental cleanup being done at the Montana Pole Superfund Site project? Please include any opportunities for improvement as well as what's being done well.**

I do not think much of it at all! The LTU was placed 90 paces from my house in a residential area. My wife is on full disability and every time the LTU activities are conducted, she gets sick. There's no effective dust and odor control at the LTU. I think the PCP and dioxin removal is ineffective and that you are going to place treated soil that is still contaminated back in the excavated area! I have issues and concerns about the groundwater treatment also.

3. **What effects do you believe Montana Pole Site activities have had on the surrounding community?**

I think the effects on the community have been significant! Other people get sick when they smell the odors and one older couple stayed with relatives when the LTU was worked. Our property values are impacted negatively and when the project is "completed" the soil and groundwater will still be contaminated.

4. **Are there any community concerns that you are aware of regarding the Montana Pole Superfund Site? If yes, what are they and when were they? Do they still exist?**

There are many community concerns which were expressed at the meeting and not answered. The community is going to have our own meeting and itemize our concerns in a letter to Gov. Schweitzer, Sen. Baucus, Sen. Tester, and Rep. Rehberg. We will also send copies to Lisa DeWitt (DEQ) and Roger Hoogerheide (EPA).

5. **What other comments or suggestions do you have about the effectiveness of cleanup at Montana Pole?**

I think your reports should be written in a clear, concise and understandable manner. They should have independent peer/technical review prior to publishing. Specific results and findings should be reported. You should also send competent technical personnel to conduct your public meetings. People who can answer technical questions without simply saying everything is being taken care of and it will be ok. Our entire community is not convinced the cleanup will be effective.

6. **How would you like to receive information or be involved in the Superfund process for Montana Pole?**

I think every household in this community should be sent copies of your reports and findings.

7. **Do you have ideas for beneficial reuse of the MT Pole Site and what are your thoughts on redevelopment?**

No. Not until it is properly remediated. I think BSB would be ill advised to accept ownership of Pole Plant when you are "finished". It will still be contaminated.

8. **Do you have other comments about Montana Pole for this Five-Year Review?**

The next time you do a project like this, consider all the options! Involve the local community in the siting process before the decision is made to place an LTU in a residential area. Follow your own state and local procedures and guidelines for permitting LTUs.

It may be zoned as an industrial area, but it is residential and should be remediated to residential standards.

Other options such as a lined repository (RCRA cell) could have been sited on site or near the site or the contaminated soils could have been sent to a licensed TSDF. These should have been considered in the RI/FS and ROD and ARCO could have been made to pay for it. The $35M they paid is apparently not sufficient to do the job correctly.

Interviewers: (Written comments submitted)

Boulevard Community Residents
1919 S. Washington
Butte, Montana 59701

April 12, 2011

Ms. Lisa DeWitt
MPTP Project Officer
Montana DEQ
Remediation Division
1100 N. Last Chance Gulch
Helena, MT 59620

Mr. Roger Hoogerheide
Remedial Project Manager
U.S. EPA , Montana Office
10 West 15th Street
Helena, MT 59626

Dear Ms. DeWitt and Mr. Hoogerheide,

Many of the residents of the Boulevard Community in Butte attended your 3rd Five-Year Review meeting on the Montana Pole and Treating Plant (MPTP) remediation project. The meeting was held on Thursday, March 24, 2011 at 7pm in the Boulevard Volunteer Fire Hall. Those of us who attended expected to hear a formal presentation on the status and progress of the remedial project. We expected to have our questions answered and our concerns addressed. There was no formal presentation and the responses to our questions and comments were rambling and evasive. The lack of preparation and project knowledge displayed was disappointing at best. Most of us left the meeting with more questions and doubts about the effectiveness of the remediation than we had before the meeting.

On April 7, 2011 the Boulevard Community residents conducted our own MPTP project meeting in order to identify our concerns and issues related to the site. This letter is written as a formal response by our community to the meeting and the remedial project in general. Copies of this letter are being sent to our elected officials (local, state, and federal), Citizens Technical Environmental Committee (CTEC) and Dr. John Ray. We are also attaching a copy of a guest editorial that appeared in the Sunday, April 10, 2011 edition of the Montana Standard, entitled "Pole Plant Cleanup Frustrating"' by Dr. John Ray. Dr. Ray wrote this letter independently, but most of the Boulevard community residents agree with it.

Our issues and concerns follow:

1. Air Quality and the Land Treatment Unit (LTU)

The fact that EPA/DEQ can locate an LTU in a residential area is a strong example of a "double standard". When asked about this location, we were told that it is zoned light industrial. The fact is that this is a residential area. There is no doubt that a private individual or private company could not have located an LTU at this site. The LTU is located approximately 30 feet from a small city park and less than 250 feet from occupied residences along Josette Street.

The 2nd Five Year Review Report states that 481 trees were planted along the south and north sides of the LTU. When the trees were planted, they were evergreen saplings that were only 2 or 3 feet tall. Today those trees are maybe six to seven feet tall and do not provide any kind of effective wind break for dust control. In fact, most of the trees planted on the south side of the LTU have died and were cut down. When asked why the trees had died there was no specific reason given. The person asking the question wanted to know if the material in the LTU had killed the trees and if not what had killed them.

The 2nd Five Year Review Report also says that dust and odor control fencing was installed and that the trees and fencing have provided effective dust and odor control. This is simply not true. The fence is a standard chain link fence. Chain link fencing is not an effective means of controlling dust and odors no matter what the report says.

The fact is that when the wind blows we get dust and dirt in our yards and all over our houses. Another fact is that the only time we notice odors of any kind in our community is when contaminated soil is being placed in the LTU, when the LTU is being tilled and when the contaminated soil is being removed from the LTU. This work is typically conducted during summer and fall when our windows are open and community residents are outside working in their yards or recreating. Notice we say contaminated soil is being removed from the LTU, because after treatment the soil is still contaminated with dioxins and furans above cleanup standards.

There are people in our community who get sick every time the LTU is worked. The odors have been so strong that one older couple had to leave home and stay with their daughter in Bozeman until the odors decreased. They eventually moved to Bozeman permanently because they could not enjoy their retirement in our neighborhood.

Reported air monitoring results indicated frequent concentrations of contaminants above acceptable levels.

2. Contaminated Soil Treatment

The LTU is not effective in removing PCP and dioxans to meet Record of Decision (ROD) cleanup levels. DEQ/EPA officials at the 3rd Five Year Review meeting stated that the concentrations of contaminants

remaining in the "treated" soil do not even meet industrial standards required by the ROD. These "treated" soils are going to be removed from the LTU and placed back into the excavated area where they came from.

The current plan is to place one foot of clean fill in the excavated area, replace the "treated" soil on top of that and cover the whole thing with an additional one foot of clean soil. We will be left with a site that is still contaminated and will probably have to be capped with asphalt or some other impermeable material for future use. It certainly will not be suitable for residential use. The bottom line is that this treatment does not even meet the ROD requirements for industrial standards.

The officials at the meeting also said that there is additional contaminated soil that will placed in the LTU for treatment. It doesn't make much sense to continue an ineffective "treatment" and expose our community to more bad air quality when they know it doesn't work. Some of the community members were told previously that no more contaminated soil would be treated in the LTU given the problems and concerns that had been voiced by community residents.

3. Public Involvement

Our concerns and complaints have not been addressed in a meaningful and timely manner. The 3rd Five Year Review meeting was conducted simply to meet the requirement of having a review meeting. DEQ/EPA officials conducting the meeting were not prepared to answer specific questions and did not present any updated, relevant information.

Our community residents would like to have a summary report that is written in a clear, concise and understandable manner that addresses our concerns and issues. We would like to have that summary report mailed to every household in our community. We want to be able to understand our exposure risk to various contaminants from the LTU whether they are by contact or by injestion. We cannot determine our risk from the existing reports and many of our community don't know how to access the reports that are posted. We feel that false and incorrect claims have been made concerning air quality and the possible impact of the contaminants.

4. Water Quality

The present water treatment system removes the "oily" contaminants through an oil/water separator and removes PCP by collection in an activated charcoal filtering system. However, the recovery trenches which were installed for the water treatment system do not effectively stop the contaminated groundwater from migrating in a northerly direction across Silver Bow Creek.

This was realized recently when the Butte Silver Bow Sewage Treatment Plant personnel were conducting dewatering activities for plant improvements. The dewatering discharge was discovered to contain PCP contaminated water from the MPTP site. Because of an inadequate remedial investigation, it is unknown whether the contamination is a result of source material beneath the sewage treatment

plant or capture of the plume from across the creek. DEQ is now claiming that Butte Silver County is at fault for expanding the contaminated plume and is expecting the taxpayers to pick up the tab to treat the contaminated water from the funded Superfund site ($30 Million left in the cleanup fund?). However, there was a physical, sheet pile barrier that ran over 800 feet along the south side of Silver Bow Creek with extraction pumps installed at both ends. If the sheet piling and pumps had been left in place and contaminants piped into the MPTP water treatment plant, it may have prevented the PCP contaminated water from reaching the Sewage Treatment Plant during dewatering. For some reason this sheet piling and pumps were removed after the recovery trenches and treatment plant were built.

5. Property Values

Our community is concerned that the ineffective remediation of the MPTP site has and will continue to have a negative effect on our property values. We are not a wealthy community and our homes and property represent a large portion of personal assets for most of us.

6. Independent Review of DEQ/EPA Reports and Findings

DEQ/EPA and their hired consultants conduct the technical review of their own reports and findings. This process does not represent independent technical review. Reviews should be conducted by qualified technical firms that have no direct involvement in the remedial project. We ask that an independent firm conduct a review of the site to determine whether remediation conducted to date has been in accordance with the ROD and in accordance to the standards set by the EPA and MDEQ for this type and level of contamination.

7. Future Land Use

Any future land use will certainly not be residential. The present cleanup standards are industrial level and those are not even being achieved.

There has been some talk of a Fair Grounds and Rodeo facility being built on the MPTP site. The Boulevard community residents object to that possible future use and none of us would support it. This discussion is premature and no one has asked for any input from residents.

We are concerned that Butte Silver Bow has already been paid to accept ownership of the MPTP property when DEQ/EPA deems that it is cleaned up. We would not want Butte Silver Bow to accept ownership of the site until it is effectively remediated. As residents of the Boulevard community and Butte Silver Bow, we are very concerned that the ownership of this property will severely limit future use of the site and may impose additional expenses in the future.

In conclusion, we are concerned that the remedial action being conducted is ineffective and we are going to be left with a site that is still contaminated. We don't know if we have been exposed to

harmful contaminants that might affect our health in the future. We are concerned that our property values will decrease even more as a result of ineffective cleanup. We are concered about future land use. And, we are concerned about continued long term impacts on water quality.

We would like a written response from you and our elected officials, and we would like to see an effective cleanup of the site.

Respectfully submitted,

Charles W Greene for the

Boulevard Community Residents

Cc: Senator John Tester, Senator Max Baucus, Representative Denny Rehberg, Governor Schweitzer, BSB Mayor Paul Babb, State Rep. Jon Sesso, Councilman Dan Foley, CTEC, Dr. John Ray

BOULEVARD RESIDENTS

NAME	ADDRESS	PHONE NUMBER
Josh Melissa Allmendinger	1916 S Jackson	406-490-6759
Ted & Ed Fisher	1918 S. Jackson	406-782-2917
Matt O'Connor	1925 S. Jackson	406 491 2065
Mark + Sharlie O'Connor	1909 S Washington	406 787 8810
Bob + Jane Bell	1917 S Washington	406-782-9464
Jerry + Sharyn Patterson	1905 S. Washington	406-782-4964
Cary & Dee Dietz	1905 S. JACKSON	782-5844
Nikki Neary	1907 S. Jackson	565-5828
Bill + Dee Fisher	1912 So Franklin	723-3121
Charles W Greene	1919 S. WASHINGTON	723-9522
Susan E Matyelle	1919 S Washington	406-7239522
Dan Walsh	923 S WASHINGTON	406 490-1535

OPINION | SUNDAY, APRIL 10, 2011

Pole plant cleanup frustrating

Guest opinion

BY JOHN RAY

Butte's most acute environmental health threat exits at the Montana Pole Plant Superfund site (Greenwood Avenue).

