RECORD OF DECISION

Big West Oil Refinery
Kevin, Montana

Prepared by:

Montana Department of Environmental Quality
Waste Management and Remediation Division
Helena, Montana

May 2016

PART 1

DECLARATION OF RECORD OF DECISION

Declaration of Record of Decision

FACILITY NAME AND LOCATION

The Big West Oil Refinery (BWOR) Facility is a high priority State Superfund facility listed on the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA) Priority List. The majority of the BWOR Facility is within the Town of Kevin, Montana, with the northernmost portion of the BWOR outside of the town limits in Toole County.

STATEMENT OF BASIS AND PURPOSE

This decision document presents the Montana Department of Environmental Quality's (DEQ's) selected final remedial action for the BWOR Facility and was developed in accordance with CECRA.

The remedial action set forth in the Record of Decision (ROD) is based on the identified administrative record, which consists of the documents DEQ cited, relied upon, or considered in selecting the remedy for the BWOR Facility. The administrative record is identified in Part 2, Section 14.0. The complete administrative record is available for public review at the office of DEQ's Waste Management and Remediation Division, located at 1225 Cedar Street in Helena, Montana.

ASSESSMENT OF THE FACILITY

DEQ is authorized to take remedial action whenever there has been a release or a threatened release of a hazardous or deleterious substance into the environment that poses or may pose an imminent and substantial endangerment to the public health, safety, or welfare, or the environment. Section 75-10-711, Montana Code Annotated (MCA). CECRA defines a hazardous or deleterious substance in Section 75-10-701(8), MCA. The primary contaminants remaining at the BWOR Facility are petroleum hydrocarbons, benzene, lead, and polycyclic aromatic hydrocarbons (PAHs). These contaminants are described in Part 2 of the ROD. DEQ has determined that these contaminants are hazardous or deleterious substances under CECRA. Based on the administrative record, DEQ has determined that contaminants have been spilled, leaked, discharged, leached, dumped, or disposed into the environment, which constitutes a release or threatened release under Section 75-10-701(19), MCA.

The potential for an "imminent and substantial endangerment to public health, safety, and welfare, or the environment" is present when contaminant concentrations in the environment exist or have the potential to exist above risk-based screening levels (Administrative Rules of Montana (ARM) 17.55.102) and an imminent and substantial endangerment does exist if contaminant concentrations exceed site-specific cleanup levels (SSCLs). DEQ has determined that contamination at the BWOR Facility exceeds risk-based screening levels and SSCLs. See Tables 1 and 2 and Part 2, Section 7.0 of the ROD. Therefore, DEQ has determined that a release or a threatened release of hazardous or deleterious substances from the BWOR Facility poses an imminent and substantial endangerment to the public health, safety, or welfare, or the

environment and further remedial action is necessary. In selecting the remedial action, DEQ evaluated the criteria found in Section 75-10-721, MCA.

DESCRIPTION OF THE REMEDY

Section 75-10-721(2)(c), MCA, directs DEQ to consider present and reasonably anticipated future uses of a facility when selecting remedial actions. The alternative selected must then meet SSCLs protective of the reasonably anticipated future uses. DEQ's evaluation of reasonably anticipated future uses of the BWOR Facility is found in Part 2, Section 6.0 of the ROD. In summary, DEQ determined that the reasonably anticipated future use of the BWOR Facility is commercial/industrial.

The remedy for the BWOR Facility consists of remediation of contaminated media to SSCLs as described in the ROD, with reliance on institutional controls. Numerous interim actions have occurred at the BWOR Facility. DEQ considered the interim remedial actions and integrated that information and those actions into the remedy to the extent possible. Major components of the remedy are summarized below. Details of the remedy are provided in Part 2, Section 11.0 of the ROD. Some of the primary components of the remedy include:

Institutional Controls

Institutional controls in the form of groundwater use and land use restrictions are necessary to protect human health and limit migration of contaminants. The selected remedy partially relies on the placement of DEQ-approved restrictive covenants on the properties that make up the BWOR Facility to limit the future use of the properties to commercial/industrial. This includes property owned by the Town of Kevin, BNSF Railway Company, Glen Habets, and Habets Grain, Inc. In addition, a restrictive covenant to prohibit use of the groundwater where it exceeds SSCLs, as well as within the well pumping radius of the benzene plume, is necessary. Construction of new buildings will be prohibited in those areas of the BWOR Facility that have the potential for vapor intrusion related to the groundwater plume and impacted soil vapor. A restrictive covenant will be placed on the properties where the stabilized/solidified Wastewater Pond (WWP) and Small Sludge Pond (SSP) are located to prohibit the use of those areas and limit disturbances of their protective caps.

Restrictive covenants will be in effect until DEQ determines they are no longer needed to ensure protection of human health or to limit migration of contaminants.

Asphaltic Materials

Asphalt product recovery involves the separation of asphalt with commercial value from waste residual material. The selected remedy for the asphalt with commercial value is product recovery and the selected remedy for the waste residual material is excavation and offsite disposal at a licensed and permitted disposal facility. This remedial alternative was selected because it removes an environmental issue and safety hazard from the BWOR Facility and the anticipated sale of asphalt with commercial value will offset the overall cost of the remedy.

Soil/Sludge/Sediment

The selected remedy for soil/sludge/sediment exceeding SSCLs includes excavation and offsite disposal at a licensed and permitted landfill. Offsite disposal of impacted soil/sludge/sediment from the BWOR Facility will eliminate future exposure from contaminated soil/sludge/sediment and eliminate the risk of contamination in soil leaching to groundwater.

Groundwater

Source removal followed by monitored natural attenuation (MNA) is the selected remedy to address the onsite plume of dissolved benzene in groundwater exceeding the SSCL. The Feasibility Study estimated the SSCL for benzene will be met within approximately 30 years or less when combined with source removal. Institutional controls will provide adequate protectiveness while benzene naturally degrades in groundwater to concentrations below the SSCL. In addition, long-term monitoring will be conducted on groundwater wells at the BWOR Facility to evaluate the effectiveness of the remedy described above and to track contaminant concentrations until SSCLs are met.

STATUTORY DETERMINATIONS

The selected remedy will attain a degree of cleanup that assures present and future protection of public health, safety, and welfare, and the environment, and complies with federal and state environmental requirements, criteria, and limitations (ERCLs) that are applicable or relevant to the remedial action and Facility conditions. DEQ considered current and reasonably anticipated future uses of the Facility and institutional controls in selecting the remedy. The selected remedy mitigates risk, is effective and reliable in the short- and long-term, is practicable and implementable, uses treatment and resource recovery technologies and engineering controls, and is cost-effective. DEQ has considered all public comment received during the public comment period on the Proposed Plan and has responded to these comments in Part 3 of the ROD.

AUTHORIZING SIGNATURE

Tom Livers

Tom Livers
Director
Montana Department of Environmental Quality

5/12/16
Date

PART 2

DECISION SUMMARY

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Acronyms and Abbreviations

AMEC – Amec Foster Wheeler Environment & Infrastructure, Inc.
AOC – Administrative Order on Consent
APA – Asphalt Pit Area
ARM – Administrative Rules of Montana
AST – Above Ground Storage Tank
ATA – Asphalt Tank Area
ATSDR – Agency for Toxic Substances and Disease Registry

B2PAH – B2-classified Polycyclic Aromatic Hydrocarbon
BER – Montana Board of Environmental Review
bgs – Below Ground Surface
BNSF –BNSF Railway Company
BTEX – Benzene, Toluene, Ethylbenzene, and Xylenes
BWOR – Big West Oil Refinery

CDC – Centers for Disease Control
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act
CECRA – Comprehensive Environmental Cleanup and Responsibility Act
CFR – Code of Federal Regulations
COC – Chemical of Concern
COPC – Chemical of Potential Concern
CWP – Cooling Water Pond

DEQ – Montana Department of Environmental Quality
DEQ-7 – Montana Water Quality Standards

EDGE – EDGE Group, Inc.
EPA – U.S. Environmental Protection Agency
EPH – Extractable Petroleum Hydrocarbons
ERCL – Environmental Requirement, Criteria or Limitation
ETI – Environmental Toxicology International, Inc.

FS – Feasibility Study

GLA – Gas Loading Area
IC – Institutional Control
IEUBK – Integrated Exposure Uptake Biokinetic
IGI – Integrated Geosciences, Inc.
IRA – Interim Remedial Action

MA – Maintenance Area
MCA – Montana Code Annotated
µg/dL – Micrograms per Deciliter
µg/L – Micrograms per Liter

µS/cm – MicroSiemens per Centimeter
mg/kg – Milligrams per Kilogram
MNA – Monitored Natural Attenuation
MNHP – Montana Natural Heritage Program

NCDC – National Climatic Data Center
NFA – North Fenced Area
NSSA – Northside Storage Area
NSTA – Northside Tank Area

OD – Oily Ditch
O&M – Operation and Maintenance

PAH – Polycyclic Aromatic Hydrocarbon
PRAO – Preliminary Remedial Action Objective
PRG – Preliminary Remedial Goals
PWS – Public Water Supply
PSY – Product Storage Yard

RAO – Remedial Action Objective
RCRA – Resource Conservation and Recovery Act
RI – Remedial Investigation
RLA – Railroad Loading Area
ROD – Record of Decision
ROLA – Road Oil Loading Area
RPA – Refinery/Process Area
RRA – Refinery Residential Area

SCEM – Site Conceptual Exposure Model
SDD – South Drainage Ditch
S/S – Stabilization/Solidification
SSCL – Site-Specific Cleanup Level
SSP – Small Sludge Pond
SVOC – Semi Volatile Organic Compounds

TCLP – Toxicity Characteristic Leaching Procedure
TEL – Tetra-ethyl Lead
TPH – Total Petroleum Hydrocarbons
TRPH – Total Recoverable Petroleum Hydrocarbons
TSA – Transfer and Storage Area

UTCC – UTC Canada Corporation

VOC – Volatile Organic Compounds
VPH – Volatile Petroleum Hydrocarbon

WWP – Wastewater Pond

yd^3 – cubic yard

1.0 FACILITY NAME, LOCATION AND DESCRIPTION

The Big West Oil Refinery (BWOR) Facility is a high priority Comprehensive Environmental Cleanup and Responsibility Act (CECRA) facility located in Kevin, Toole County, Montana. The Montana Department of Environmental Quality (DEQ) is overseeing remediation at the facility under CECRA. This Record of Decision (ROD) identifies DEQ's selected final remedy for the BWOR Facility. The majority of the BWOR Facility is within the Town of Kevin limits and the northernmost portion of the BWOR Facility is outside the town limits. The BWOR Facility consists of about 80 acres at a land elevation of approximately 3,324 feet above mean sea level, and is located within Township 35 North, Range 3 West, Section 35 (Figure 1). The surficial boundaries of the BWOR Facility generally extend from and include the drainage ditch to the south, the Town of Kevin wastewater treatment plant to the north, the BNSF Railway Company (BNSF) rail line to the west, and the South Drainage Ditch and an undeveloped dry lake bed to the east and include all areas where contamination has come to be located.