Dangerous dioxins, PCPs and furans contaminate the site's soil and groundwater. Dioxins and furans are two of the most toxic substances.

The EPA warns: "Exposure to dioxin, even at minute levels, poses cancer risks and health concerns wider than previously suspected, including possible damage to the immune and reproductive systems."

The EPA states the PCPs cause cancer and damage the immune, reproductive, nervous and endocrine systems.

The Montana Department of Environmental Quality (MDEQ) and EPA are currently conducting a "Five-Year Review" of the Pole Plant site to determine if the current cleanup is protecting human health.

Citizens living around the Pole Plant deserve a much better cleanup from the EPA and MDEQ. At a recent public meeting, attended by about 30 residents of the area, citizen frustration boiled over and residents expressed legitimate complaints about the cleanup and the current cleanup review.

1. The Pole Plant review process is potentially biased. The EPA and MDEQ Pole Plant project managers are evaluating their own work. Can citizens reasonably expect a fair and impartial review when the EPA and MDEQ are judging themselves?

2. Current treatment methods, by the agency's own admission, have not been effective in lessening dioxin in the soils nor in groundwater. EPA and MDEQ have ignored this failure to meet their own treatment goals and intend to continue using the same old failed treatment method.

The continuing presence of significant levels of dioxin, PCBs and furans is an immediate threat to resident's health and a continuing threat to groundwater and surface water. EPA and MDEQ have ignored using more effective treatment approaches such as fungi that could be more efficacious in really cleaning up the site.

3. Given EPA's and MDEQ's treatment failures, the dioxins and other contaminants will all be just left in place, covered with only 12 inches of topsoil caps. Previous capping on the Butte hill, which uses more soil than the level at Montana Pole, has not worked well.

We have a situation where the most toxic substances in Butte (dioxins, PCPs and furans) are to be covered with the least amount of soil. Caps, as we have seen in Butte already, are susceptible to failure by means of: bio-irrigation, advection, desiccation, erosion, weathering, bio-intrusion and stabilization problems. Caps also have significant construction, repair and maintenance problems.

4. PCP/dioxin contamination north of Silver Bow Creek has been ignored, as has the expansion of the groundwater contaminant plume.

Although EPA has promulgated more stringent and restrictive dioxin standards for groundwater, these new standards have not been applied to the Pole Plant.

5. The current treatment protocol at the Pole Plant releases toxic and noxious odors. There is abundant scientific evidence that exposure to noxious odors can, in and of themselves, cause serious health harms to sensitive individuals. Numerous cases exist of residents near the Pole Plant made ill by the noxious fumes emanating from the Plant treatment.

6. Significant amounts of toxic materials exist under the Interstate Bridge near the Pole Plant that could be removed with current technology without compromising the roadway.

EPA and MDEQ have failed to take effective action to deal with this contamination. Leaving this toxic waste in place under the Interstate is leaving a future threat to human health and the environment in place as these wastes can easily migrate into ground and surface water.

7. EPA's and MDEQ's treatment of area residents is one of the Pole Plant cleanup's most egregious failures. Local resident's legitimate concerns have been ignored. I have seen how agency personnel treat residents in a condescending manner and obfuscate, delay and dissembled. Residents have serious concerns about a significant toxic threat, literally in their back yards. Odors have already affected their health.

The current waste-in-place cleanup approach means they will never be rid of this toxic threat. Residents deserve better. EPA is supposed to listen to citizens and provide for meaningful and efficacious public involvement. Yet, citizen concerns disappear into the agency's black hole. Local residents have been dismissed, given inaccurate information and generally treated in an indifferent and diffident manner by the EPA and MDEQ. The current Pole Plant cleanup is not working and citizens have a right to hold the EPA and MDEQ accountable for this failure.

The existing record of decision for the Montana Pole Plant needs to be reopened and revised to provide residents with a real cleanup of the deadly toxins at the site.

John W. Ray
915 W. Galena St.
Butte

P.O. Box 593
Butte, MT 59703
(406) 723-6247
buttectec@hotmail.com

CITIZENS TECHNICAL ENVIRONMENTAL COMMITTEE

www.buttectec.org

April 14, 2011

Lisa DeWitt
Project Officer
Remediation Division
Montana DEQ
P.O. Box 200901
1100 N. Last Chance Gulch
Helena, MT 59620

Dear Ms. DeWitt,

CTEC recognizes the progress made at Montana Pole and Treatment Plant (MPTP) Federal Superfund Site in treating contaminated soils and groundwater, and in reducing air quality impacts from the Land Treatment Unit to the surrounding community. CTEC understands the challenges of performing the required soil and water treatment both within a community neighborhood and within urban infrastructure. CTEC respectfully submits the following comments in an effort to constructively improve the remedy and to address community concerns.

The 2006 Five Year Review did not address CTEC's concerns regarding dioxin remaining in treated soils or air quality impacts. CTEC hopes that these issues are better addressed in the current review.

CTEC concerns are summarized here and described in more detail in an attachment.

Summary of concerns, MPTP 3rd Five Year Review

1- Dioxin in Treated Soils

Soil treatment at the site is not effective for reducing dioxin to meet the ROD cleanup level or EPA Regional Screening Levels for Chemical Contaminants at Superfund Sites. CTEC is concerned that the current program of backfilling dioxin containing soils with a 1 ft cap of clean soil will not be protective of human health given potential future land uses, and may still provide a pathway for groundwater impacts. The failure of treatment to meet ROD cleanup levels warrants detailed evaluation in the Five Year Review.

2 - PCP Detections North of Silver Bow Creek

Construction dewatering discharge at the Butte Metro Wastewater Treatment Plant (WWTP) north of Silver Bow Creek contains PCP. The Five Year Review should evaluate whether PCP source material exists outside of the confines of the MPTP Superfund site and develop effective strategies to maintain control of the PCP plume through physical and/or hydraulic means as called for in the ROD. Control of the plume must account for continued de-watering activities at the WWTP, Metals Treatment Lagoons and the BRW ponds.

3- Points of Compliance

ROD defined Point of Compliance criteria (locations for soil and water compliance, well depth, well screen interval, sampling methods, etc.) need to be reconciled with the current conditions where dioxin is above ROD cleanup levels in backfilled soils, and PCP concentrations above standards have been detected north of Silver Bow Creek. Final Points of Compliance criteria need to be established which are compliant with the exposure scenarios used in risk assessment and remedy selection for the ROD.

4- Dioxin in Groundwater

Water quality standards for dioxin have been lowered since the ROD. The 2006 Five Year Review noted the need to evaluate lower dioxin standards, but a description of this evaluation has not been provided to the public. The Five Year Review needs to evaluate if cleanup levels for dioxin in groundwater are adequate given the new lower standards.

5- Air Quality Monitoring

Air quality impacts from the MPTP have been a long-standing public concern. During CTEC's community interview during active operations at the soil treatment unit in 2005, citizens indicated that several households experienced health impacts due to air quality and one family left town and stayed with relatives during active operations to prevent health concerns or sickness. MPTP air monitoring data from 2003-2005 indicates concentrations of organic contaminants in air exceed site specific target levels regularly and during active operations. Air quality data need to be presented to the public demonstrating the level of background contaminant concentrations and concentrations downwind during active operations. These levels should be compared to typical ambient air in US cities, and compared to levels deemed safe by EPA.

6- Unbiased Review

CTEC is concerned that the Five Year Review process for MPTP involves DEQ, EPA and their contractors evaluating their own work and that no objective party review has occurred. The Five Year Review should follow EPA's own guidance that review be performed by objective parties without bias or preconceived views or conclusions about the remedy and conditions at the site.

7- Provide meaningful public involvement
Citizens have not received needed answers to their questions and health concerns. DEQ and EPA need to provide meaningful public outreach, not just conduct the minimum required public meetings.

8- Additional contaminant source treatment or removal
Contaminant source areas remain on-site both under Interstate 90 and below the water table. Additional treatment of residual contaminated soil is needed to ensure remedial goals are met and groundwater capture and treatment is not needed in perpetuity.

CTEC members hope to work with EPA and DEQ to address the issues in the Five Year Review. There is great concern by the citizens of Butte that their past concerns have not been addressed. CTEC requests that DEQ provides a formal written response letter specifically addressing each of the aforementioned concerns and submitted directly to CTEC.

Respectfully,
orginal signed by
Suzzann Nordwick
President, CTEC Board of Directors

Attachments:

1. Detailed CTEC Comments to this letter, dated April 15, 2011 (pages 4-8)
2. CTEC Comments on Air Quality Monitoring, dated June 16, 2006 (pages 9-25)

Cc:

Larry Scusa, DEQ
Joe Griffin, DEQ
Mary Ann Dunwell, DEQ

Julie DalSaglio, EPA
Joe Vranka, EPA
Sara Sparks, EPA
Wendy Thomi, EPA
Nikia Greene, EPA

Paul Babb, BSB CEO
Dave Palmer, BSB Commissioner
Dan Foley, BSB Commissioner
Jon Sesso, BSB
Tom Malloy, BSB
Rick Larson, BSB

Pat Cunneen, NRD
Carol Fox, NRD

U.S. Senator Jon Tester
– Butte office
U.S. Senator Max Baucus
– Butte office
U.S. Rep. Denny Rehberg
– Missoula office

Helen Joyce, CTEC VP
Dave Williams, CTEC Secretary
Elizabeth Erickson, CTEC Treasurer
John Ray, CTEC

Attachment – Detailed Comments

1- Dioxin in Treated Soils

Treatment has not been effective at reducing dioxin levels in soil to meet ROD requirements. Data provided in the Second Five-Year Review indicates that soil with a dioxin level over 4 times the ROD cleanup level and 48 times higher than EPA industrial Regional Screening Levels (RSLs) is being backfilled at the site. Cleanup levels derived in the ROD assumed future recreational land use. The Five Year Review should evaluate if dioxin in soil will be compliant with recreational use and if not, disclose what types of reuse or institutional controls will be necessary.

The 2006 Five Year Review stated disposing of dioxin soils on top of clean fill extending at least one foot above the historical high groundwater mark and covered with at least one foot of clean fill is contemplated in the ROD. CTEC's review of the ROD does not find any contingency measures for backfilling soils which do not meet cleanup levels, including dioxin. A one foot cap of clean fill is insufficient for dioxin containing soils. Worms will actively bring dioxin contaminated soil to the surface if caps are not greater than the frost depth in Butte, which historically has been up to 5-6 ft. Backfilling soil with dioxin is a significant difference from the remedy proposed in the ROD, which alone warrants adequate evaluation and public comment and an Explanation of Significant Differences (ESD) given the significant nature of this remedy change. CTEC contends that the ROD should be amended to address treatment of dioxin containing soils because dioxin treatment is technically practical. Treatment of dioxin soils will prevent the need for additional institutional controls (ICs) which are inherently limited in protection due to cap failures, the need for perpetual maintenance, and limitations which ICs will place of future land reuse.

CDM's (2001) study of leachability of dioxins and furans predicted groundwater concentrations under extreme worst-case conditions of 37 pg/L; 18.5 times higher than the current groundwater quality standard. CTEC is concerned that the backfilling of dioxin containing soil could present a long-term source of dioxin to alluvial groundwater, for which no permanent dioxin treatment is proposed.

The ROD states waste should not be stored or disposed within the 100-yr floodplain. FEMA maps indicate the 100-yr floodplain includes a large portion of the site. The Five Year Review should provide maps of the 100-year floodplain and maps of locations where soils with dioxin levels exceeding cleanup levels have been backfilled. Soils containing dioxin should not be backfilled within the floodplain under the current ROD or any changes invoked with an ESD.

Alternatives to backfilling and institutional control need to be considered for soils which do not meet dioxin cleanup levels. CTEC recommends dioxin treatments such as using white rot fungi be used to optimize the remedy for treatment of waste and future land re-use.

2 - PCP Detections North of Silver Bow Creek

CTEC is aware that DEQ and BSB are developing actions to deal with PCP concentrations in de-watering effluent at the Butte Metro WWTP. As BSB is under an Administrative Order on Consent (AOC) from DEQ to complete upgrades to the WWTP, due to significant nutrient impacts to Silver Bow Creek, PCP mitigations should be both expeditious and significant. The WWTP rate-payers of Butte should not be held paying the bill for dewatering impacts because

the contaminant plume associated with MPTP has expanded or was not adequately characterized during the remedial investigation. These actions should account for the continued de-watering necessary at the WWTP, BRW Ponds, Metals Treatment Lagoons and other infrastructure maintenance, operation and upgrades in the area.

Maps of contaminant concentrations sampled in groundwater should be provided in the Five Year Review. Groundwater contaminants associated with MPTP (PCP, dioxin, and other groundwater contaminants of concern identified in the ROD) need to be investigated north of the current Silver Bow Creek channel. The fate of these contaminants needs to be determined given current withdrawals and hydraulic controls on the alluvial groundwater system. The former sheet piling wall separating MPTP contaminated groundwater from other groundwater should be re-installed if the wall will prevent off-site migration of contaminated groundwater.

3 - Points of Compliance

Points of compliance need to be determined for contaminated groundwater given the PCP detections north of Silver Bow Creek. The ROD identifies the south bank of Silver Bow Creek as a point of compliance for groundwater. Given that Lower Area One adjacent to MPTP has been engineered for capturing metals contaminated groundwater from the Butte Priority Soils Operable Unit, Silver Bow Creek does not currently function as a groundwater divide and the designation of Silver Bow Creek as a final point of compliance for groundwater is not technically supported. The Five Year Review needs to recommend that final points on compliance be identified after the current extent of the plume of groundwater associated with MPTP contaminants is investigated.

ROD identified points of compliance also assume that soils will be remediated to levels safe for recreational exposure. However, soil treatment has not reduced dioxin to levels safe for recreational exposure. Final Points of Compliance criteria for soils and groundwater need to be established which are compliant with the exposure scenarios used in risk assessment and remedy selection for the ROD.

4- Dioxin in Groundwater

The 2006 Five Year Review states (pp19) average August 2005 influent TCDD concentration in groundwater is 19.46 pg/L and plant effluent averaged 0.518 pg/L. The 2006 Five Year Review also indicates dioxin concentrations up to 43.45 pg/L at the leading periphery of the contaminant plume. These concentrations exceed both current groundwater standards and surface water standards (for effluent).

The 2006 Five Year Review indicated that DEQ and EPA would evaluate modification of the cleanup standards for dioxins in groundwater and in discharge to surface water to the current standards, 2 pg/L and 0.05 pg/L respectively. To date, the public has only been provided with the statement that the new water quality standards were considered during summer 2007 but that the existing remedy was deemed appropriate (DEQ December 2009 update), which does not explain how the need to meet current water quality standards was evaluated or the rationale for not adopting the current standards. The Five Year Review needs to describe in detail the evaluation of these updated water quality ARARs.

The dioxin concentration of 43.45 pg/L sampled at the leading periphery of the contaminant

plume is 22 times the current groundwater standards and 869 times current surface water standards. An evaluation of groundwater impacts to surface water, springs and wetlands, once the groundwater capture and remediation system is no longer operated. A comparison of dioxin levels in groundwater at MPTP with background levels of dioxin in groundwater at other urban areas would be helpful for the public to understand the magnitude of dioxin levels. Evaluation of long-term fate of dioxin in groundwater needs to be incorporated into the evaluation of dioxin cleanup levels to meet current water quality standards.

CTEC's review of the Butte Alluvial and Bedrock Controlled Ground Water Area (BABCGWA) Petition and Final Order indicates that the controlled groundwater area designation was focused on the widespread metals contamination from mining and not dioxin. The plume of groundwater contaminated with dioxin may have expanded. The BABCGWA does not consider dioxin in water quality testing of wells completed in contaminated aquifers. It needs to be determined whether the BABCGWA will adequately protect the public and environment from drinking PCP or Dioxin contaminated water.

5- Air Quality Monitoring

CTEC has been provided with and reviewed a limited air monitoring data set for MPTP (partial dataset 2003-2005). CTEC's review of the air data (attached June 16, 2006 CTEC comments) indicates concentrations of organic contaminants in air exceed site specific target levels regularly. Additionally, there is a clear signal of increased concentration of contaminants of concern during active operations. Adequate evaluation of these air quality impacts has not been provided to the public. The 2006 Five Year Review indicated that benzene was detected only at low levels and concentrations of organic contaminants are below EPA Preliminary Remediation Goals, which is clearly not supported in CTEC's review of the air data.

DEQ proposes that the impacts to air quality are from sources off-site. CTEC understands that much of the air quality impacts may be related to background sources. An evaluation of background air quality and site air quality is needed to address public concerns. The Five Year Review should assess background concentrations of air contaminants of concern and separate those contributions from operations at MPTP. The Five Year Review should also reconcile how safe public exposure to air contaminants of concern as concentrations appear to exceed risk-based target levels developed in the CDM (2002) air quality analysis.

Health issues caused by odors related to active operations of the land treatment unit (LTU) need to be addressed as a health issue in and of itself, not just with respect to the individual toxins which are sampled for. Citizens in the Boulevard neighborhood report health issues when LTU odors are present, such as an individual with multiple sclerosis who cannot leave their house due to affects of odor exposure. The Five Year Review must evaluate the current scientific and medical knowledge of health impacts due to exposure to odors like those found at the site. CTEC respects that measures taken to date have reduced public exposure to LTU odors. However, the problem persists during active operations. Additional measures need to be outlined to lower odor levels to acceptable levels for the public, such as reducing the area of soil disturbed at one time, or a containment structure for the LTU.

6- Unbiased Review

Many citizens of Butte perceive that the review is a biased process and that our concerns are

disregarded. EPA's Comprehensive Five-Year Review Guidance (EPA 540-R-01-007—OSWER No. 9355.7-03B-P, June 2001) states: "The review should be performed by objective parties without bias or preconceived views or conclusions about the remedy and conditions at the site." CTEC is greatly concerned that the Five Year Review is performed by DEQ and EPA officials and their contractors who are not objective parties. Specifically the choice of GeoTrans Inc. to lead the review, whose subsidiary TetraTech is contracted to DEQ for site operations, investigation, and reporting, does not indicate to the public that the need for objectivity was considered.

CTEC contends that the draft review needs to be audited by an objective party prior to being finalized and that future reviews are performed entirely by an objective party. An objective review party could be developed based on the "Tiger team" model, or by agency representatives from a different region who are not invested in remedy success.

7- Provide meaningful public involvement

Butte residents have serious concerns regarding MPTP which have not been adequately answered. Examples of these questions voiced at the recent public meeting include causes of tree die-off at the site, health risks associated with air toxins and odors from the site, and whether the site will be safe for re-use when cleanup has finished. CTEC recommends the following changes to public outreach:

- Non-technical public outreach information should be developed which the typical resident can understand.
- Information developed by the agencies, including the Five Year Review, should be mailed to Boulevard neighborhood residents.
- The public's questions need to be documented and answered systematically in a format available to the public, such as a publication mailed to Boulevard neighborhood residents, or email list if residents choose this option.

8- Additional contaminant source treatment or removal

CTEC is concerned that contaminant source areas were left in-place according to remedy design and since remedy design decisions have been made by the agencies without public input to leave additional contaminants in-place without treatment. The ROD calls for soil flushing of contaminants under I-90 to reduce contamination to the extent practical. Soil flushing has not been performed nor scheduled and the public has not been provided with an explanation of why the ROD is not being followed. The mounting volume of waste left in-place will lengthen the time groundwater treatment will be necessary. Treatment methods are available for the organic contaminants at the MPTP and should be used to the maximum extent practical. The Five Year Review should investigate whether groundwater will meet remedial goals within a reasonable amount of time - 30 years, given current plans for waste left in-place. If wastes will cause perpetual groundwater treatment needs CTEC supports amending the ROD to provide additional source removal.

References

CDM. 2001. Montana Pole and Treating Plant Site Vadose Zone Dioxin/Furan Mobility Evaluation. Technical Memorandum, September 27, 2001.

CDM. 2002. Montana Pole and Treating Plant Site Final Investigation Report of Land

Treatment Unit Odor and Dust Concerns. Prepared for Montana Department of Environmental Quality.

DEQ. 2006. Second Five-Year Review Report for Montana Pole and Treating Plant Site Butte Silver Bow County, Montana. State of Montana Department of Environmental Quality Remediation Division. Helena, Montana. June 2006.

P.O. Box 593
Butte, MT 59703
(406) 723-6247
ctec@montana.com

CITIZENS TECHNICAL ENVIRONMENTAL COMMITTEE

Comments on Air Quality Monitoring

MONTANA POLE AND TREATING PLANT (MPTP) SUPERFUND SITE

Prepared by

Citizens Technical Environmental Committee (CTEC) Of Butte, Montana

June 16, 2006

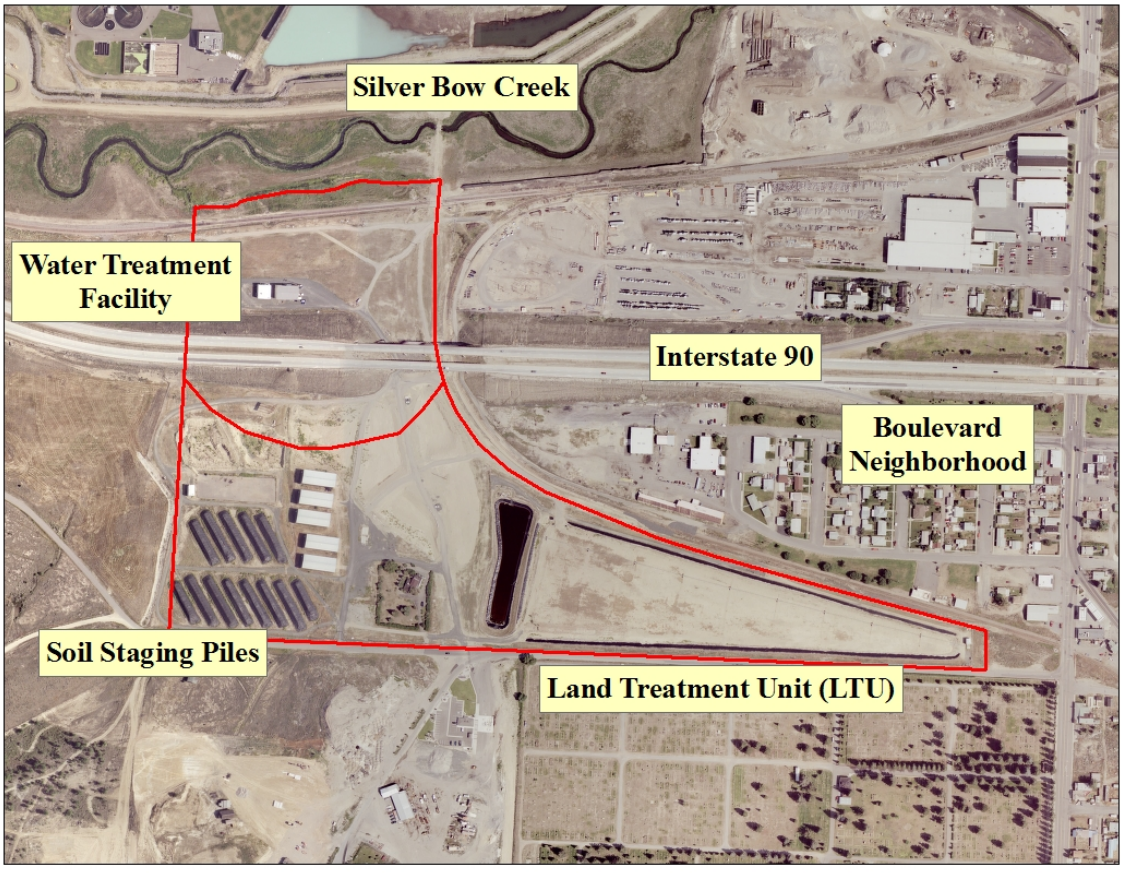


Photo: The MPTP site from the air in 2002. Site boundary shown in red.