2.0 FACILITY HISTORY

2.1 OWNERSHIP AND OPERATIONAL HISTORY

The BWOR Facility was operated as a petroleum refinery from approximately 1925 to 1977 (ViroGroup, 1994). The historic refinery occupied approximately 140 acres. Of that, the BWOR Facility encompasses approximately 80 acres (Figure 1) and includes all areas where contamination came to be located (EDGE Group, Inc. (EDGE) & AMEC Earth & Environmental, Inc. (AMEC), 2016). The refinery received crude oil from several sources including Canada, the Kevin-Sunburst oil fields, and the Sweetgrass Hills Field. The refinery was reportedly a "topping" operation where the fractionation of crude oil produced refinery products included propane, butane, regular and premium gasoline, stove oil, diesel fuel, asphalt cements, and cut back asphalt. Refinery infrastructure included a cracking and polymerization unit, a refinery process area, a tetra-ethyl lead (TEL) addition area, above ground storage tanks (ASTs), underground storage tanks and piping, a waste water disposal pond, a cooling water pond, petroleum loading and unloading areas, and other petroleum storage areas (including storage of petroleum products in unlined pits) (ViroGroup, 1994).

Big West Oil Company of Montana and its predecessor, Big West Oil Company of Idaho, owned the major portions of the property on which the BWOR Facility is located and operated a petroleum refinery from 1925 to 1970 (ViroGroup, 1994). Big West Oil Company of Montana merged with additional corporations in 1971 to form Thunderbird Resources, Inc. (ViroGroup, 1994). Thunderbird Resources, Inc. (owned by Inter-City Gas Corporation) owned major portions of the BWOR Facility and had responsibility for the daily operations for the refinery and associated waste disposal areas from 1971 until 1977 (DEQ, 1984). The refinery was permanently shut down in 1977 (Thunderbird Resources, 1979). Thunderbird Resources, Inc. sold the part of the BWOR Facility south of Highway 215 to Glen Habets in 1977 (Deed, 1977). The northern portion was subdivided into two parcels, the larger of the two including the refinery, remaining tankage, one process water pit, and one oily waste pit. This parcel remained the property of Thunderbird Resources Inc. until it was sold to Flying J, Inc. in 1980 (ViroGroup,

1994). Flying J, Inc. then entered into a sale agreement with Habets Grain, Inc. for this property in 1981, and officially transferred ownership to Habets Grain, Inc. in 1984 (Deed, 1984).

Beginning in 1978, Lynn Stewart claimed ownership of the smaller northern parcel that contained several oil storage tanks (Steptoe & Johnson, 1993). Mr. Stewart's title to the approximately five acre portion of the former refinery property was never established (EDGE & AMEC, 2016). Tank # 8 is located in this area (Figure 2). As recently as 1996, Mr. Stewart claimed ownership of the tank, its contents, and the five acre parcel (EDGE & AMEC, 2016). In 1997 and 2000, DEQ denied Mr. Stewart's requests to remove Tank #8 and its contents from the BWOR Facility, and the tank remains. Between 1985 and 2003, Messrs. Habets and Stewart disputed ownership of the parcel until Mr. Habets obtained title to the parcel in 2003 (EDGE & AMEC, 2016).

Currently, the majority of the BWOR Facility property is owned by Mr. Habets or Habets Grain, Inc. BNSF owns a small southwest portion of the BWOR Facility that serves as a railroad, and the Town of Kevin owns a parcel of land that intercepts the northern extent of the BWOR Facility (Montana State Library, 2015). A current parcel and property ownership map is provided as Figure 3.

2.2 REGULATORY HISTORY

A number of regulatory actions have been conducted at the BWOR over the years. Following a site inspection in 1979, the United States Environmental Protection Agency (EPA) completed a Hazardous Waste Identification and Preliminary Assessment (EPA, 1979 and 1979a). EPA again inspected the Facility in 1980 to further document contamination and refinery infrastructure (Ecology & Environment, 1980). DEQ, through its predecessor agency, the Montana Department of Health and Environmental Services, conducted a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Preliminary Assessment and Site History Report in 1984 (DEQ, 1984). (Hereinafter, both agencies will be referred to as "DEQ.") With assistance from DEQ, EPA conducted CERCLA field investigations in 1987 and 1988 (EPA, 1988). These investigations found the BWOR Facility contaminated with benzene, toluene, ethylbenzene and xylene (BTEX) and polycyclic aromatic hydrocarbons (PAHs). Numerous physical hazards such as sludge pits, dilapidated structures, rusted piping, and asbestos were also documented. After the 1988 investigation, EPA recommended "No Further Action" under CERCLA for the BWOR Facility (EPA, 1988). In 1988 and 1989, DEQ sent Notice of Potential Liability letters to Flying J, Inc. (DEQ, 1988a), Glen Habets (DEQ, 1988b), InterCity Gas Corporation (DEQ, 1988c), and Lynn Stewart (DEQ, 1989b).

In 1989, DEQ issued a number of administrative orders at the BWOR Facility. Administrative Order No. SF-89-00003 was issued to InterCity Gas Corporation for the preparation of a Remedial Investigation (RI) work plan, a schedule for the investigation and remediation, and a schedule for completing a Feasibility Study (FS) (DEQ, 1989). InterCity Gas Corporation was succeeded by International Comfort Products Corporation, which is now known as the UTC Canada Corporation (EDGE & AMEC, 2016). (Hereinafter, all these companies will be referred to as "UTCC.")

Flying J, Inc. received Order No. SF-89-00004, dated June 23, 1989, that included requirements similar to those of UTCC's Order (DEQ, 1989a). In December 2008, Flying J filed for Chapter 11 bankruptcy relief. In June 2009, DEQ filed a claim in the bankruptcy that included a claim for future remediation costs at the BWOR Facility. Flying J and DEQ ultimately resolved DEQ's claims in a Settlement Agreement and Stipulation which was approved by the bankruptcy court in July 2010 and Flying J was released from further obligations or liability at the BWOR Facility (United States Bankruptcy Court, 2010 and 2010a).

Mr. Habets received DEQ Order No. SF-89-00005, dated August 24, 1989, requiring that the BWOR Facility be fenced to control access (DEQ, 1989c). Additionally, Mr. Habets was ordered to cooperate with DEQ and other liable persons conducting work at the BWOR Facility, not to alter any contaminated area, and coordinate all "construction-type activities" with DEQ (DEQ, 1989c).

Subsequently, Mr. Habets has received three additional administrative orders:

- DEQ Order No. 94-0001, dated November 2, 1994, "Stabilization and Access" including removal actions and fence repair (DEQ, 1994);
- DEQ Order No. SF95-0002, dated April 11, 1995, "Interim Measures" including removal of property and fence repair (DEQ, 1995); and
- EPA (Region VIII) Order No. Resource Conservation & Recovery Act (RCRA) (7003) VIII-98-03, dated March 25, 1998, requiring protective netting of ponds presenting a threat to wildlife (EPA, 1998).

Mr. Stewart and his related company, L S Farms Inc., received DEQ Order # 94-0002, dated November 4, 1994, "Stabilization and Access" that includes requirements to conduct removal actions and fence repair (DEQ, 1994a). This Order is comparable to Mr. Habets' Order of November 2, 1994, incorporating many of the same provisions and "Work Required" (DEQ, 1994a).

2.3 INVESTIGATION HISTORY

In addition to the regulatory events described above, a number of investigations have been conducted at the BWOR Facility. These investigations are briefly described below:

- In 1979, EPA conducted a site inspection and completed a Hazardous Waste Identification and Preliminary Assessment of the BWOR Facility that outlined historical property usage and refinery product inventory information (EPA, 1979a).

- In 1980, EPA again inspected the BWOR Facility, documenting that the refinery infrastructure, waste pits, and product tanks remained despite no evidence of recent operations. The inspection included interviews of the BWOR Facility property owners and former refinery managers (Ecology & Environment, Inc., 1980).

- In 1984, DEQ completed a Preliminary Assessment and Site History Report for the BWOR Facility. The assessment summarized property owners, historical property usage, and onsite

asphalt pits. Based on the available data, DEQ recommended further investigation of the BWOR Facility (DEQ, 1984).

- In 1987 and 1988, EPA completed a site investigation that resulted in the preparation and submittal of an Analytical Results Report (EPA, 1988). After the 1988 investigation, EPA recommended "No Further Action" under CERCLA for the BWOR Facility (EPA, 1988). In 1990, EPA explained that "No Further Action" under CERCLA meant that although the site is ineligible as a CERCLA site, it does not mean health and/or environmental problems do not exist at the BWOR Facility (EPA, 1990).

- In 1989 and 1990, MSE, Inc., on behalf of DEQ, prepared and submitted two reports: a remedial investigation report, and sampling activities report for the BWOR Facility (MSE, Inc., 1990 and 1990a).

- In 1993, UTCC conducted a Phase II RI to supplement the data collected by DEQ and prepare the final RI Report. This investigation included an investigation of surface water, surface and subsurface soil/sludge/sediment, groundwater, and ambient air. Samples were collected to characterize concentrations of heavy metals, TEL, PAHs, total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and asbestos. Samples were collected throughout the BWOR Facility and it was found that petroleum hydrocarbon compounds, lead, and asbestos were present at the BWOR Facility (ViroGroup, 1994). This RI was not approved by DEQ at the time, but DEQ has since found it complete for the work conducted through that date (DEQ, 2015a).

- In 1994, DEQ employed Environmental Toxicology International, Inc. (ETI) to prepare a risk assessment of the BWOR Facility. ETI compiled all of the available site-specific data, validated it, and prepared two draft reports (ETI, 1994 and 1994a). ETI subsequently filed for bankruptcy and did not complete the work. DEQ provided the two drafts to UTCC, and UTCC used the draft reports as a starting place for preparing a risk assessment.

- Between 1994 and 2005, UTCC and DEQ worked on preparation of and ultimately finalized the Preliminary Remediation Action Objectives and Preliminary Remediation Goals (PRAO-PRG) Report, which is similar to a risk assessment (DEQ, 2016). This report included an identification of chemicals of potential concern (COPCs), an exposure assessment, a toxicity assessment, and provided risk-based PRGs (now referred to as site-specific cleanup levels (SSCLs)) for all media at the BWOR Facility. Additionally, this document included an ecological risk characterization (EDGE & AMEC, 2005).

- In 2006, UTCC conducted a supplementary soil/sludge/sediment sampling effort to better characterize contamination remaining at the BWOR Facility to improve the reliability of the alternative evaluations in the FS. A total of 27 surface soil/sludge/sediment and 32 subsurface soil/sludge/sediment samples were collected (EDGE, 2007). Unlike historical sampling events, benzene was not detected in the subsurface soil/sludge/sediment samples from November 2006. Some samples were collected with the intent of replicating previous sample data since laboratory analytical methods had improved to provide lower detection limits. The data demonstrated the area where the SSCLs for PAHs classified as B2 probable

human carcinogens (B2PAHs) were exceeded was smaller than initially thought, and that overall contamination at the BWOR Facility had decreased (EDGE, 2007). The report submitted following this sampling event included two updated comprehensive data tables for all of the surface and subsurface soil/sludge/sediment data collected at the BWOR Facility from 1989 through 2006 (EDGE, 2007).

- Between 2005 and 2014, UTCC and DEQ worked on preparation of the FS (DEQ, 2016a). The FS discussed potential remedial technologies or cleanup alternatives that may be used to complete cleanup at the BWOR Facility. This document synthesized previous data collected at the BWOR Facility, COPCs at the BWOR Facility, potential receptor exposure to contaminants, and evaluated remedial options for contaminants exceeding the SSCLs for the BWOR Facility. In reviewing the FS, DEQ identified data gaps that had to be addressed prior to evaluation of cleanup options.