1.0 Introduction

This paper provides information and CTEC comments on the Montana Pole and Treating Plant (MPTP) Superfund Site air quality monitoring. Members of the public have been concerned for a number of years with air quality and odor problems caused by emissions from soil treatment at the MPTP site. Bioremediation of PCP and petroleum product contaminated soils at the MPTP site involves a process referred to as land farming wherein contaminated soils are spread on a land treatment unit (LTU), irrigated, fertilized, and tilled until natural soil microbes degrade the contaminants. A common negative side effect of land farming for remediating soils contaminated with petroleum hydrocarbons is that the contaminants volatilize into air and cause air quality problems. The LTU at the MPTP site is situated adjacent to the Butte Boulevard neighborhood and when large amounts of hydrocarbons are volatilizing, airborne contaminants and associated petroleum smells may become either annoying or at high enough levels, health compromising to people living near the site.

In 2001, DEQ responded to public concern over air quality problems at the MPTP site by hiring a contractor, Camp Dresser McKee (CDM), to undertake an analysis of air quality at the MPTP site. In 2002 a report was published by CDM detailing the combined results of air quality monitoring, air contaminant dispersion modeling, and human health risk assessment. Among other things provided by the CDM report were risk based target levels, which are levels for air contaminants at which and lower than which contaminants do not present a public health risk. Air quality monitoring data is referenced in the CDM (2002) report dating back to at least 1990, and air quality data has been collected on a regular schedule since the development of risk based target levels in that report. Much of the air quality data has not been made public however. More importantly, other than the discussion in the CDM (2002) report which quickly concludes that air quality is not a health concern in the vicinity of the MPTP site, no analyses of the air quality data have been shared with the public. This CTEC publication presents preliminary findings that CTEC has made on review of the 2003 – 2005 air quality monitoring data provided to us. This report is intended to share an analysis of the air quality data that has been missing from the public's eye. Section 2 of this report provides a brief background on the MPTP site; more in depth history of the site can be found at both www.buttectec.org and at www.epa.gov/region8/sf/sites/mt/montpole.html. Section 3 presents monitoring data from the MPTP site for the period 2003 - 2005 and includes a breakdown of each chemical constituent that has been identified as a target compound, along with discussion of that target compound's

compliance with risk based target levels and identifiable trends and probable sources for each target compound. Section 4 provides CTEC comments both on the air quality data, the human health risk assessment, and additional data and reporting needs for air quality monitoring at the MPTP site.

2.0 Background

The MPTP site is an abandoned 40-acre wood treatment facility in Butte, Montana. From 1946 to 1983, the facility preserved utility poles, posts and bridge timbers with pentachlorophenol (PCP) in a petroleum carrier oil similar to diesel. Hazardous substances from the pole-treating operations were discharged into a ditch next to the plant that ran towards Silver Bow Creek. The ground water and soils at the Montana Pole site are contaminated with PCPs, dioxins, furans (flammable liquids from wood oils), volatile organic compounds (VOCs) and metals. EPA initiated cleanup activities in 1988; under a 1996 Consent Decree agreement and settlement with the responsible party Montana DEQ is implementing the cleanup remedy.

Contaminated soil being treated with bioremediation in an on-site land treatment unit has caused odor and dust concerns in the adjacent Boulevard neighborhood. The complex mix of organic compounds in the treated soils causes vapors to be released when the soil is mixed. Mixing the soil is necessary while loading/off-loading soils and during routine tilling of the soil to allow aeration for the biological degradation of contaminants. Neighbors and people who work in the Boulevard neighborhood have complained of headaches and other flu-like symptoms caused by odors from the treatment site.

In response to these concerns, DEQ contracted CDM to prepare a study of the air quality issues associated with site operation (CDM, 2002). The CDM report discusses the risk assessment of the compounds associated with odor and dust emissions from the MPTP site and details options for controlling emissions. The CDM report finds that the substances that are emitted into the air are generally at safe levels of exposure. The CDM report states that although short term spikes in some constituents occur, long term exposure is at a safe level. Additionally, in the report it is determined that compounds that are odorous are not at toxic levels.

The CDM report exemplifies one problematic result of the complexity of the volatile organic compounds found in the soil and air at the MPTP site, that individual compounds may not be at particularly high levels but the different compounds can lead to additive effects that are detrimental to public health. While the individual compounds that are identified in the CDM

report are assessed to be non-toxic, the effects are nonetheless onerous to people who live and work nearby. To address the odor concerns DEQ is in the process of adjusting soil tilling and loading/off-loading schedules as described in the report Montana Pole and Treating Plant Site Remedial Action Phase 4 Dust Control Measures 2003 produced by CDM (2003). Adjustments to the land treatment unit (LTU) operation have lead to slower turnover times for soil treatment, but have reduced emission of odors from the site.

In addition to these concerns, air quality monitoring data made available to CTEC by DEQ negates some of the claims made in the CDM (2002) report about the safety of contaminant of concern (COC) levels in ambient air near the MPTP site. Specifically the data shows that during 2003 – 2005, levels of acetaldehyde always exceeded the site specific target levels, which are based upon EPA Region IX Preliminary Remediation Goals (PRGs) and used to determine human health risks associated with breathing air near the MPTP site. Additionally, benzene exceeded the target level in 86% of the samples taken during 2003 – 2005. It is also clear from the air quality data that other sources of these contaminants are present outside of the MPTP site. Given the data that has been made available, CTEC is not able to determine with accuracy the relative impact that the MPTP site has on local air quality compared to other offsite sources. However, analysis of the data allows some inferences regarding probable sources of air contaminants. In the following section, the air quality data made available to CTEC is reviewed for each target compound to elucidate both what the data allows us to determine about the safety of breathing air near the MPTP site and to evaluate the adequacy of the DEQ air monitoring schedule.

3.0 Air Quality

3.1 Air Quality Monitoring

Due to the potentially hazardous nature of vapor and dust emissions from the MPTP site, DEQ developed an air quality monitoring program. The CDM (2002) report describes how target compounds and target levels were determined for air quality monitoring. Currently, DEQ actively monitors air quality at the LTU on a regular basis and also as needed during active operations as described in the following table.

MPTP Site Air Quality Monitoring Schedule. Table provided by Montana DEQ.

FREQUENCY	SAMPLE LOCATION	DATA LOGGED	EPA METHOD	METHOD DETECTION LIMIT
Monthly	Air 4, Air 4A, Air 5, Air 10	VOCs (suma-canisters)	EPA-19 TO-14A, EPA-2 TO-15 SIM	
	Air 10	PCP (sorbent tube)	OSHA 39M	0.007 mg/m3
		PAH (sorbent tube)	NIOSHA 5515	0.3 to 0.5 ug per sample.
	Air 4, Air 4A, Air 11	PM-10	40 CFR 50, Appendix J	150 ug/m3
	Meteorological Station	Weather Conditions	--	--
As-Needed Basis	Any location necessary	VOC library search (mini-canisters)	TO-15 with TICS	
	Air 4, Air 4A, Air10	Dioxin/Furans	EPA-2 TO-9	MDLs not representative of reporting convention.
		B(a)P	SW846/8270C SIM	
		PCP (PUF)	TO-13/8270C	
	Stations around excavation and construction, LTU tilling, loading and offloading	Any of the following: VOCs, PCP, PAH, Dust, etc.		

Note: Frequency of sampling may change during winter months; PM-10 sampling will be suspended from November to April.
Air4 is located along the north LTU fenceline near the Fire Department Training building. Air4A is located along the LTU fenceline adjacent to the Central Pivot Irrigation Unit control building. Air5 is located along the south LTU fenceline adjacent to Greenwood Avenue. Air10 is located along the north LTU fenceline at the end of Josette Avenue. Air 11 is located adjacent to the Montana Pole weather station.

3.2 Air Quality Monitoring 2003 – 2005 by Constituent

The constituents listed as target compounds in the human health risk assessment presented in the CDM (2002) report are identified individually below. The reason for each constituents listing as a target compound is provided and the basis for the target level concentration is listed as either, EPA Region IX PRG, or reference concentration (RfC) from the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG) Series Volume 4 study. Both EPA PRGs and TPHCWG RfCs are standard peer reviewed scientifically based sources for determining safe levels of human exposure to contaminants. The monitoring data for each constituent is then explained and if possible inferences are made concerning probable sources of airborne contaminants or safety issues due to contaminant levels.

Acetaldehyde:

- Listed as target compound because acetaldehyde was detected at relatively high concentrations in samples from the MPTP site.

- Target level based upon EPA ambient air cancer preliminary remediation goal (PRG).
- Acetaldehyde was sampled regularly at 4 sites (see figure 1).
- Exceeds target level in 100% of samples.
- The mean concentration of acetaldehyde at the MPTP site is 25.7 ug/m^3 or 14.3 ppb which is approximately 3 times the mean concentration in the general outdoor environment reported by Shah and Singh (1988) in their national database for volatile organic compounds (VOCs).
- Concentrations of acetaldehyde are typically higher in summer than winter and are notably high during active operations. Concentrations of acetaldehyde during active operations are similar in magnitude to peak concentrations sampled during non-active operations.
- Acetaldehyde emissions are modeled in the human health risk analysis, section 3 of CDM (2002). Modeled annual average concentrations in CDM (2002) at the LTU fence line and at the nearest residence is 0.002 ug/m^3. Air quality monitoring data shows that the average concentration measured at Air10 at the end of Josette Ave is 25 ug/m^3 which is 12,500 times the modeled concentration, indicating that the model did not accurately represent cumulative exposure to acetaldehyde from sources both offsite and onsite at MPTP. This suggests that the risk analysis determined from using the TSCREEN model in CDM (2002) did not sufficiently address the total human exposure to acetaldehyde.
- If the modeling performed in the CDM (2002) report is conservative and accurate for onsite sources of Acetaldehyde, then the sampled concentrations indicate that offsite sources of acetaldehyde are potentially 1000 times greater than onsite sources. However, the correlation between active operations at the MPTP site and elevated levels of acetaldehyde indicate that onsite sources are likely more significant than represented in the model.
- Acetaldehyde sources offsite may include any type of burning/combustion including woodstoves and vehicle exhaust, and evaporation of gas from service stations.

Aromatic TPH (C >8 - 16)

- Listed as target compound because aromatic TPH (C >8 – 16) was detected at relatively high concentrations in samples from the MPTP site.
- Target level based upon the TPHCWG RfC.

- Aromatic TPH (C >8 – 16) data was **not** made available to CTEC for review.
- Aromatic TPH (C >8 – 16) data reviewed in the CDM (2002) report indicated that at that time concentrations were on average 2.9 times higher than the target level suggesting that levels of aromatic TPH (C >8 – 16) may regularly exceed target levels.
- Naphthalene data for site Air10 at the end of Josette Ave is described under that constituents section below. Naphthalene is a representative compound of aromatic TPH (C >8 – 16) and may contribute much to the toxicity of aromatic TPH (C >8 – 16). However, the relationship of naphthalene to total aromatic TPH (C >8 – 16) at the MPTP site is unclear and CTEC cannot infer the levels of aromatic TPH (C >8 – 16) based upon naphthalene data alone.

Benzene:

- Listed as target compound because benzene is identified in the Final Remedial Action Plan.
- Target level based upon EPA ambient air cancer PRG.
- Benzene was sampled regularly at 4 sites (see figure 2).
- Exceeds target level in 86% of samples.
- Concentrations are typically highest in winter and in summer during active operations. Concentrations during active operations are similar in magnitude to winter levels.
- Sampling at Air10 at the end of Josette Ave shows higher concentrations during active operations than other sites suggesting contribution of benzene to local air from the MPTP site. Concentrations of benzene at Air10 have been 4 – 10 times higher than other surrounding sites during active operations.
- Benzene reacts in air and generally breaks down within a few days indicating a continued source of benzene in the vicinity of the MPTP site during winter. Offsite benzene sources possibly include burning oil, car exhaust, and evaporation of gas at service stations.
- Concentrations of benzene in air near the MPTP site are similar to the concentrations measured in outdoor air in urban areas as reported by the Agency for Toxic Substances and Disease Registry (ATSDR). The highest concentrations of benzene measured near the MPTP site are relatively low compared to maximum concentrations reported by ATSDR and measured in urban areas with high benzene levels in the United States.

Benzo(a)pyrene (B(a)P):

- Listed as target compound because B(a)P is a surrogate for carcinogenic polycyclic aromatic hydrocarbons (PAHs) a COC listed in the ROD.
- Target level based upon EPA cancer PRG.
- The majority of B(a)P sampling was performed at Air10 at the end of Josette Ave using sorbent tubes. All of these samples were non-detects. However, the detect limit using this method appears to be <2.9 ug/m^3 from the air quality data and the target level is .0037 ug/m^3. Because the target level is extremely small compared to the detection limit of this method, the majority of data do not allow us to determine the presence of unsafe levels of B(a)P.
- B(a)P sampling using polyurethane foam filters (PUF) with lower detection limits was performed on two occasions. B(a)P was sampled on 1/14/03 at 3 of the monitoring sites during non-active operations and concentrations ranged from as low as ½ to slightly over the target level on this date. B(a)P was sampled at Air10 at the end of Josette Ave and at Air4A at the fence at the center pivot on the land treatment unit during active operations on 7/19, 7/26, and 8/2/05 and concentrations were below the detection limit of <0.00469 on these dates. This detection limit is slightly over the target level; but the data indicate that levels of B(a)P significantly higher than the target level were not present during the summer 2005 soil lift.
- The limited PUF sampling for B(a)P does not allow us to determine the average human exposure to this contaminant. Sampled concentrations indicate that unsafe levels of B(a)P may occur.

Ethylbenzene:

- Listed as target compound because ethylbenzene is identified in the Final Remedial Action Plan.
- Target level based upon EPA ambient air non-cancer PRG.
- Ethylbenzene was sampled regularly at 4 sites.
- Sampled concentration is always below the detection limit and is at most less than 0.5% of the target level indicating that unsafe levels of ethylbenzene are not likely present.

Naphthalene:

- Listed as a target compound because naphthalene was chosen as a surrogate for diesel fuel fumes. Naphthalene is also a COC listed for groundwater media in the ROD.
- Target level based upon EPA ambient air non-cancer PRG.
- Naphthalene was sampled often, but only at station Air10 at the end of Josette Ave.
- All samples were below the apparent detection limit of 0.0029 ug/m^3 and below the target level of 0.0052 ug/m^3 indicating that unsafe levels of naphthalene are not likely present.

Pentachlorophenol (PCP):

- Listed as a target compound because PCP is listed as a COC in the ROD and Final Remedial Action Plan. Additionally, PCP can be considered a unique tracer for emissions whose source is the MPTP site because PCP was used at MPTP for wood treatment and is relatively uncommon in ambient air compared to the volatile organic compounds (VOCs) present.
- Target level is based upon EPA ambient air cancer PRG.
- PCP was sampled regularly at Air10 at the end of Josette Ave at a detection limit of 0.000014 mg/m^3, or 1/6^{th} of the target level, with the sorbent tube sampling method used the majority of the time at Air10. PCP has also been sampled with a slightly higher detection limit during active operations at Air 10 and at Air4 at the Fire Training Center on Josette Ave on 10/13/03 and on 7/19, 7/26, and 8/2/05 and at Air 4A near the central pivot on 10/13/03. All of these PCP samples during the October 2003 and late July to early August 2005 active operations have been below the detection limits of the PUF XAD media collection method used and also below the target level concentration indicating that PCP was not in exceedence of target levels during these times.
- PCP has a relatively low volatility compared to the VOCs present and as such it is expected that PCP is less likely to be detected in air sampling than the VOC contaminants suggesting that the use of PCP as a tracer for contamination emanating from the MPTP site is of limited value.

2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD):

- Listed as a target compound because it was chosen as a surrogate for total polychlorinated dioxins and dibenzofurans both of which are COCs listed in the ROD.
- Target level based upon EPA ambient air cancer PRG.
- Dioxin in air was sampled only on 1/14/03 and has not been sampled during any active operations. Concentrations at site Air4, Air4A, and Air10 on 1/14/03 were approximately 1/3 of the target level. The limited data for dioxin is not sufficient to determine if there is any correlation between operations at the MPTP site and dioxin in air, or seasonal variations. Nor is the available data sufficient to determine potential human health hazards. It is also likely that during the 1/14/03 sampling event that soils were frozen and the ground snow covered so we would not expect any dust/particulate containing dioxin to be blown offsite on that date.

Toluene:

- Listed as target compound because toluene is identified in the Final Remedial Action Plan.
- Target level based upon EPA ambient air non-cancer PRG.
- Toluene was sampled regularly at 4 sites (see figure 3).
- Sampled concentration is generally measurable but below the target level; highest sampled concentration is 2% of the target level indicating that unsafe levels of toluene are not present.
- Sampling site Air10 at end of Josette Ave shows a similar response to benzene with higher concentrations of toluene during active operations than other sites suggesting contribution of toluene to local air from the MPTP site. Concentrations of toluene at Air10 may be 3 ½ times higher than other sites during active operations.

Xylenes:

- Listed as target compound because xylenes are identified in the Final Remedial Action Plan.
- Target level based upon EPA ambient air non-cancer PRG.
- Xylenes were sampled regularly at 4 sites.

- Sampled concentration is generally below the detection limit; highest sampled concentration is 1% of the target level indicating that unsafe levels of xylenes are not present.

1,3,5 Trimethlybenzene:

- Listed as target compound because 1,3,5 Trimethlybenzene was detected at relatively high concentrations in samples from the MPTP site.
- Target level based upon EPA ambient air non-cancer PRG.
- 1,3,5 Trimethlybenzene was sampled regularly at 4 sites.
- Sampled concentration is generally below the detection limit and below the target level; the one sample with a detected concentration is 59% of the target level. The data indicates that unsafe levels of 1,3,5 Trimethlybenzene are not likely present.

1,2,4 Trimethlybenzene:

- Listed as target compound because 1,2,4 Trimethlybenzene was detected at relatively high concentrations in samples from the MPTP site.
- Target level based upon EPA ambient air non-cancer PRG.
- 1,2,4 Trimethlybenzene was sampled regularly at 4 sites.
- Sampled concentration is generally below the detection limit and below the target level; the one sample with a detected concentration is 0.013 ug/m^3 which is just over the target level of 0.0106 ug/m^3 indicating that unsafe levels of 1,2,4 Trimethlybenzene are not likely common, but may occur.

4.0 Comments

4.1 Human health risk assessment due to exposure to air contaminants associated with the MPTP LTU needs to incorporate accurate measures of background exposure to contaminants. The CDM (2002) report *Section 3.6 Human Health Risks Associated with LTU Emissions* states that concentrations of aromatic TPH and acetaldehyde have not been detected in amounts that would suggest a human health risk. Additionally, section 3.6 states that, "(m)ost air samples taken near the the MPTP site detect no benzene, suggesting that air concentrations of benzene are usually much lower on average [than that sampled during the Fall 2001 off-loading] over the course of a year." It is clear from the air quality monitoring data that concentrations of acetaldehyde and benzene are generally present at levels higher

than would indicate an absence of human health risk. Additionally, CTEC has not been provided with any aromatic TPH (C >8 – 16) data to base that there is not exposure to this COC and data from the CDM (2002) report suggests that aromatic TPH (C >8 – 16) may be on average 2.9 times the target level. The data described in section 3.2 above suggest that much of the human exposure to acetaldehyde and benzene is from sources offsite of the MPTP site and it is also evident that exposure occurs due to emissions from the LTU. It is also evident from the comparison of acetaldehyde sampling and the TSCREEN modeling results presented in section 3.2 above that human exposure to acetaldehyde in the CDM (2002) report *Section 3.3 Further Evaluation of Chemicals Detected in Recent Flux Chamber Analyses* was likely underestimated by four orders of magnitude. The risk based target levels and human health risk assessment presented in the CDM (2002) report are developed based on EPA Region IX PRGs and site specific data used in the TSCREEN air dispersion model. The EPA Region IX 2002 PRG User Guide/Technical Background Document (EPA, 2002) states that development of site specific target levels such as was done for airborne COCs at the MPTP site may need to include consideration of ambient levels in the environment. It is specifically stated in EPA (2002) under section *3.4 Potential Problems* that "the following should be avoided: Not considering background concentrations when choosing PRGs as cleanup goals". As described in the CDM (2002) report, the development of site specific target levels for the MPTP site involved using air dispersion modeling to calculate sampling levels at which the EPA PRG would not be exceeded at the nearest residence. It appears that the human health risk assessment used for determining the affects of public exposure to airborne contaminants at the MPTP site did not consider anthropogenic background levels of COCs and that further exposure to these COCs due to emissions from the MPTP site beyond background are not accounted for in the human health risk assessment. The human health risk assessment needs to be updated to incorporate the real background exposure to these airborne COCs, using current PRGs, to adequately describe the risk of additional exposure due to emissions from the MPTP site. CTEC believes that this can be accomplished relatively easily considering that the site conceptual model and TSCREEN model are already developed and the air quality database now exists. CTEC also believes that the development of new risk based target levels may be necessary for those compounds present at high levels in background ambient air.

4.2 Aromatic TPH (C >8 – 16) data for all sampling sites and data and analyses specific to sample location Air11 need to be made available to the public. Aromatic TPH (C >8 – 16) data was not provided to CTEC. Additionally, no data from sampling location Air11 was furnished. According to the air data collection requirements furnished by DEQ in the table presented above in section 3.1, PM-10 data is sampled monthly at Air11. It is suggested in CDM (2002) that PM-10 data could be used to estimate airborne TCDD, B(a)P, and PCP concentrations. As described in section 3.2 above, quantified exposure to B(a)P and PCP has not been well covered in the air quality data and TCDD data is basically nonexistent. If PM-10 data is available, CTEC requests that these data and any estimates of TCDD, B(a)P, or PCP exposure based upon PM-10 emissions be made public.

4.3 The rational behind the air quality monitoring program needs to be further explained. PCP and naphthalene is sampled regularly at Air10 only. It needs to be explained why the Air10 site was chosen as the only regular site for monitoring PCP and naphthalene and how this sampling schedule allows an accurate characterization of the offsite exposure to these COCs in areas adjacent to the LTU other than towards Air10 at the west end of Josette Ave.