- In 2011, UTCC conducted a soil vapor sampling event at the BWOR Facility. Thirteen soil gas samples collected from a depth of five feet below ground surface (bgs) from potential VOC source areas were planned for collection. However, only five of the thirteen samples were able to be successfully collected in the field. UTCC concluded that low permeability clay soils at the BWOR Facility significantly inhibit the movement of soil vapor in the subsurface and prevented successful sample collection at some locations (AMEC, 2012).

- In 2011, UTCC discovered that BNSF had taken the former BWOR Facility railroad siding (owned by BNSF) along the western boundary of the BWOR Facility out of commercial service. BNSF had re-ballasted the siding, including the Railroad Loading Area (RLA) and was using the siding to service its track maintenance equipment. BNSF's physical disturbance of the RLA may have involved the removal, spreading, or capping of the asphalt in the RLA, and BNSF has ongoing servicing of rail road equipment at this location (EDGE & AMEC, 2016).

- In 2014, DEQ identified the need for additional groundwater data collection to better evaluate one of the remedial alternatives included in the draft FS. UTCC prepared a sampling plan for the data (AMEC, 2014), which DEQ approved (DEQ, 2014). UTCC collected the groundwater data in October 2014 and reported it to DEQ in December 2014 (AMEC, 2014a).

- In 2015, UTCC submitted a Revised Addendum to the 2005 PRAO-PRG Report providing an update based on new toxicity values for some COPCs and new exposure factors. This document summarized the extent of contaminants in all media at the BWOR Facility, identified media specific COPCs, assessed exposure to COPCs for receptor populations, and ultimately calculated revised SSCLs (EDGE & AMEC, 2015).

- In 2015, UTCC submitted a revised FS that incorporated DEQ's comments on the draft FS as well as the new groundwater monitoring data collected in October 2014 (EDGE & AMEC, 2015a). That revised FS provided the basis for the alternatives evaluation in the Proposed Plan. The FS was finalized in 2016, concurrently with release of this ROD (EDGE & AMEC, 2016).

The results for the various investigations described above are discussed in Section 5.0.

2.4 INTERIM REMEDIAL ACTION HISTORY

Numerous interim remedial actions have occurred at the BWOR Facility. DEQ considered the interim remedial actions and integrated that information and actions into the remedy to the extent possible. Interim remedial actions (IRAs) conducted at the BWOR include the following:

- In 1995, UTCC conducted interim actions at the BWOR Facility to remove former refinery infrastructure, consolidated petroleum products present in pits at the BWOR Facility, abated asbestos, and completed a post demolition subsurface soil/sludge/sediment investigation. Asbestos-containing materials at the BWOR Facility included pipe and pipe joint insulation, tank and tower (stack) insulation, gasket material, and floor tile and adhesive (ViroGroup, 1994a). All identified asbestos-containing materials, 190.3 cubic yards (yd^3), were removed and disposed of at the City of Shelby Landfill under an Asbestos Abatement Project Permit issued by the DEQ Air Quality Division (ViroGroup, 1995). Free product gasoline was discovered in a test pit completed west of the former refinery process area. Impacts at the refinery Waste Water Pond (WWP) were found to be limited to the lateral edges of this pond. Hydrocarbon impacts were discovered between 0 and 8 feet bgs in the Refinery/Process Area (RPA) and beneath many of the former AST locations. Following demolition and removal activities, refinery infrastructure remaining included several large ASTs and several office, maintenance, storage buildings, and former refinery residential buildings used for storage (Figure 2). UTCC noted that activities remaining to be completed included removal of free product from Tanks 4 and 5, remediation of the WWP, remediation of contamination in refinery AST bermed areas and tank bottoms, soil/sludge/sediment remediation and recovery of free product gasoline in the RPA, and re-grading of the BWOR Facility to improve surface drainage (ViroGroup, 1995).

- In 1996, UTCC continued to conduct interim actions at the BWOR Facility to remove ASTs and refinery structures on the south side of Highway 215, installed a free product recovery system in the Road Oil Loading Area (ROLA) with the northside recovery trench extending into the RPA, stabilized the WWP, recovered and disposed of petroleum from ASTs, and abandoned BWOR Facility monitoring wells installed in 1993. Free product gasoline, discovered in the subsurface in 1995, was delineated with test pits and a petroleum recovery system was installed. This recovery system removed 3,620 gallons of free product and 3,520 gallons of water in 1996. Refinery infrastructure was removed including underground piping, scrap metal, lumber, refinery out-buildings, and miscellaneous vehicles at the BWOR Facility. The sludge in the WWP was solidified and stabilized with an 80% kiln dust and 20% Type II Portland Cement mixture at a 30% application rate. Toxicity Characteristic Leaching Procedure (TCLP) analysis on the treated sludge samples from the WWP demonstrated that the material was stable and non-leaching. An 18-inch temporary soil cap on top of a six millimeter polyethylene sheet was placed over the stabilized WWP. Figure 4 displays the location of the WWP. Additionally, 47 barrels (approximately 1,972 gallons) of petroleum was recovered from onsite AST #4 and transported offsite for recycling (ViroGroup, 1997).

- In 1997, UTCC continued to conduct interim actions and investigations at the BWOR Facility to recover free product gasoline from the subsurface, conducted surface soil/sludge/sediment sampling to delineate the extent of lead impacts in the TEL Addition Area (TEL area), placed a permanent soil cap and liner over the stabilized WWP, inventoried the quantity of drums containing petroleum products still remaining, and buried rebar-free concrete rubble in a soil borrow area. Forty-four drums were inventoried and listed as containing petroleum from former AST #6, and 20 drums were inventoried and found to contain sludge or scrap metal from other areas of the BWOR Facility. Concrete rubble not containing hazardous or deleterious substances was buried (after removing any rebar sticking out of the concrete) in a soil borrow area in the northern portion of the Northside Storage Area (NSSA). The free product gasoline recovery system removed 5,640 gallons of gasoline during 1997 and was recovered into an onsite 12,000 gallon storage tank that was ultimately transported offsite for recycling (ViroGroup, 1998). Surface soil/sludge/sediment sampling (0-12 inches) was conducted in the vicinity of the TEL area followed by excavation of approximately 57 yd^3 of soil/sludge/sediment with lead concentrations between 150 and 500 milligrams per kilogram (mg/kg) for placement on top of the temporary cap of the stabilized WWP. TEL soil/sludge/sediment with lead concentrations of greater than 500 mg/kg was left in place. A 60 millimeter flexible membrane liner and geonet combination liner was placed on top of the lead impacted soil/sludge/sediment in the WWP followed by several more feet of clean fill material excavated from the NSSA where the temporary cap soil was borrowed. Eighteen inches of clean topsoil imported from offsite was then placed on the minimum seven feet of cover on the WWP and the area was re-vegetated (ViroGroup, 1998).

- In 1998, UTCC continued to conduct interim actions and investigations at the BWOR Facility including the recovery of free product gasoline from the subsurface, the solidification and stabilization of additional sludge in the Small Sludge Pond (SSP), the disposal of lead-impacted soil/sludge/sediment, the disposal of 66 drums of non-hazardous waste, and the installation and sampling of four groundwater monitoring wells. The free product gasoline recovery system removed 2,213 gallons of free product gasoline and 4,250 gallons of groundwater from the subsurface (ViroGroup, 1999). The recovered gasoline was stored in a 12,000 gallon tank while the groundwater was used in the stabilization of the SSP (Figure 4). Petroleum sludge in the SSP was stabilized in the same manner as was conducted in 1996. Prior to stabilization of sludge in this area, approximately 250 yd^3 of lead impacted soil/sludge/sediment from the former TEL building area were excavated and added to the sludge in this pond. Additionally, 42 drums of non-hazardous petroleum waste from Asphalt Tank 6, approximately 20 yd^3 of surface sludge north of the SSP, and tank bottom material immediately southeast of the SSP were also added to the sludge pond prior to stabilization. A total volume of 1,469 yd^3 of materials were treated within the SSP using 337 tons of stabilization reagents (Portland cement, cement kiln dust, and water). Each of the thirty-five samples collected from the stabilized material met the interim action stabilization criteria and, as done at the WWP, a minimum of seven feet of clean fill material (including 18 inches of topsoil) and a 60 millimeter flexible membrane liner and geonet combination were placed on top of the stabilized material as a permanent cap, covered with soil, and re-vegetated (ViroGroup, 1999). Four groundwater monitoring wells were installed surrounding the free product gasoline recovery system. All four wells were sampled and found to have detectable

concentrations of petroleum compounds; MW-98-1 and MW-98-3 were found to exceed the Montana water quality (DEQ-7) standard for benzene. The remaining drums on the BWOR Facility were disposed of offsite by Oily Waste Processors of Great Falls (ViroGroup, 1999). In complying with an Order from the EPA in 1998, Mr. Habets installed protective netting over remaining ponds at the BWOR Facility as a wildlife protective measure.

- In 2004, DEQ approved UTCC to discontinue free product recovery after two consecutive years of essentially no recovery. From 1996 through 2003, the free product recovery system removed a total of 10,939 gallons of free product from the ROLA (EDGE, 2003). Free product recovery steadily decreased each year until no free product was recovered in 2002 and 2003. Free product has not been detected at the BWOR Facility since that time.

- In 2004, UTCC conducted interim actions to remove asphalt products present in open pits at the BWOR Facility. A total of 2,154 barrels, or 90,456 gallons, of asphalt was recovered from Asphalt Pits #3 through 6 (Figure 4) and sold to Robins Construction Company of Plains for re-use. An additional400 barrels, or 16,800 gallons, of asphalt were recovered from Asphalt Pits #3 through 6 and consolidated in Pits #7 and 8, with lower quality material placed in Pit #7 and higher quality material placed in Pit #8. By removing and consolidating asphalt, Pits #3 through 6 were emptied, over excavated by a few inches, and sampled at the extent of excavation for characterization purposes. Eight of the emptied pit soil samples (two from each pit – pit bottom and north sidewall) were analyzed for extractable petroleum hydrocarbons (EPH) and lead; while two samples (pit bottoms at Pits #5 and 6) were also analyzed for volatile petroleum hydrocarbons (VPH) and BTEX. Each sample was non-detect for EPH, VPH, and, where applicable, for BTEX. Lead concentrations ranged from 11.2 to 14.7 mg/kg. UTCC estimated that approximately 30,000 barrels, or 1,260,000 gallons, of asphalt remained between Pits #1, 2, 7 and 8 following this interim action (EDGE, 2005).

- In 2007, UTCC conducted interim actions to remove asphalt from open pits and place the recovered asphalt into ASTs at the BWOR Facility. Approximately 2,978 barrels, or 125,076 gallons, of asphalt were recovered from Pit #1 and placed into a 10,000 barrel (420,000 gallon) AST. Asphalt products remaining in ASTs at the BWOR Facility were analyzed for TCLP and ignitability and were determined to be non-hazardous waste. UTCC also conducted sampling of surface soil/sludge/sediment from secondary contaminant areas in the portion of the BWOR Facility north of Highway 215. Petroleum compounds were detected in most samples and C11-C22 aromatic hydrocarbons were found to exceed the SSCLs in some samples. UTCC estimated that approximately 28,428 barrels, or 1,193,976 gallons, of asphalt remained at the BWOR Facility, of which 2,978 barrels, or 125,076 gallons, were stored in ASTs (EDGE, 2008).