4.4 Dioxin/furans - TCDD equivalents data needs to be sampled at a minimum during active soil movement and also during high wind events that produce blowing dust on the LTU. According to air quality data made available to CTEC, TCDD equivalents were only directly sampled on 1/14/03. Despite this, DEQ has stated to CTEC that dioxin/furans are sampled on an "as needed" basis and that any soil movement onto or off of the LTU is considered to be a "needed" event. Additionally, DEQ's air data collection requirements presented in the table in section 3.1 above state that dioxin/furans will be collected at Air4, Air4A, and Air10 during these as-needed events. CTEC agrees that at a minimum, TCDD data needs to be taken during active soil movement whether tilling, offloading, or on-loading the LTU. Additionally, TCDD data needs to be sampled downwind of the LTU during high wind events to characterize the amount of TCDD equivalents in airborne dust during windy days typical of Butte's climate. Once the potential human exposure to dioxin/furans in airborne dust has been characterized during both wind and soil movement events and if the data shows that human exposure is well enough below risk based target levels to provide for a degree of safety, then it may be reasonable to reduce the frequency of dioxin/furans sampling.

4.5 Once annually DEQ or a contractor should produce a report detailing management activities and monitoring results for the MPTP site. There is a lack of easily accessible information available to the public on ongoing activities at the MPTP site. CTEC suggests that once annually DEQ produce a report that includes an overview of site activities for the previous year. Routine monitoring results of air, water, and soil should be included in tables and graphs in the annual report. CTEC suggests that the report be produced in a digital pdf file and a link added to the DEQ website such that the information is available to the public.

4.6 Air quality monitoring results should be reported and explained in the 2006 FYRR. Currently, much of the air quality monitoring data is unpublished. CTEC maintains that the 2006 FYRR should contain a detailed description of the correlation between site operations and air quality. CTEC suggests that graphs of air sampling analytical results need to be compiled that contain site operations activity labeled on the time axis (Y-axis) so that correlations between site activities and levels of COCs in air can be determined. CTEC requests that the 2006 FYRR provide graphs and tables of historic air quality data and discussion of current versus historic air quality. The 2006 FYRR report should also investigate the relationship between meteorology and air quality. For instance, the relationship between levels of COCs in air and summer daytime heating needs to be established. Additional meteorological factors that need to be investigated include wintertime inversions, and the affect of wind on PM-10 emissions. CTEC also requests that air quality monitoring of dust and PM-10 particulate be included as graphs/tables and discussion in the 2006 FYRR.

4.7 Odor and dust emission needs to be carefully addressed in the protectiveness evaluation in the 2006 FYRR. Discussion of hazards associated with vapor and dust emissions were not given sufficient detail in the 2001 FYRR. Recent technical review and risk analysis at the MPTP site has been directed at odor and dust concerns. CTEC contends that the 2006 FYRR must carefully address the human health risks associated with vapor and dust COCs in air near the MPTP site in addition to providing general air quality monitoring results and discussion.

Figure 1: MPTP Acetaldehyde Monitoring 2003-2005

Note: used 1/2 detection limit for samples below detect.

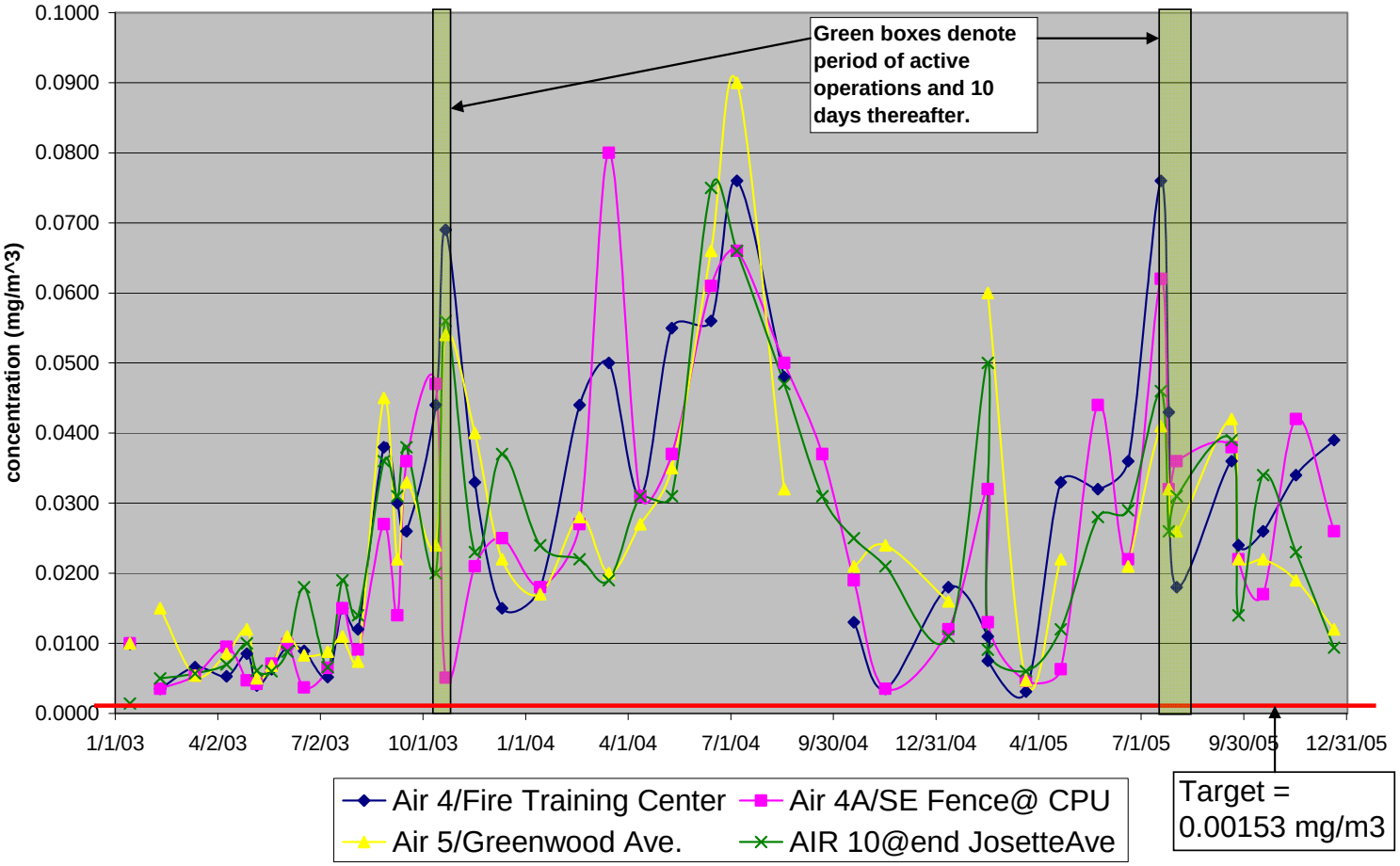


Figure 2: MPTP Benzene Monitoring 2003-2005

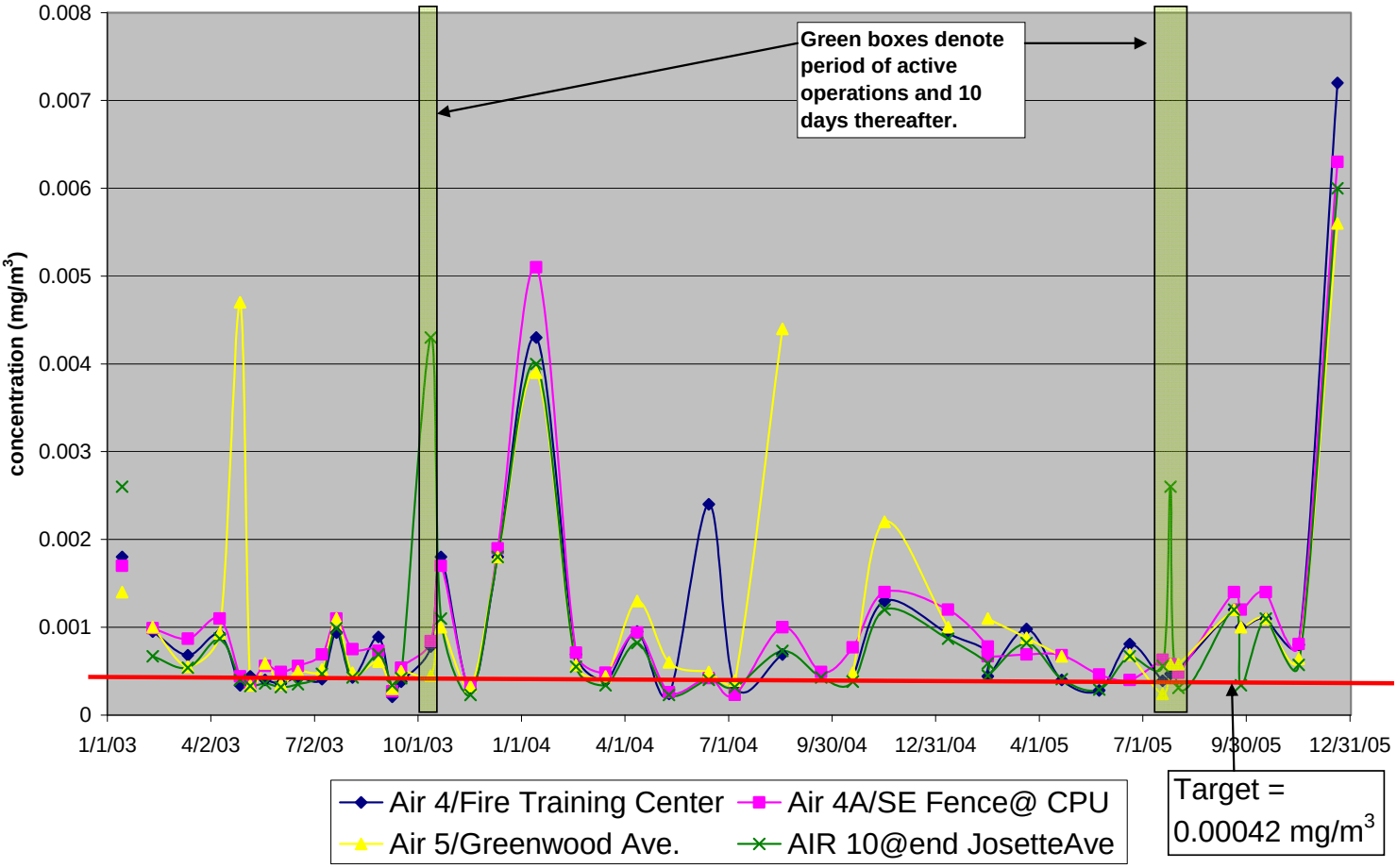
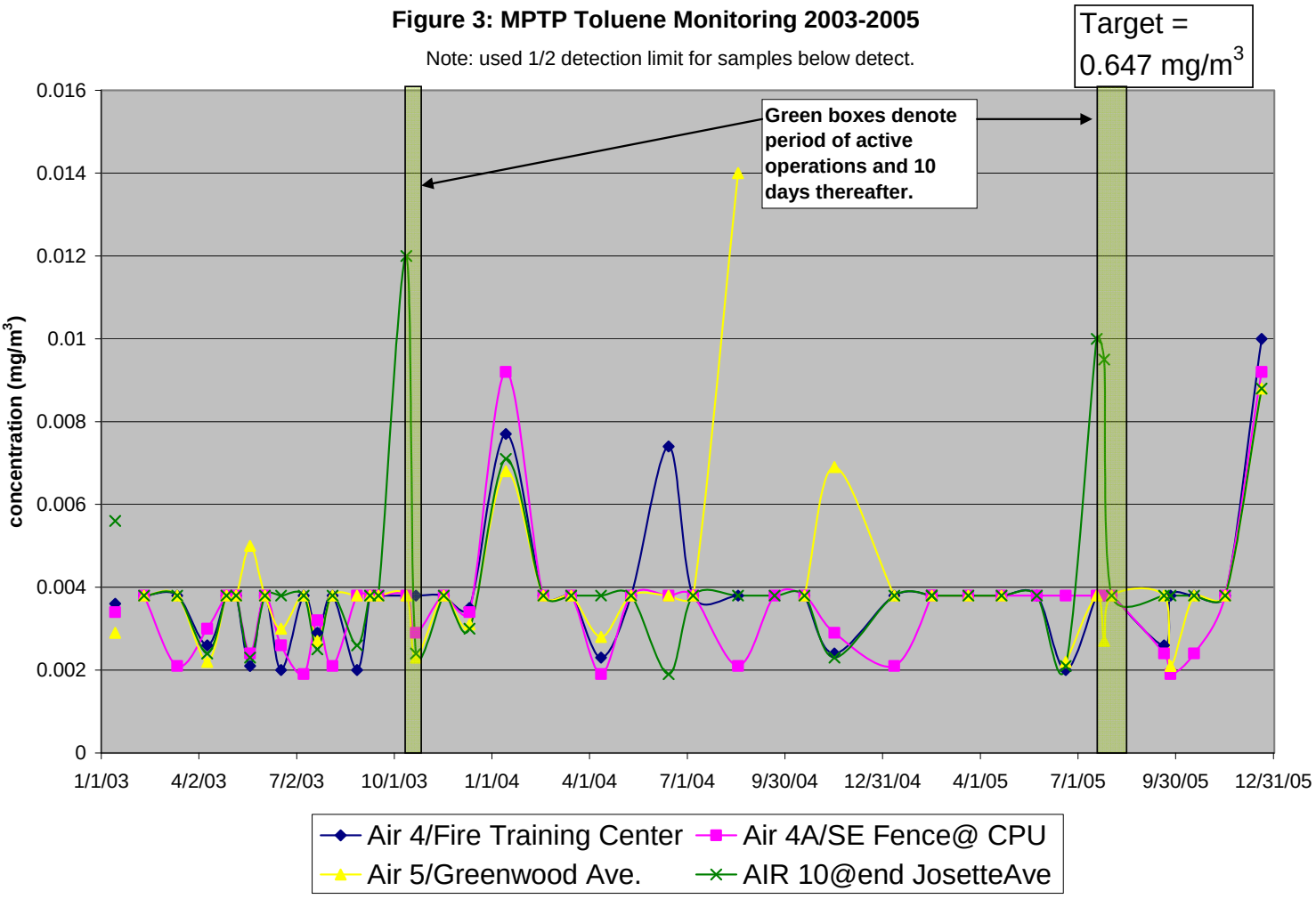


Figure 3: MPTP Toluene Monitoring 2003-2005

Note: used 1/2 detection limit for samples below detect.



5.0 References

CDM. 2002. Montana Pole and Treating Plant Site Final Investigation Report of Land Treatment Unit Odor and Dust Concerns. Prepared for Montana Department of Environmental Quality.

CDM. 2003. Montana Pole and Treating Plant Site Remedial Action Phase 4 Dust Control Measures 2003. Prepared for Montana Department of Environmental Quality.

DEQ. 2001. First Five-Year Review Report for Montana Pole and Treating Plant Site Butte Silver Bow County, Montana. State of Montana Department of Environmental Quality Remediation Division. Helena, Montana.

EPA. 2002. Cover letter for Region 9 PRGs Table 2002 Update from Stanford J. Smucker, Ph.D., Regional Toxicologist (SFD-8-B) Technical Support Team, October 1, 2002.

Attachment 9

Responsiveness Summary

RESPONSIVENESS SUMMARY

DEQ conducted community involvement activities, as described in Section VI of the Five-Year Review. It is the intent of DEQ that the citizens of Montana have the opportunity to be actively involved in the DEQ decision-making process. Although not required, DEQ is providing this Responsiveness Summary in order to comprehensively respond to comments received by community members. Comments were compiled during community interviews for the Five-Year Review for the Montana Pole and Treating Plant Site (Site). In addition, DEQ received comments from Charles Greene representing the Boulevard Community Residents, CTEC, and Dan Foley, as well as several emails from Dr. John Ray. Many comments provided were common from one set of comments to the next, and DEQ has aggregated the comments by issue. DEQ has summarized and responded to each of the common issues raised in the following text.

Comment #1: ***Concerns were expressed that soils are not achieving cleanup goals for pentachlorophenol (PCP) and dioxins/furans via biological treatment on the LTU.***

The cleanup levels for PCP are anticipated to be met if the current remedy operates as intended. Please see the "Data Review" Section and Table A3-9 of the Five-Year Review, which discuss the data demonstrating that PCP cleanup levels will be met.

The cleanup levels for dioxins in soils are not currently being met and are not anticipated to be met if the current remedy operates as intended. CDM's Technical Memorandum *Vadose Zone Soils Dioxin/Furan Mobility Evaluation*, September 27, 2001, evaluation concluded that dioxins and furans are not likely to be treated, biodegraded, or leached from soils during bioremediation, and that the predicted aquifer concentration under unrealistically worst-case conditions is just barely over the ROD cleanup levels of 3.0E-8 mg/L TCDD equivalent. The risk exposure pathways for soils are ingestion or direct contact. By backfilling the treated soils that still contain dioxins above the historic high groundwater level (based on over 20 years of monitoring); covering these soils with at least one foot of clean soil; and placing appropriate institutional controls on the property to ensure future protectiveness of the remedy, these exposure pathways are rendered incomplete.

DEQ, in consultation with EPA, will address the long-term protectiveness of the remedy for dioxin in the soils once EPA has finalized the revised interim PRGs for dioxin and dioxin-like compounds based on technical assessment of scientific and environmental data, and update the administrative remedy and/or Record of Decision (ROD), as appropriate.

Comment #2: ***Concerns were raised about the ability of caps to provide protection to human health (specifically with respect to treated soil containing dioxin left on site).***

The selected remedy, as described in the ROD, included "backfill of excavated and treated soils into excavated areas, if possible, surface grading and revegetation" combined with "additional institutional controls preventing access to contaminated soils and groundwater." Implementation of this remedy described in the ROD is considered to be protective in the long-term. Please see the response to Comment #1, above, regarding the effectiveness of the remedy for dioxins in soil.

Comment #3: ***Concerns were expressed that PCP was found north of Silver Bow Creek, leading to concerns of an inadequate Remedial Investigation at the site and concerns that the water treatment system does not effectively prevent the migration of contaminated groundwater.***

Both the Remedial Investigation and the ROD acknowledged that some migration of dissolved contamination had migrated north of Silver Bow Creek. Under typical operating conditions groundwater capture associated with the MPTP extraction system appears to be sufficient based on historical monitoring and operations and on the recent groundwater modeling. PCP concentrations at the extraction trenches have declined substantially over the course of the remedy and the quantity of LNAPL recovered from the area beneath the interstate has decreased as well (see Table 10 of the Five-Year Review), indicating that the soil remediation coupled with natural flushing has reduced the PCP source significantly. The current groundwater pump and treat system has been operating since 1997. The ROD anticipated "…the groundwater action would occur for a period of 30 years. Although groundwater remediation to cleanup levels is expected …, some inaccessible source areas (under the interstate highway) would remain and be treated in place." Additionally, the ROD stated "Once site remediation has effectively contained the contaminated groundwater and LNAPL and releases to Silver Bow Creek have been effectively reduced or eliminated, it is expected that natural biodegradation and attenuation will effectively reduce the levels of organic contaminants in Silver Bow Creek, stream sediments, and groundwater downstream of the site. These natural mechanisms will be relied on to address the low level of contamination found in this area."

In November 2009, groundwater levels at the MPTP site were observed to be at historic lows. DEQ subsequently learned that significant dewatering was underway at the WWTP, located on the opposite (north) side of Silver Bow Creek, related to upgrades at the WWTP required by an Administrative Order on Consent (AOC) issued by DEQ Enforcement Division to bring the treatment system into compliance with nitrate discharge regulations.

Upon learning of the dewatering activities taking place, DEQ collected additional water level and water quality data, both north and south of Silver Bow Creek. Water level data clearly indicated that dewatering at the WWTP caused a water level response on both sides of Silver Bow Creek. The water quality data indicated that concentrations of PCP (the primary contaminant of concern in groundwater at the MPTP) are above standards in groundwater samples collected north of Silver Bow Creek, including samples of the groundwater extracted by the WWTP dewatering pumps.

The controlled ground water area implemented in October 2009 does not explicitly address large increases in groundwater extraction from existing infrastructure, such as is used for dewatering at the WWTP to allow for construction at the WWTP. Such extraction negatively impacts the MPTP capture zone. Additional dewatering at the WWTP is anticipated in the future. DEQ and Butte/Silver Bow are working cooperatively to address this issue and minimize continued impacts to the MPTP capture zone. As part of the recommendations in the Five-Year Review, DEQ will also be seeking revisions to the Controlled Groundwater Area to address large-scale withdrawals of water.

Comment #4: ***A concern was raised that points of compliance need to be reconciled with the current site conditions.***

The compliance point for groundwater described in the ROD is the south bank of Silver Bow Creek,

unless appropriate institutional controls are not implemented. However, after the ROD, Silver Bow Creek was reconstructed to a new location and to a new elevation to avoid groundwater discharge to the creek. Also, PCP is currently observed in groundwater north of Silver Bow Creek and the HCC, likely due to dewatering at the WWTP. Accordingly, the point of compliance for groundwater needs to be clarified to ensure that cleanup levels are met in accordance with the ROD.

The agencies agree that the points of compliance require clarification, and this is a recommendation of the Five-Year Review.

Comment #5: ***Water quality standards for dioxin have been lowered since the ROD; the Five-Year Review needs to evaluate if cleanup levels for dioxin in groundwater are adequate given the new lower standards.***

While dioxin concentrations in groundwater do not necessarily meet the current DEQ-7 standards (the DEQ-7 human health standard for dioxin TEQ is 2 pg/l versus the ROD cleanup criterion of 30 pg/l), access to groundwater is prohibited through the implementation of a Controlled Groundwater Area, and the remedy is thus protective. Groundwater, surface water, and effluent from the Water Treatment Plant will continue to be monitored for dioxins. DEQ intends to conduct a comprehensive review of the remedy for dioxin in all media once EPA has finalized the revised interim preliminary remediation goals (PRGs) for dioxin and dioxin-like compounds.

Comment #6: ***Commentors felt that air quality data need to be presented to the public demonstrating the level of background contaminant concentrations and concentrations downwind during active operations. A commenter stated that monitoring indicates that contaminants are frequently present above acceptable levels. A desire for additional measures to reduce odors was expressed. Additionally, there were concerns about dust that may blow off the LTU when contaminated soil is removed from the LTU.***

While the ROD does not require air monitoring, DEQ has conducted air monitoring around the MPTP Land Treatment Unit in response to community concerns regarding odors and to ensure that contaminated materials were not "leaving the site" and causing a health concern. Air monitoring to date has indicated that the concentrations of volatile and semi-volatile organic contaminants of concern that would be expected to be associated with air in the vicinity of the site (primarily PCP) are below EPA Region 9 Regional Screening Levels (RSL) (EPA, 2010). Not all compounds detected at concentrations greater than RSLs (benzene and acetaldehyde) can be directly attributable to contaminated soils at the facility, as these compounds are not listed as contaminants of concern in the MPTP ROD. The primary contaminant associated with the MPTP is PCP; PCP has never been found in the air sampling conducted. The compounds found in the air monitoring are not exclusive to those found at MPTP, making it difficult to determine their source and/or sources. While any data collected by the Agencies is publicly available, the Agencies will pursue compilation of air monitoring data that have been collected over time, and summarize this information for the public.