- In 2009 and 2010, UTCC continued to recover asphalt from open Pits #1 through 8 at the BWOR Facility and place the recovered asphalt into ASTs at the BWOR Facility. Approximately 1,890 barrels, or 79,380 gallons, of asphalt were recovered primarily from Pits #1, 2, and 8, along with residual material from Pits #5 and 6 that surfaced since the 2004 removal. Confirmation soil sampling was conducted at the emptied Pits #1, 5, 6, and 8. Characterization sampling was conducted at an offsite soil borrow area and at the lower

extent or eastern portion of the Oily Ditch (OD). All samples were analyzed for PAHs and EPH, with 20% analyzed for VPH. Many of the asphalt pit and OD samples exceeded the SSCLs for residential surface soil/sludge/sediment for EPH. As the sample concentrations for the emptied pits did not exceed the SSCLs for subsurface soil/sludge/sediment, UTCC backfilled the emptied pits with two feet or more of clean soil imported from the sampled borrow area. UTCC reassessed the volume of asphalt remaining and estimated that 2,847 barrels, or 119,574 gallons, of asphalt residue remained in Pit #7; 100 barrels, or 4,200 gallons, of asphalt remained in Pit #2; and 12,180 barrels, or 511,560 gallons, of asphalt remain in Asphalt Tanks 1, 2, 3 and 6, with Asphalt Tanks 4 and 5 being empty (EDGE, 2010).

3.0 COMMUNITY PARTICIPATION

The Proposed Plan (DEQ, 2015b) was made available to the public for comment from November 17, 2015, to December 16, 2015. DEQ provided notice of the public comment period and public meeting/hearing associated with the Proposed Plan via website posting and a site update mailing distributed to the local post office boxes, stakeholders, and local government entities. A legal notice of the public comment period and public meeting/hearing was published on November 22, 2015, in the Great Falls Tribune and on DEQ's website. At the request of UTCC, the public comment period was extended until December 30, 2015. A legal notice of the public comment period extension was published on December 6, 2015, in the Great Falls Tribune and on DEQ's website. DEQ held a public meeting/hearing on December 2, 2015, to present and discuss the Proposed Plan, answer questions, and to receive oral public comments.

Notice of the issuance of this ROD will be published in accordance with Section 75-10-713, Montana Code Annotated (MCA), and a copy of the ROD will be available to the public at the information repository at the Kevin City Government Office and at DEQ Waste Management and Remediation Division's office in Helena. The ROD is accompanied by a discussion of any notable changes to the selected remedy presented in the Proposed Plan along with reasons for the changes. Also included in Part 3 of the ROD is a Responsiveness Summary, which provides a response to each of the comments received during the comment period on the Proposed Plan.

The administrative record that contains the documents DEQ cited, relied upon, or considered in selecting the final remedy for the BWOR Facility (see Section 14.0) is available for review by contacting DEQ at:

Montana Department of Environmental Quality
Waste Management and Remediation Division
1225 Cedar Street
Helena, MT 59601 Business Hours: Monday – Friday, 8:00 am – 5:00 pm
(406) 444-6444

In addition, a copy of the ROD is available at:

Kevin City Government Office
211 Front Street
Kevin, MT 59454 Business Hours: Monday – Friday, 9:00 am – 1:00 pm
(406) 337-2141

4.0 SCOPE AND ROLE OF REMEDIAL ACTION

The BWOR Facility consists of approximately 80 acres that is bisected by Montana Highway 215 located immediately southeast and adjacent to the Town of Kevin, Toole County, Montana (Township 35 North, Range 3 West, Section 35) (Figure 1). The elevation of the BWOR Facility is approximately 3,324 feet above mean sea level. The BWOR Facility is generally bounded to the south by and includes the south drainage ditch, to the west by and partially including the BNSF rail line, to the north by the Town of Kevin wastewater treatment plant, and to the east by a dry lake bed. The actual BWOR Facility boundaries are based on the extent of contamination and no contamination is known to extend outside of these general boundaries (EDGE & AMEC, 2016). Beginning with the PRAO-PRG Report, UTCC apportioned the BWOR Facility into 18 general contamination source or refinery activity areas for more consistent referencing in future reports. The names and boundaries of these 18 source or activity areas are listed below and included in Figure 2. The area beyond the BWOR Facility fences and not included within one of the eighteen operating areas was identified as "Outside."

- Asphalt Pit Area (APA)
- Asphalt Tank Area (ATA)
- Cooling Water Pond (CWP)
- Gas Loading Area (GLA)
- Maintenance Area (MA)
- North Fence Area (NFA)
- Northside Storage Area (NSSA)
- Northside Tank Area (NSTA)
- Oily Ditch (OD)
- Product Storage Yard (PSY)
- Railroad Loading Area (RLA)
- Refinery/Process Area (RPA)
- Refinery Residential Area (RRA)
- Road Oil Loading Area (ROLA)
- South Drainage Ditch (SDD)
- TEL Addition Area (TEL area)
- Transfer and Storage Area (TSA)
- Waste Water Pond (WWP)

In general, the purposes of the RI and subsequent investigations were to collect data necessary to adequately characterize the BWOR Facility for developing and evaluating effective remedial alternatives that address human health and environmental risks at the BWOR Facility. The primary objectives of the RI, PRAO-PRG, FS, and other investigations for the BWOR Facility include the following:

- Adequately characterize the nature and extent of releases or threatened releases of hazardous or deleterious substances;
- Allow an assessment of health and ecological risks and development of SSCLs;
- Allow the effective development and evaluation of alternative remedies to be included in the FS to allow selection of a final remedy.

Based on the RI, PRAO-PRG and Addendum, and FS, DEQ finds that the data obtained is adequate for DEQ to evaluate and select an appropriate remedy for the BWOR Facility. Any

remaining data gaps will be evaluated during remedial design. The ROD contains SSCLs for all known chemicals of concern (COCs), and addresses all media contaminated from the hazardous or deleterious substances released from or associated with the former oil refinery operations at the BWOR described herein.

The ROD documents the final remedy for the BWOR Facility; it addresses the principal threats to public health, safety, and welfare and the environment posed by contaminated media; and selects a remedy that will comply with applicable or relevant state and federal environmental requirements, criteria, and limitations (ERCLs).

DEQ anticipates that remedial design for portions of the remedy will begin shortly after the ROD is issued, and implementation or construction will begin in approximately one year. Institutional controls (ICs) will be implemented during and/or after the construction phase of the remedy.

5.0 FACILITY CHARACTERISTICS

5.1 SITE CONCEPTUAL EXPOSURE MODEL

The Site Conceptual Exposure Model (SCEM) (Figure 5) is the framework for understanding the receptors and exposure pathways included in the PRAO-PRG evaluation and the way contaminants move in the BWOR Facility environment. It identifies the primary source of contamination at the BWOR Facility as the spills and releases of contaminants from historic refinery operations. Contaminants migrated from the soil/sludge/sediment to the groundwater and flowed with the groundwater to form a contaminant plume. Contaminants may also volatilize from the soil/sludge/sediment and groundwater, forming vapors, which can move underground upward into overlying structures. Contaminants in surface soils may be re-suspended as dust and may contribute to surface water contamination via contact with ponded surface water in depressions throughout the BWOR Facility. These primary sources and migration pathways result in potential exposures for humans through exposure to contaminated soil/sludge/sediment, exposure to contaminated groundwater, and breathing contaminated soil vapors resulting from volatilization from soils/sludge/sediment and groundwater.

While not included in the SCEM figure, the asphaltic materials present at the BWOR Facility also present a potential safety risk to people as well as a threat to birds and other wildlife (see Sections 7.1.2.2.2 and 7.2).

5.2 BWOR FACILITY OVERVIEW

5.2.1 Geographic Setting

The BWOR Facility is located in the glaciated Missouri Plateau of the Great Plains physiographic province in a glacial outwash channel that extends from Sweetgrass, Montana, to Kevin, Montana. The BWOR Facility is located in a northeast to southwest trending valley, which is generally flat and consists of several playa lake beds. The elevation of the BWOR Facility is approximately 3,324 feet above mean sea level. Most of the elevation change at the

BWOR Facility is man-made and consists of drainage ditches, holding ponds, and berms. There is approximately five feet of total relief across the BWOR Facility from west to east, which is also the general direction of surface water flow (runoff) across the BWOR Facility (ViroGroup, 1994). A dry playa lake bed is present on the northeastern edge of the BWOR Facility. The lake bed only contains surface water immediately following heavy rainfalls (ViroGroup, 1994). The BWOR Facility is generally surrounded by gently rolling hills covered with grasses, brush, and un-drained depressions forming numerous alkali lakes and flats. The Town of Kevin borders the BWOR Facility immediately to the west.

5.2.2 Climate

The local climate is semi-arid as reflected in the poorly established drainage system and lack of perennial streams. One of the closest weather stations to the BWOR Facility is Station "Sunburst 8E, #247996," which is operated by the National Climatic Data Center (NCDC) Cooperative Stations, part of the National Oceanic and Atmospheric Administration. Based on data from 1981 through 2010, the average annual precipitation is 13.87 inches, with the wettest months being May and June (NCDC, 2015). The mean annual temperature is 43.2 degrees Fahrenheit, ranging from a mean monthly temperature of 66.0 degrees Fahrenheit in July to 21.8 degrees Fahrenheit in December (NCDC, 2015). The Kevin area receives winds generally prevailing from the southwest, with gusts that can reach 70 miles per hour (ViroGroup, 1994).

5.2.3 Geology

The Natural Resources Conservation Service lists three distinct soil classes within the boundaries of the BWOR Facility including McKenzie – silty clay, NOBE – clay and clay loam, and ABSHER – clay (ViroGroup, 1994). Soil boring logs at the BWOR Facility have verified clay as the predominant soil type in the subsurface, with some silt to silty clay deposits and fill material more prevalent near the ground surface.

Approximately eight miles southeast of Kevin is the center of the Kevin-Sunburst dome. This uplift raised the Cretaceous Colorado Group to the surface where it was exposed and subsequently eroded into a valley, where the BWOR Facility is located. This valley has been filled with glacial outwash and more recently with playa lake bed deposits (ViroGroup, 1994).

5.2.4 Surface Water

Due to the semiarid climate, substantial quantities of surface water are not typically present at the BWOR Facility (EPA, 1988). There are no perennial surface water bodies present at the BWOR Facility. When present at the BWOR Facility, surface water represents storm water runoff that has not yet infiltrated into the soil or evaporated into the atmosphere (EDGE & AMEC, 2016).

5.2.5 Groundwater

The Town of Kevin provides a public water supply to residents. The source wells for the public water supply (PWS) are located six to eight miles west of Kevin (MSE, 1990). DEQ verified that the PWS source wells are still currently located at those distances to the west-northwest of

the Town and BWOR Facility (DEQ, 2014a). Groundwater flow is generally from the north to the south across the BWOR Facility. The measured potentiometric gradient ranges from 0.016 to the south to 0.005 to the north-northeast (Integrated Geosciences, Inc. (IGI), 2003). The saturated zone exhibits characteristics of perched groundwater lenses with depth to groundwater and well recovery rates varying from one well location to the next. During the monitoring well re-development and sampling in 2014, groundwater elevations ranged from 3,324.99 to 3,329.89 feet above mean sea level in wells MW-98-3 and MW-98-2, respectively; groundwater recovery times ranged from 2 days in MW-98-2 to 78 days in MW-98-3 (AMEC, 2014a). The average depth to groundwater in monitoring wells at the BWOR Facility is 5 feet bgs. Shallow groundwater is primarily located in perched zones that are recharged from surface water drainage (EDGE & AMEC, 2016).