Many people interviewed felt that the objectionable odors from the LTU have reduced significantly over the last five years, but there were still complaints at the public meeting about odor issues. Since the 2007 LTU offload, DEQ has received no comments or complaints from the adjacent neighborhood. Since that offload as well, DEQ responded to previous complaints

by reducing the frequency of tilling from weekly/biweekly to no more than semiannually, because residents of the adjacent neighborhood indicated that the activities that disturbed the soil resulted in odors. Approximately 40 inches of soil remain on the LTU for treatment; in a continuing effort to address area resident concerns, DEQ has decided that, rather than remove these soils in stages, soils will remain on the LTU until the entire depth reaches cleanup standards for PAHs and PCP, thus reducing the number of remaining treated soil offloads. At this time, approximately 90% of the soils on the LTU have been sampled and have met the cleanup goals for both PCP and PAHs. To further address resident's comments that soil disturbing activities create unacceptable odors, no tilling activities are planned for 2011. These changes in tilling frequency, in combination with the regular irrigation of the LTU, will also minimize the potential for dust to be blown off of the LTU and reduce odors.

Comment #7: ***Concerns were expressed that since the Five-Year Review was prepared by DEQ, EPA, and their consultants, it does not represent an independent technical review of the remediation at the Site.***

This comment was also submitted to the Inspector General of the United States, who referred it to EPA's Office of Superfund Remediation and Technology Innovation (OSRTI). EPA responded that independence is achieved through the varying levels of review required by individuals who have no connection to the site in question, even though they are employed by the Agencies. Additionally, EPA Headquarters staff reviewed and commented on the draft Five-Year Review.

EPA's response included the following:

> "Project managers conduct reviews in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act… and program guidance. In addition, the "Comprehensive Five-Year Review Guidance" (OSWER 9355.7-03B-P, June 2000) indicates that the project manager is part of the review team conducting a five-year review at any site. While EPA (and DEQ) can use contractor services or other agencies to provide assistance in conducting the five-year reviews, EPA is ultimately responsible for making the determination whether the remedy is protective. [This may have been delegated to DEQ for the settlement sites.]
>
> While the Agency respects your perspective, we believe there is no potential bias in having the project manager involved in the remediation also conduct the five-year review. This is standard practice in the Superfund program. The project manager does not act in a vacuum when he or she conducts such a review. His/her work is reviewed by a supervisory branch or unit chief, in this case a branch chief."

Additionally, under the National Contingency Plan, the lead agency (DEQ at this site) is required to conduct the Five-Year Review. 40 C.F.R. § 300.430. DEQ believes that this concern has been adequately addressed.

Comment #8: ***There was concern that the Five-Year Review does not comply with EPA's guidance.***

EPA's "Comprehensive Five-Year Review Guidance" was followed in preparation of this Five-Year Review. The Five-Year Review was reviewed by both EPA Headquarters and Regional staff, and these reviews addressed any issues concerning compliance with EPA's guidance.

Comment #9: ***Concerns were expressed that public involvement has not been sufficient. A Five-Year Review summary report, written for the layperson, was requested.***

Public notices announcing the beginning of the Third Five-Year Review were published in the Montana Standard on January 16 and 19, 2011. An updated fact sheet with notification of the third Five-Year Review, dated March 2011, was distributed as an insert to the Montana Standard and the Butte Weekly newspapers on Wednesday, March 16, and was also made available at the CTEC office in Butte. This fact sheet was posted on the following website: http://www.deq.mt.gov/Rem/default.mcpx.

CTEC held a public meeting on March 24, 2011 at the Boulevard Volunteer Fire Hall, 1900 South Franklin, in Butte, for the purpose of assisting the Agencies in obtaining community input for the Five-Year Review.

Eleven interviews for the Third Five-Year Review were conducted and represent a mixture of nearby residents and public officials. Additionally, four sets of written comments were received, as well as a series of emails from Dr. Ray that echo the sentiments in his interview.

To provide further information to the public, after completion of the Five-Year Review Report, the Agencies will place an ad in the Montana Standard that states that the Five-Year Review has been completed. Per Five-Year Review guidance, the ad will include:

- The site name, its location and web address where additional information is available;
- The lead agency conducting the review;
- A brief description of the selected remedy;
- A summary of contamination addressed by the selected remedy as provided in the initial notice;
- A brief summary of the results of the Five-Year Review;
- The protectiveness statement(s);
- A brief summary of data and information that provided the basis for determining protectiveness, issues, recommendations, and follow-up actions directly related to the protectiveness of the remedy;
- Location(s) where a copy of the Five-Year Review can be obtained or viewed (including site repositories);
- A contact name and telephone number where community members can obtain more information or ask questions about the results; and
- The date of the next Five-Year Review or a statement and supporting rationale that Five-Year Reviews will no longer be required.

The Agencies will also create and distribute a summary of the findings of the Five-Year Review, written for the layperson, as requested in the comments.

Comment #10: ***Concerns were raised that not all areas of contamination are being addressed nor are there current plans to address them, and that there is no comprehensive approach for dealing with contamination under the Interstate.***

The remaining areas of known contamination are the area beneath three power poles located between the BNSF Railroad and Silver Bow Creek, and the area beneath the Interstate.

DEQ plans to excavate remaining sources of PCP beneath the power poles in summer 2011, thus removing this potential source material.

For the area of contamination remaining beneath the Interstate, this is planned to be addressed in Phase 5 of the MPTP remediation. In 2001, a preliminary remedial alternatives report was prepared to evaluate various potential remediation methods including surfactant flushing, soil vapor extraction, and hydraulic manipulation. DEQ, the Montana Department of Transportation (MDT), and EPA extensively evaluated the vertical and horizontal extent of remaining contaminated soils, and the technical and economic feasibility of excavating and remediating these remaining contaminated soils. Based on the results of these evaluations and preparation of preliminary construction schedules, DEQ concluded, and EPA concurred, that it is not economically or technically reasonable to pursue excavation of these soils during MDT's interstate bridge removal project. In March 2009, an updated treatability study was prepared. DEQ intends to revisit the treatability study to enhance remediation of the contaminated soils remaining beneath the Interstate beginning in 2012, after MDT's construction activities have been completed and in coordination with any LTU closure activities that may be ongoing at that time. As described on page 44 of the ROD, "After it has been determined by the lead agency, in consultation with the support agency, that recovery of hazardous substances from these areas is no longer effective or practical and contaminant levels have plateaued, these areas will be addressed by *in situ* bioremediation as outlined under Performance Standards for Groundwater."

Comment #11: ***Concerns about the impact of an adjacent Superfund Site on residential property values were expressed.***

DEQ notes the community's concern about the effect of the MPTP site on property, and recognizes that the community's homes and properties represent significant personal assets for the community. EPA conducted a literature review of studies that looked at the effect of National Priority List (NPL) sites on surrounding property values. The review found that there were often decreases in property values around the time of discovery of the contamination and at the time of a site's proposed addition and listing on the NPL (EPA 2009). However, the review also found that the reductions in property values are often site-specific and that no single effect or magnitude can be applied across all NPL sites. The review also found reversals of the price decline at certain sites upon issuance of a ROD, where data was available. It should be noted that the review also found that the price decline did not reverse at certain sites with long, complex and contentious histories. The review concluded that more research is needed, because there is not a clear consensus on price declines and reversals of these price declines. This review can be found at: http://www.epa.gov/superfund/programs/recycle/effects/property.html.

DEQ can provide comfort letters to residents stating that a particular property is outside of the site boundaries, if desired. This is standard practice.

As described in the Five-Year Review, cleanup will continue to occur at the site. The final remedy will be protective of human health and the environment, with implementation of the recommendations listed in the Five-Year Review. Upon final closure of the LTU in the coming years, the area is expected to be left in better condition than it was previously. Although neither CERCLA nor CECRA specifically evaluates or addresses any declines in property values, DEQ is hopeful that the continued cleanup of the site will have a positive effect on the surrounding community.

Comment #12: ***Concerns that Future Land Use of the site would preclude its use as a residential area ere expressed. Some want a revised ROD and cleanup to residential levels.***

DEQ notes that the commenters and surrounding community would like the site used for residential use. However, the ROD specified cleanup standards for the site that are designed to protect recreational and industrial land users. The ROD also includes implementation of appropriate engineering and institutional controls during the remedial action in order to prevent access to contamination and to limit the spread of contamination. Cleanup levels and the selection of the remedy are based on the anticipated future use of the Site at the time the ROD was issued. The ROD also assumes adequate institutional controls will be implemented to prevent any residential use at the site. Treated soils will be left in place above levels that allow for unlimited use and unrestricted exposure; therefore, future land use precludes use as a residential area, as long as appropriate institutional controls are implemented.

The northern portion of the MPTP site (i.e., north of I-90) is currently zoned M1 (Light Industrial). The southern portion of the MPTP site (i.e., south of I-90) is currently zoned M2 (Heavy Industrial). The current zoning therefore also precludes residential construction on the MPTP site. Long-term institutional controls precluding future residential use of the Site still need to be implemented, or the ROD states that the cleanup levels will need to be adjusted accordingly.

Comment #13: ***During the public meeting, there were concerns expressed about why trees that were planted along the southern site fence line died.***

DEQ does not believe the tree mortality was caused by site contaminants, but will collect soil samples to try to determine why the trees did not survive. Since no contamination was noted at the time the trees were planted, and since the revegetation on the north side of the site over treated soils has thrived, DEQ does not believe the site contamination resulted in the tree mortality. Regardless, DEQ will attempt to assess the reason for the mortality and to confirm that site contaminants are not present above ROD cleanup levels.

Comment #14: ***There are concerns about the LTU location (proximity to residential areas). Some residents interviewed expressed dissatisfaction about the potential of placing additional material in the LTU.***

Since the LTU has already been constructed and has the last lift of soils placed on it for treatment, it is not possible or practical to change the location of the LTU at this time. At this time, 90% of the soils on the LTU meet the treatment standards for PCP and PAHs; DEQ is hopeful that sampling in 2011 will show that all soils on the LTU meet the treatment standards for PCP and PAHs, and that efforts to dismantle and close the LTU can begin once the reconstruction of the interstate bridge is complete. Every effort

will be made to limit or eliminate the need for additional soils to be placed on the LTU, and to close this treatment unit as soon as soils have met the cleanup goals for PCP and PAHs. For example, additional potentially contaminated soils will be removed from beneath three power poles located north of the NCRT in 2011. To address residents' concerns about the placement of additional soils on the LTU and thus possibility extending the life of this treatment unit, DEQ is evaluating other disposal options for this soil.

Comment #15: ***Concerns about the future use of the site were expressed, and area residents expressed interest in being part of the decision process. Additionally, concern was expressed that Butte Silver Bow has already been paid to accept ownership of MPTP property when DEQ/EPA deems that it is cleaned up.***

Final land use at the Site will be determined in conjunction with Butte/Silver Bow, with certain constraints on land use specified by EPA and DEQ consistent with the MPTP ROD. Public involvement and participation is expected to be part of the process of determining the final use of the property.

Butte Silver Bow has not been paid money to accept ownership of the MPTP property. Although there has been discussion about Butte-Silver Bow ultimately taking ownership of the property, there is no requirement that this occur. The settlement monies paid to Butte Silver Bow were for costs related to implementation of institutional controls and maintenance of property at the site, and for implementation of groundwater well restrictions at the site.