Surface soils have been reported as saline and sodic, conditions that can ultimately reduce water infiltration and plant growth. Because recharge is from the surface through these soils, the quality of groundwater present within the vicinity of the BWOR Facility has been characterized as brackish to saline. UTCC conducted an evaluation of potential groundwater classification that revealed the groundwater at the BWOR Facility had specific conductance measurements averaging 42,109 microSiemens per centimeter (µS/cm) (EDGE & AMEC, 2005). After verifying the groundwater data fit the normal distribution, a 95 percent upper confidence limit of 47,974 µS/cm was calculated (EDGE & AMEC, 2005). According to the Administrative Rules of Montana (ARM) 17.30.1006, groundwater with a natural specific conductance of greater than 15,000 µS/cm at 25 degrees Celsius is classified as Class IV. Class IV groundwater must be maintained so that it is suitable for some industrial and commercial purposes, the DEQ-7 human health standards for carcinogens are met, and there are no increases of a parameter to a level that would adversely affect existing beneficial uses. There is no current usage of groundwater at the BWOR Facility (EDGE & AMEC, 2016).

5.3 BWOR FACILITY CONTAMINATION

DEQ evaluated data collected for the RI and subsequent to the RI to: (1) identify sources of contamination; (2) determine the extent of contamination in soil/sludge/sediment, groundwater, surface water, and soil vapor; (3) determine risks to human health and the environment; and (4) develop and evaluate cleanup options. During the RI and post-RI investigations, groundwater samples, surface soil/sludge/sediment samples, subsurface soil/sludge/sediment samples, surface water samples, and soil vapor samples were collected. The findings of the investigations are summarized below.

5.3.1 Asphaltic Materials

During a May 9, 1988, visit to the BWOR Facility, DEQ noted the remains of both a dog and a duck in one of the asphalt pits at the BWOR Facility (DEQ, 1988). DEQ received a letter from a Kevin resident on May 12, 1988, indicating that the resident's dog had died after getting into one of the asphalt pits at the BWOR Facility (Blount, 1988). In letters dated November 7, 1988, DEQ requested of Glen Habets, UTCC, and Flying J Inc. that two sludge pits be fenced (DEQ, 1988a and 1988b and 1988c). A May 8, 1989, letter from the Kevin Mayor identified concerns about the sludge pits after several area dogs were trapped in the sludge pits and died (Fagan,

1989). In 1989 and 1994 administrative orders, DEQ required of Glen Habets to install fencing around any unfenced pits and to control site access at all times (DEQ, 1989c and 1994). EPA Region VIII issued a unilateral administrative order (RCRA (7003) VIII-98-03) to Glen Habets and Habets Grain, Inc. on March 25, 1998, requiring protective netting of asphalt ponds which present an imminent and substantial endangerment to wildlife after a site visit identified 22 dead oiled birds around the asphalt ponds (EPA, 1998).

Samples of asphaltic materials for hazardous waste characterization were collected in 2007 and 2011. As described in Section 2.4, several interim remedial actions involved the removal of asphalt from pits and tanks at the BWOR Facility. Figure 4 displays the current locations of the remaining 15,663 barrels of asphaltic materials at the BWOR Facility, with 12,180 barrels of that total contained in onsite asphalt tanks. Although not identified on Figure 4, during a visit on October 25, 2011, DEQ also noted small amounts of asphaltic materials surrounding the former location of Asphalt Pit #8, where they appear to have migrated to the surface after asphalt recovery and excavation efforts were completed in Pit #8.

5.3.2 Soil/Sludge/Sediment

In the PRAO-PRG Report and its Addendum, contaminants detected in soil/sludge/sediment samples collected from the BWOR Facility were evaluated using a concentration-toxicity screen to identify those contaminants that required additional risk evaluations. Based on the results of the concentration-toxicity screen, the following were retained as COPCs in soil/sludge/sediment: VOCs (benzene and 2-hexanone), SVOCs (2-methylnaphthalene), PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and pyrene), metals (cadmium, copper, lead, mercury, and zinc), VPH (C5-C8 aliphatics, C9-C12 aliphatics, and C9-C10 aromatics), EPH (C9-C18 aliphatics, and C11-C22 aromatics), and total recoverable petroleum hydrocarbons (TRPH) (EDGE & AMEC, 2005 and 2015a). Areas at the BWOR Facility with soil/sludge/sediment exceeding SSCLs are shown on Figures 7 and 8.

5.3.3 Groundwater

The most recent sampling results from October 2014 indicate groundwater at the BWOR Facility is impacted by VPH (C5-C8 aliphatics, C9-C12 aliphatics, and C9-C10 aromatics), VOCs (benzene, ethylbenzene, naphthalene, toluene, and xylenes), and elevated levels of dissolved iron, manganese, nitrate, and sulfate. Class IV groundwater is not required to meet DEQ-7 human health standards for non-carcinogens so the SSCLs for Class IV groundwater are based on the DEQ-7 standards for carcinogenic contaminants. Groundwater data from the last five monitoring events (including October 2014) revealed that only one carcinogenic contaminant, benzene, was detected in groundwater at concentrations exceeding DEQ-7 standards. The DEQ-7 standard of 5 micrograms per liter (µg/L) for benzene was exceeded in MW-98-1 and MW-98-3 with concentrations at 10.6 and 117 µg/L, respectively (Figure 6) (AMEC, 2014a). Well MW-98-3 has historically exhibited the highest concentrations of benzene, but concentrations decreased from 200 µg/L in 2006 to 117 µg/L in 2014 (AMEC, 2014a). Elevated concentrations of dissolved iron, manganese, and sulfate were also present in 2014, but those parameters are not carcinogens and do not have numeric DEQ-7 groundwater standards.

5.3.4 Surface Water

Where the surface soil/sludge/sediment is uncontaminated or has been remediated to direct contact SSCLs, the potential pathway is eliminated. Therefore, when surface soil/sludge/sediment is remediated, contact with surface water is not expected to result in significant human or ecological exposure. Remediation of surface soil/sludge/sediment will remove the source of contamination for pooled surface water from storm water runoff (when present) and mitigate any potential risk associated with human and ecological exposure to this medium. In addition, re-grading of the BWOR Facility ground surface will reduce or eliminate surface water ponding.

5.3.5 Soil Vapor

UTCC conducted a soil vapor investigation at the BWOR Facility in October 2011. Soil vapor samples were successfully collected from five of thirteen sample locations (Figure 9). The COPCs included: benzene, bromodichloromethane, chloroform, ethylbenzene, 2-hexanone, methylene chloride, naphthalene, C5-C8 aliphatics, C9-C12 aliphatics, and C9-C10 aromatics. With the exception of bromodichloromethane and naphthalene, each of the targeted COPCs were detected in at least one soil vapor sample (AMEC, 2012). In addition, benzene and ethylbenzene were detected above the EPA Regional Screening Levels for industrial property use (EPA, 2012). C5-C8 aliphatics, C9-C12 aliphatics, and C9-C10 aromatics were present above the DEQ screening levels for industrial property use (AMEC & EDGE, 2016). However, the soil vapor survey indicated that the potential for soil vapor migration and accumulation beneath structures is relatively low based on low flow conditions (insufficient vapor recovery in eight of thirteen samples) resulting primarily from low permeability clayey soil types that underlie the BWOR Facility (AMEC & EDGE, 2016).

5.3.6 Ambient Air

UTCC conducted an ambient air monitoring event in 1992. During this event, 12 air samples were collected and analyzed for VOCs, SVOCs, and metals (a total of 36 samples). Although the analytical data associated with the acid extractable compounds were invalidated during review, all other air data were considered to meet data quality objectives (ETI, 1994). SVOCs detected in the air samples were bis(2-ethylhexyl)phthalate, di-n-butylphthalate, 2-methylnaphthalene, and naphthalene. Metals also detected in the samples included cadmium, copper, lead, and zinc.

UTCC evaluated this data in the Addendum to the PRAO-PRG Report; however, SSCLs were not calculated for di-n-butylphthalate, 2-methylnaphthalene, copper, lead, or zinc due to the lack of inhalation toxicity factors (EDGE & AMEC, 2015). SSCLs for ambient air were calculated for bis(2-ethylhexyl)phthalate, naphthalene, and cadmium. However, the maximum concentrations of those COPCs detected at the BWOR Facility were below the SSCLs (EDGE & AMEC, 2016). Therefore, this media does not pose an unacceptable risk and no remediation is required to address ambient air.

5.3.7 Asbestos

As described in greater detail in Section 4.0, all of the identified asbestos-containing materials were removed from the BWOR Facility in 1995. Asbestos-containing materials included pipe and pipe joint insulation, tank and tower (stack) insulation, gasket material, and floor tile and adhesive (ViroGroup, 1994). Therefore, no further remediation is required to address asbestos at the BWOR Facility.

6.0 CURRENT AND REASONABLY ANTICIPATED FUTURE LAND AND RESOURCES USES

6.1 LAND USES

The majority of the BWOR is within the Kevin town limits in Toole County, Montana. The BWOR Facility is currently not used by the property owner except for some storage of personal possessions. To the north and west of BWOR, current land use is the residential and commercial development of the Town of Kevin, on the opposite side of the BNSF rail line and Front Street (Figure 3).

As part of selecting the final remedy, Section 75-10-721(2)(c), MCA, requires that DEQ consider the reasonably anticipated future use of the Facility. DEQ determines the reasonably anticipated future use by assessing the four factors found in Section 75-10-701(18), MCA: 1) local land and resource use regulations, ordinances, restriction, or covenants; 2) historical and anticipated uses of the BWOR Facility; 3) patterns of development in the immediate area; and 4) relevant indications of anticipated land use from the owners of the BWOR Facility and local planning officials:

1. The Town of Kevin population was 154 at the 2010 census (US Department of Commerce, 2015). There are no zoning regulations or ordinances in Kevin or Toole County (EDGE & AMEC, 2016). Most of the BWOR Facility properties are assessed as agricultural rural (Montana State Library, 2015). No regulations, ordinances, restrictions, or covenants were identified that limit the uses of the property within the BWOR Facility.

2. Historically, the BWOR Facility has been used for commercial/industrial purposes, specifically as an oil refinery from 1925 to 1977 (except for the refinery residential area at the east portion of the BWOR Facility along Highway 215; those residences were used by refinery workers and are no longer habitable). There is a railway at the western edge of the BWOR Facility that has historically been used in commercial/industrial operations. In addition, the Town of Kevin uses a portion of the BWOR Facility for its wastewater treatment plant. Currently, most of the BWOR Facility has no active use other than storage, along with continued use of the railway and wastewater treatment plant.

3. A review of aerial imagery revealed very little new land development in the immediate area from 1991 to present (Google, 2015). Between 1991 and 2004, the Town of Kevin's present day wastewater treatment plant was constructed. Also during that time period, a single

family residence was constructed to the southeast outside the BWOR Facility boundary on property owned by Glen and Corliss Habets, and farther southeast an apparent salvage yard was developed on land owned by Habets Grain, Inc. No other prominent land development has taken place in the immediate area surrounding the BWOR Facility for the past 25 years.

4. To evaluate relevant indications of anticipated land use from the owners of the BWOR Facility and local planning officials, DEQ sent letters to Glen Habets, Habets Grain, Inc., BNSF, and the Town of Kevin. During a phone conversation with DEQ on March 17, 2015, Mr. Habets indicated his future land use plans are commercial/industrial for property he owns as well as that owned by Habets Grain, Inc. (DEQ, 2015). Mr. Habets confirmed this future use in his comments on the Proposed Plan (see Part 3 of the ROD). BNSF indicated that its property will continue to be used for railroad purposes and that it has no other anticipated uses for the property at this time (BNSF, 2015). Mr. Robert Fagan, the Mayor of Kevin, responded to DEQ in an email on April 10, 2015, indicating that the Town plans to continue utilizing the property at the north end of the BWOR Facility as the location of its wastewater treatment plant (Fagan, 2015).

The BWOR Facility has been used historically for primarily commercial/industrial use, and Kevin's population has been on a steady decline in recent decades, indicating that significant residential development in the area is unlikely in the near future. The property owners of the BWOR Facility indicated their intent to use the property for commercial/industrial purposes in the future. Based upon this evaluation of the four statutory factors, DEQ has determined the reasonably anticipated future use of the BWOR Facility is commercial/industrial.

6.2 GROUNDWATER USES

As indicated in Section 5.2.5, the Town of Kevin provides a public water supply to residents from source wells located six to eight miles west of Kevin (MSE, 1990). Therefore, groundwater underlying the BWOR Facility is not used for human consumption at the BWOR Facility or in the surrounding community. Additionally, the quality of groundwater present at the BWOR Facility has been classified as Class IV due to the high specific conductance which can generally be attributed to too many dissolved solids. Class IV groundwater is not suitable for human consumption, irrigation, or stock watering. However, Class IV groundwater must be maintained so that it is suitable for some industrial and commercial purposes, the DEQ-7 human health standards for carcinogens are met, and there are no increases of a parameter to a level that would adversely affect existing beneficial uses. There is no current usage of groundwater at the BWOR Facility. As part of the final remedy, an IC will prohibit the use of groundwater and installation of new wells where groundwater exceeds the SSCL for benzene, in addition to the buffer zone calculated in the FS. As shown on Figure 6, the pumping radius (referred to as a buffer zone) for a 100-gallon per minute industrial well was calculated to be 80 feet (EDGE & AMEC, 2016).

6.3 SURFACE WATER USES

There are no perennial surface water bodies at BWOR Facility. When present, surface water represents storm water runoff that has not yet infiltrated into the soil or evaporated into the

atmosphere (EDGE & AMEC, 2016) and the surface water at the BWOR Facility is not utilized for any purpose.

7.0 HUMAN HEALTH AND ECOLOGICAL RISK ANALYSIS

In 2005, EDGE and AMEC developed a PRAO-PRG Report, similar to a risk assessment, which included an identification of COPCs, an exposure assessment, a toxicity assessment, calculation of SSCLs for all media at the BWOR Facility, and an ecological risk characterization. In February 2013, EDGE and AMEC submitted an Addendum to the PRAO-PRG Report to incorporate updated toxicity information and developments in risk assessment guidance into the 2005 PRAO-PRG Report. The exposure factors and resulting SSCLs were further updated in 2015. These documents collectively summarize the extent of contaminants in all media at the BWOR Facility, identify media specific COPCs, assess exposure to COPCs for receptor populations, and calculate SSCLs where appropriate.

Through completion of the PRAO-PRG and its Addendum, EDGE and AMEC compared the COPC concentrations at the BWOR Facility with the SSCLs and numeric DEQ-7 standards. Based upon this evaluation, chemicals present at concentrations in surface soil/sludge/sediment, subsurface soil/sludge/sediment, and groundwater at the BWOR Facility that exceed SSCLs or DEQ-7 standards have been identified as COCs. When considering all potential receptor populations, unacceptable risks to human health and the environment were identified for the BWOR Facility groundwater and soil/sludge/sediment associated with 12 of the 18 operating areas along with the area defined as Outside (EDGE & AMEC, 2016). Those 12 operating areas are: APA, ATA, GLA, NFA, NSTA, OD, PSY, RLA, ROLA, RPA, SDD, and TSA (EDGE & AMEC, 2016). Cleanup of the soil/sludge/sediment and groundwater will also address identified soil vapor impacts. Remaining asphaltic materials at the Facility will also be removed.

The remedial actions selected in this ROD are necessary to protect public health, safety, and welfare and the environment from actual or threatened releases of hazardous or deleterious substances into the environment and to abate the imminent and substantial endangerment those releases pose.

7.1 HUMAN HEALTH RISKS

Current and potential future land uses were evaluated by UTCC as part of the PRAO-PRG Report and Addendum and SSCLs protective of those uses were calculated. For the purposes of the risk assessment, populations that were evaluated for potential exposure to contamination at the BWOR Facility include current offsite residents, future hypothetical onsite residents, future onsite commercial/industrial indoor workers, current and future onsite outdoor commercial/industrial workers, current onsite visitors/trespassers, and future onsite construction workers (EDGE & AMEC, 2015). A SCEM is provided as Figure 5. For each of the potential receptor populations listed above, ambient air was not determined to provide a significant pathway for exposure due to data being below SSCLs. Furthermore, the current (or future) offsite resident is not considered to have the potential for exposure to Facility-impacted soil/sludge/sediment since BWOR Facility investigations have not revealed any contamination to

offsite soil/sludge/sediments. For all other exposure scenarios, the exposure pathways of incidental ingestion, dermal contact, and inhalation of volatiles and particulates from soil/sludge/sediment were quantitatively evaluated. The exposure pathway of groundwater consumption does not exist because the groundwater the BWOR Facility is Class IV and not suitable for consumption. The exposure pathway of inhalation of indoor air containing contaminants volatized from groundwater or subsurface soil/sludge/sediment was initially quantified in the PRAO-PRG Report but was later eliminated as a quantified pathway. However, as explained in the PRAO-PRG Addendum, an onsite soil gas vapor investigation in 2011 led to the conclusion that, although possible where benzene in groundwater is present, the potential for soil/ gas vapor migration and accumulation in potential future structures is likely minimal at most locations throughout the BWOR Facility. Where the potential for soil gas vapor migration exists at the BWOR Facility, the proposed remedy will address the pathway. Additional details regarding the above pathways can be found in Section 4.0 of the PRAO-PRG Report and Section 4.0 of the Addendum (EDGE & AMEC, 2005 and 2015a) and are summarized in Section 2.10.3 of the Feasibility Study (EDGE & AMEC, 2016).

In the PRAO-PRG Report and its Addendum, UTCC estimated potential cancer risk and potential non-cancer effects for general exposure, ingestion, dermal contact, and inhalation. COPCs were identified by their detection frequency and exceedance of screening levels. COPCs were then separated based on their effect (i.e., cancer causing or non-cancer effects). Target hazard quotients were determined for non-carcinogenic effects based on target organs or critical effects to ensure that the total hazard index did not exceed 1.0 for any organ or effect. Target cancer risks were determined to ensure that the total excess lifetime cancer risk did not exceed a one in 100,000 (1×10^{-5}) individual excess lifetime cancer risk. "Excess lifetime cancer risk" is additional risk that someone might have of getting cancer if that person is exposed to cancer-causing compounds. DEQ considers an additional or excess 1 in 100,000 chance (or 0.001%, or 0.00001, or 1×10^{-5}) allowable. The most recent toxicity information available was used to calculate risk levels in the PRAO-PRG Addendum (EDGE & AMEC, 2015 and 2016).

7.1.1 Determination of COCs

COPCs that exceed SSCLs are COCs for the BWOR Facility. Petroleum hydrocarbon fractions (C5-C8 aliphatics, C9-C12 aliphatics C11-C22 aromatics, and TRPH), benzene, PAHs, and lead are the primary COCs remaining at the BWOR Facility in onsite surface and subsurface soil/sludge/sediment (direct contact) and onsite groundwater. Tables 1 and 2 identify the COCs in groundwater and soil/sludge/sediment and their SSCLs. A brief discussion of health effects from exposure to some of the contaminants that remain at the BWOR Facility follows.

7.1.1.1 Health Effects and Hazards

Health effects of petroleum hydrocarbons, benzene, lead, and PAHs are discussed below:

- Petroleum hydrocarbons: Health effects from exposure to petroleum hydrocarbons depend on many factors, including the type of chemical compounds in the petroleum hydrocarbons, how long the exposure lasts, and the amount of the chemicals contacted. Very little is known about the toxicity of many petroleum hydrocarbon compounds. Until more information is

available, information about health effects of petroleum hydrocarbons is based on specific compounds or on data for petroleum products that have been studied. According to the Agency for Toxic Substances and Disease Registry (ATSDR), the compounds in some petroleum hydrocarbon fractions can affect the blood, immune system, liver, spleen, kidneys, developing fetus, and lungs. Certain petroleum hydrocarbon compounds can be irritating to the skin and eyes and can cause neurological affects consisting primarily of central nervous system depression (ATSDR, 1999).

- Benzene: Brief or acute exposure to benzene, whether by inhalation or ingestion, can cause drowsiness, dizziness, rapid heartbeat, and, at high levels, even unconsciousness. Breathing benzene for long periods may cause damage to blood cell-forming tissues and immune systems. Long-term exposure to benzene can cause cancer of the blood-forming organs and reproductive organs (ATSDR, 2015).

- Lead: According to ATSDR, human exposure to lead occurs primarily through diet, air, drinking water, dust, and paint chips. The efficiency of lead absorption depends on the route of exposure, age, and nutritional status. In many human populations, exposure to elevated lead levels can create an increased risk of hypertension and higher blood pressure. The most sensitive system is the central nervous system, particularly in children. Irreversible brain damage occurs at blood lead levels greater than or equal to 100 micrograms per deciliter (µg/dL) in adults and at 80 to 100 µg/dL in children; death can occur at the same blood levels in children. For children, lead exposure can lead to a decrease in brain development and learning abilities, particularly with arithmetic and reading skills. For adult men, occupational lead exposure can decrease fertility. And for the general population, pre-term births increase when women are exposed (ATSDR, 2007).

- PAHs: The primary exposure route for PAHs is inhalation. Prolonged human exposure to some PAHs can lead to respiratory issues, including but not limited to breathing problems, lung abnormalities, chest pain and irritation, throat irritation, and increased coughing. A study showed that PAHs can also cause immunological and lymphoreticular effects such as reduced levels of serum immunoglobins, but the significance of such effects is unknown. Carcinogenic PAHs are commonly associated or included with other carcinogens in roofing tar emissions, coke oven emissions, and cigarette smoke, and therefore, studies cannot evaluate the contribution of any individual PAH to the total carcinogenic effects in humans from such mixtures. However, benzo(a)pyrene inhalation studies for animals found a significant increase in lung tumors (ATSDR, 2015a).

7.1.2 Calculation of Cleanup Levels

The following sections provide a discussion of COCs for each media and a discussion of the calculation of SSCLs, and the established regulatory cleanup levels. These cleanup levels establish acceptable levels that are protective of human health associated with exposure to soil/sludge/sediment, soil vapor, and groundwater, and protective of the environment by minimizing the migration of contaminants into the groundwater from soil/sludge/sediment. For human health, DEQ allows cleanup levels to be calculated based on cumulative risk levels less than or equal to a total excess cancer risk of $1x10^{-5}$ for carcinogens or a total hazard index less

than or equal to 1.0 for non-carcinogens. For the environment, soil/sludge/sediment cleanup levels must be adequately protective to ensure leaching to groundwater does not exceed DEQ-7 water quality standards and asphaltic material must be removed to prevent humans and wildlife from coming in contact with it which will address the entrapment (safety) hazard.

7.1.2.1 Groundwater

The Montana Board of Environmental Review (BER) has enacted rules establishing water quality standards for protection of human health pursuant to Section 75-5-301, MCA. Montana's numeric groundwater quality standards (DEQ-7 standards) are the applicable cleanup level for groundwater. As noted previously, the groundwater at the BWOR Facility is Class IV groundwater. Cleanup levels for Class IV groundwater are represented by the DEQ-7 standards (DEQ, 2012), for carcinogenic chemical compounds only (ARM 17.30.1006). Groundwater data from the October 2014 sampling event were compared to the DEQ-7 standards. This comparison revealed only one carcinogenic contaminant, benzene, in groundwater at concentrations exceeding the DEQ-7 standards (AMEC, 2014a). While it is anticipated that free product recovery was completed as part of the IRAs described in Section 2.4, if free product is encountered during remediation, it must be removed from the groundwater to the maximum extent practicable, which DEQ has determined to be 1/8 inch or less. The groundwater SSCL for benzene and requirement for free product removal are provided in Table 1.

7.1.2.2 Soil/Sludge/Sediment

7.1.2..2.1 Lead

The SSCL of 500 mg/kg for lead was calculated in 1997 using EPA's Integrated Exposure Uptake Biokinetic (IEUBK) model to represent a protective soil/sludge/sediment concentration for childhood exposure using a blood lead level endpoint of 10 µg/dL (ViroGroup, 1999a). This SSCL was utilized for interim action work in 1997 and 1998 and was incorporated into the PRAO-PRG Report. In 2012, the Centers for Disease Control (CDC) identified a blood lead level of 5 µg/dL as the level above which significant health risks may occur (CDC, 2012). While EPA has not yet adopted use of this lower blood lead endpoint for use in risk assessment, EPA has indicated that until the lead guidance is updated, risk assessments should include evaluations for both 10 µg/dL and 5 µg/dL blood lead endpoints. While this revised blood lead endpoint is lower than that used in the calculation of the SSCL for the BWOR Facility, DEQ has not required revision of the SSCL because it has determined the reasonably anticipated future use of the BWOR Facility to be commercial/industrial. Also, to ensure that this cleanup level for lead remains protective using new exposure assumptions and taking into account the lower blood lead level, DEQ used the IEUBK model to calculate SSCLs for commercial/industrial and construction workers using both the 5 µg/dL and 10 µg/dL blood lead levels, which resulted in cleanup levels greater than 500 mg/kg (see Appendix A for tables showing the resulting values). Therefore, DEQ has determined that the SSCL of 500 mg/kg is protective of both commercial/industrial workers and construction workers, consistent with the reasonably anticipated future use for the BWOR Facility.

7.1.2.2.2 Direct Contact

For each receptor population identified in Section 6.2 (except offsite resident as discussed in Section 6.2), SSCLs were quantified for potential exposure to surface soil/sludge/sediment through incidental ingestion, dermal contact, and inhalation of volatiles and particulates. Figure 7 displays the locations where SSCLs are exceeded in surface soil/sludge/sediment. The results are presented in the PRAO-PRG Report and Addendum (Table 2). In addition, asphaltic material must be removed to the maximum extent practicable, which DEQ has determined to be based on visible observation (Figure 4). Comparison of sample data to the SSCLs indicates that contaminants were detected at concentrations above corresponding SSCLs for the current/future onsite visitor/trespasser, the future onsite resident, the future industrial/commercial worker, or the future construction worker populations. Because future onsite residential use is not reasonably anticipated based upon the statutory evaluation described in Section 6.1, it is not considered further here. To ensure protection of human health and the environment, the more protective of the other SSCLs for each COC were used (e.g. SSCL for future onsite industrial/commercial worker). Therefore, these are considered potentially significant exposure pathways (Figure 5).

The future onsite construction worker population is also considered to have the potential for exposure to subsurface soil/sludge/sediment (2-10 feet bgs) through incidental ingestion, dermal contact, and inhalation of volatiles and particulates. An evaluation of sample data indicates that only one sample, NS-0601 in the ROLA, reported COC concentrations above the SSCLs based on construction worker exposure to subsurface soil/sludge/sediment (Figure 8). Therefore, although construction workers may have the potential for exposure to subsurface soil/sludge/sediment, there is a minimal risk for adverse health effects. The remaining receptor populations are not considered to have the potential for direct contact exposure to subsurface soil/sludge/sediment.

7.1.2.2.3 Leaching to Groundwater

An initial screening evaluation of the potential for contaminants detected in soil/sludge/sediment to migrate through leaching to groundwater was performed in the PRAO-PRG Report and updated in the Addendum (EDGE & AMEC, 2005 and 2015a). Groundwater at the BWOR Facility has been classified as Class IV groundwater and therefore only the DEQ-7 standards for carcinogenic contaminants must be met. Evaluation of the carcinogenic contaminants identified nine contaminants with concentrations above initial screening criteria, including benzene, bromodichloromethane, chloroform, ethylbenzene, methylene chloride, benz(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, and naphthalene (EDGE & AMEC, 2016).

Depth to groundwater at the BWOR Facility has historically ranged from 2.4 feet bgs at MW-2 to 21.86 feet bgs at MW-3 (IGI, 2002). Using these distances, the leaching time required for each contaminant to migrate to groundwater was estimated. Benz(a)anthracene, benzo(a)pyrene, and benzo(k)fluoranthene (the high molecular weight PAHs) have elevated retardation factors and very low dissolved phase migration potential indicating that these contaminants are basically immobile. These PAH constituents were not detected in groundwater and the lowest estimated leaching time to reach groundwater at 2.4 feet bgs is 5,800 years (EDGE & AMEC, 2016). Therefore, leaching of benz(a)anthracene, benzo(a)pyrene, and benzo(k)fluoranthene to

groundwater is not considered a complete migration pathway for the BWOR Facility, and removal or treatment of these contaminants from soil/sludge/sediment to provide protection of Class IV groundwater quality is not required.

The remaining six constituents have lower retardation factors and higher potential for dissolved phase migration. Chloroform and bromodichloromethane, which have not been detected in groundwater, have an estimated leaching time of 1.2 to 11 years to reach groundwater. The historical petroleum refinery ceased operation in 1977. If chloroform and bromodichloromethane were present at concentrations that would leach to groundwater, the time frame has been sufficient such that these contaminants should have been detected (EDGE & AMEC, 2016). Since neither chloroform nor bromodichloromethane were detected in groundwater, there is no reasonable potential for migration of them from soil/sludge/sediment to groundwater. Removal or treatment of soil/sludge/sediment to address these contaminants is not required.

Methylene chloride, benzene, ethylbenzene, and naphthalene have been detected in groundwater; however, only benzene has been detected at concentrations above DEQ-7 standards. Again, sufficient time has elapsed such that if methylene chloride, ethylbenzene, or naphthalene were present in soil/sludge/sediment at concentrations that could impact groundwater, then the impact would have been observed during previous groundwater monitoring events (EDGE & AMEC, 2016). Because methylene chloride, ethylbenzene, and naphthalene were not detected at concentrations that would adversely impact the Class IV groundwater at the BWOR Facility, there is no reasonable potential for migration of these contaminants from soil/sludge/sediment to groundwater. Therefore, removal or treatment of soil/sludge/sediments to address these contaminants is not required.

Benzene was detected above the DEQ-7 standard in the vicinity of the free product recovery system. A total of 10,939 gallons of petroleum were removed from the ROLA (Figure 2). As the recovery system was operated from 1996 to 2003, the amount of free product recovered steadily deceased to essentially no recovery in 2002 and 2003 (EDGE, 2003). Therefore, DEQ approved of UTCC discontinuing the system operation in 2004. The evaluation of the potential for benzene to leach from soil/sludge/sediment to groundwater indicates a leaching interval of 1.7 to 16 years. Since the petroleum refinery ceased operation in 1977, sufficient time has passed for such migration to occur, and it has occurred as indicated by the presence of benzene in the groundwater (EDGE & AMEC, 2016). Therefore, a SSCL for benzene leaching to groundwater was not calculated.

7.1.2.3 Soil Vapor

Historical soil/sludge/sediment data document the presence of low permeability clay soils at the BWOR Facility. The presence of this clay inhibits the migration of volatile hydrocarbon vapors in the soil/sludge/sediment at most BWOR Facility locations. This was further illustrated by the difficulty in obtaining sufficient soil gas samples during the 2011 investigation. UTCC concluded that the potential for soil gas vapor migration and accumulation in potential future structures is likely minimal at most locations throughout the BWOR Facility (AMEC, 2012). However, benzene is present in shallow groundwater in the center of the BWOR Facility and

there is a potential for vapor migration and accumulation if structures were to be built in this area. As noted previously, groundwater at the BWOR Facility has been classified as Class IV groundwater and only DEQ-7 standards for carcinogenic contaminants must be met for Class IV groundwater. The reasonably anticipated future use of the BWOR Facility is commercial/industrial and cleanup of the soil/sludge/sediment and groundwater will also address identified soil vapor impacts. The BWOR Facility has low permeability clayey soils which, along with the soil moisture, inhibit the flow of volatile hydrocarbon vapors in the soil/sludge/sediment at most locations (EDGE & AMEC, 2016). During the soil vapor investigation, samples were only able to be collected from five of 13 locations, under vacuum conditions (Figure 9). Even in areas where VOCs were detected by a photo-ionizing detector, there was no correlation between the photo-ionizing detector reading and the ability to obtain a soil vapor sample. The potential for soil vapor migration and accumulation in potential future structures is minimal (AMEC, 2012). Therefore, no independent SSCLs for soil vapor were calculated.

7.1.3 Evaluation of Uncertainties

This section evaluates uncertainties associated with the PRAO-PRG and Addendum (EDGE & AMEC, 2005 and 2015), which are discussed below.

Investigations have been conducted for soil/sludge/sediment, soil vapor, ambient air, groundwater, and surface water at the BWOR Facility and COPC concentrations and distributions are adequately characterized. While unlikely, it is possible that unidentified data gaps exist, and COPCs may be screened out and therefore not evaluated as COCs as a result.

In general, the available scientific literature is insufficient to provide a thorough understanding of potential toxic properties of chemicals to which humans are exposed. Therefore, it is necessary to infer these properties by extrapolation from data obtained under other conditions of exposure, usually from experimental laboratory animals. This introduces two types of uncertainties into the risk evaluation: (1) the uncertainty of extrapolating from one species to another; and (2) the uncertainty related to extrapolating from the high exposure doses usually employed in experimental animal studies to lower doses usually estimated for human environmental exposures. The development approach EPA applies to cancer slope factors and non-cancer reference doses likely results in an over estimate of the actual risk to humans. Because of the conservatism or uncertainty inherent in the non-cancer reference dose, a hazard quotient or hazard index greater than 1.0 does not necessarily mean that an adverse effect will occur.

7.2 ECOLOGICAL RISK EVALUATION

In 2004, UTCC conducted a preliminary screening level ecological assessment, identifying the current or potential future risk of harm to indicator terrestrial and aquatic species through the evaluation of exposures to the COPCs at the BWOR Facility. Of the eight species of concern listed in the Montana Natural Heritage Program (MNHP) report for Toole County, only the ferruginous hawk or *Buteo regalis* was identified as being found within the area of the BWOR Facility (EDGE & AMEC, 2005). The ferruginous hawk nests on the Kevin Rim, a prominent sandstone escarpment located approximately 4.5 miles northwest of the BWOR Facility. No

plant species listed as threatened or endangered under the Endangered Species Act were identified within a one-mile radius of the BWOR Facility. In addition, no threatened or endangered mammalian species were identified as inhabiting, or expected to inhabit, the same BWOR Facility area. There are three species of special interest potentially present at the BWOR Facility: the Dwarf shrew, the Preble shrew, and the Dakota toad (EDGE & AMEC, 2005).

Since the MNHP database had not been searched since 2004 for species of special status or concern in the BWOR Facility vicinity, DEQ conducted an on-line database search for the township including the BWOR Facility, Township 35 North, Range 3 West. Within that area of one square mile or 640 acres, no plant species of concern were identified (MNHP, 2016). Within the same search area, 11 animal species of concern were identified including two mammals (hoary bat and little brown myotis), eight birds, and one amphibian (MNHP, 2016a). The BWOR Facility occupies 80 acres of the 640 acres reviewed and there is no feature of the Facility that would make it more attractive to wildlife than the other 560 acres comprising the search area. Also, as described in the 2005 PRAO-PRG Report, none of the species of concern are expected to inhabit the BWOR Facility due to its historic use as an oil refinery, specific habitat needs of the species identified, and the nature of the species identified. No threatened or endangered species were identified in the updated review (MNHP, 2016 and 2016a).

No perennial streams or standing water bodies of ecological significance are present at the BWOR Facility. Based on this information, aquatic biota was not evaluated in the ecological assessment. Six wetland areas, including three man-made features of the former refinery (CWP, WWP, and OD) and three wet areas associated with the Town of Kevin wastewater treatment plant, were identified in the area of the BWOR Facility. Given the poor quality of this habitat, no wetland species were selected as indicator species.

Three indicator terrestrial receptors were quantitatively evaluated. These species and their potential exposure scenarios were 1) Richardson ground squirrel (soil/plant/squirrel), 2) Ferruginous hawk (soil/plant/squirrel/hawk), and 3) Horse (soil/plant/horse). For the exposure scenarios, three COCs were quantitatively evaluated:

- PAHs (i.e. benzo(a)pyrene, benz(a)anthracene, and benzo(k)fluoranthene),
- total inorganic lead, and
- mercury given its toxicity and potential to bioaccumulate in the food chain.

The ecological assessment quantitatively indicated that there is the potential for risk of harm to animals in direct contact with soil/sludge/sediment at the BWOR Facility for benzo(a)pyrene equivalents and lead (EDGE & AMEC, 2005). The evaluations were conservative in that they do not account for the fact that animals would not spend their entire lives within the boundaries of the BWOR Facility.

The assessment also qualitatively indicated that the open pits and asphalt filled secondary containment areas at the BWOR Facility present a potential for adverse health effects and even mortality for migratory waterfowl through the possibility of entrapment. Because exposure to COPCs in surface water is unlikely compared to the potential for exposure through soil

/vegetation ingestion, the potential exposure to surface water was qualitatively incorporated into the wildlife entrapment scenario.

7.3 SUMMARY OF COCS EXCEEDING SSCLS

In summary and listed by media, the COCs exceeding commercial/industrial SSCLs, with the location areas in parentheses, at the BWOR Facility are:

1. **Surface soil/sludge/sediment (0 - 2 feet bgs)** – B2PAHs (ATA, NFA, and RPA), C9-C18 aliphatics (NFA), C11-C22 aromatics (NFA and RLA), lead (NFA and NSTA), and TRPH (NFA, RLA, and ROLA);

2. **Subsurface soil/sludge/sediment (2 - 10 feet bgs)** – C5-C8 aliphatics (ROLA) and C9-C12 aliphatics (ROLA);

3. **Groundwater** – benzene (GLA and RPA);

4. **Surface water** – none. However, remediation of surface soil/sludge/sediment will address any future potential for onsite surface water or storm water to become contaminated;

5. **Ambient Air** – none; and

6. **Soil vapor** – SSCLs were not calculated because remediation of the soil/sludge/sediment and groundwater will also address soil vapor impacts.

Please refer to Figure 4 and Figures 6 through 9 for the locations where contaminated media is present or where COCs exceed SSCLs.

8.0 REMEDIAL ACTION OBJECTIVES

DEQ established Remedial Action Objectives (RAOs) for each contaminated medium. RAOs are general descriptions of what the remediation must accomplish in order to protect public health, safety, and welfare and the environment against unacceptable risk identified in the PRAO-PRG and Addendum, along with the FS, consistent with reasonably anticipated land use and beneficial use of groundwater. The PRAO-PRG and Addendum identified unacceptable risks to receptor populations for direct contact with soil/sludge/sediment. In addition, the PRAO-PRG and Addendum calculated SSCLs for onsite ambient or outdoor air (no exceedances or unacceptable risks identified), as well as SSCLs for soil/sludge/sediment that are protective of leaching to groundwater (EDGE and AMEC, 2005 and 2015a). The groundwater SSCL for benzene is the DEQ-7 standard. Using the RAOs, DEQ identified and screened remedial alternatives that will achieve protection of public health, safety, and welfare and the environment consistent with reasonably anticipated future land use and beneficial use of groundwater.

8.1 ASPHALTIC MATERIALS

The RAOs for asphaltic materials at the BWOR Facility include:

- Prevent human contact by removing asphaltic materials to the maximum extent practicable.

- Prevent wildlife from coming into direct contact with asphaltic material that is an entrapment hazard.

8.2 SOIL/SLUDGE/SEDIMENT

The RAOs for soil/sludge/sediment at the BWOR Facility include:

- Prevent direct contact exposures with surface soil/sludge/sediment (0 - 2 feet bgs) with concentrations of COCs in excess of the SSCLs listed in Table 2;

- Prevent construction worker direct contact exposures with subsurface soil/sludge/sediment (2 - 10 feet bgs) at location NS-0601 (ROLA) with concentrations of COCs in excess of the SSCLs listed in Table 2;

- Re-grade the BWOR Facility to minimize surface water ponding of storm water; and

- Prevent exposure to volatilized contaminants in indoor air (considered minimal for the majority of the BWOR Facility);

8.3 GROUNDWATER

The RAOs for groundwater at the BWOR Facility include:

- Prevent human exposure to groundwater containing benzene in excess of 5µg/L (DEQ-7 standard for benzene);

- Meet DEQ-7 water quality standard for benzene in groundwater; and

- Remove petroleum free product, if additional product is encountered, to the maximum extent practicable.

8.4 INDOOR AIR AND SOIL VAPOR

The RAO for indoor air and soil vapor at the BWOR Facility includes:

- Where there is potential for vapors from contaminants in shallow groundwater or soil vapor to accumulate beneath structures, limit exposure to contaminants that may volatize from groundwater to indoor air or from soil vapor.

9.0 DESCRIPTION OF FS ALTERNATIVES

The FS (EDGE & AMEC, 2016) describes the alternatives evaluated to cleanup soil/sludge/sediment, groundwater, and surface water at the BWOR Facility. Section 9.0 summarizes the alternatives evaluated in the FS. These alternatives are summarized and evaluated in the following sections using the remedy selection criteria provided in Section 75-10-721, MCA:

Protectiveness: Overall protection of public health, safety, and welfare and the environment addresses whether an alternative provides adequate protection in both the short-term and the long-term from unacceptable risks posed by hazardous or deleterious substances by eliminating, reducing, or controlling exposure to protective levels.

Compliance with ERCLs: This criterion evaluates whether each alternative will meet applicable or relevant state and federal ERCLs. Preliminary ERCLs are included in the FS (EDGE & AMEC, 2016). Final ERCLs are identified and located in Appendix C.

Mitigation of Risk: This criterion evaluates mitigation of exposure to risks to public health, safety, and welfare and the environment to acceptable levels.

Effectiveness and Reliability: Each alternative is evaluated, in the short-term and the long-term, based on whether acceptable risk levels are maintained and further releases are prevented.

Practicability and Implementability: Under this criterion, alternatives are evaluated with respect to whether the technology and approach could be applied at the BWOR Facility.

Treatment or Resource Recovery Technologies: This criterion addresses use of treatment technologies or resource recovery technologies, if practicable, giving due consideration to engineering controls. These technologies are generally preferred to simple disposal options.

Cost Effectiveness: Cost effectiveness is evaluated through an analysis of incremental costs and incremental risk reduction and other benefits of the alternatives considered. This analysis includes taking into account the total anticipated short-term and long-term costs, including operation and maintenance (O&M) activities.

The first two criteria, protectiveness and compliance with ERCLs, are threshold criteria that must be met in order for DEQ to select a remedy. The next five criteria are balancing criteria that DEQ evaluated to obtain the best balance in selecting the remedy. These criteria also consider present and reasonably anticipated future uses of the BWOR Facility as well as ICs. In addition to these criteria, DEQ considered the acceptability of the preferred alternative to the affected community, as indicated by community members and local government, during the public comment period on the Proposed Plan.

The cost estimate for each alternative evaluated in the FS was based on present worth estimates of capital and O&M costs for a specific time period. The costs were developed using environmental costing software and vendor information. The types of costs that were assessed include the following:

- Capital costs, including both direct and indirect costs
- Annual O&M costs, including long-term effectiveness monitoring cost
- Periodic costs
- Implementation of ICs
- Net present worth of capital, O&M costs, periodic costs, and implementation of ICs

A brief description of the cleanup alternatives presented in the FS (EDGE & AMEC, 2016) and evaluated by DEQ in the Proposed Plan are set forth below.

- Alternative 1 – No Further Action
- Alternative 2 – Stabilization/Solidification with Capping
- Alternative 3 – Asphalt Product Recovery
- Alternative 4 – Excavation and Offsite Landfill Disposal
- Alternative 5 – Excavation and Onsite Landfarming
- Alternative 6 – Excavation and Offsite Landfarming
- Alternative 7 – Monitored Natural Attenuation

In considering the affected media, the alternatives listed above relate to those media as follows:

o Asphaltic Materials	* Asphalt Product Recovery with either Stabilization/ Solidification with Capping (residue) or Excavation and Offsite Landfill Disposal (residue) * No Further Action
o Soil/sludge/sediment	* Stabilization/Solidification with Capping * Excavation and Offsite Landfill Disposal * Excavation and Onsite Landfarming * Excavation and Offsite Landfarming * No Further Action
o Groundwater	* Monitored Natural Attenuation * No Further Action

Typically, more alternatives for groundwater remediation would be evaluated in the FS. However, because this is Class IV groundwater and there is only a limited area (approximately 1.8 acres) of exceedance of one DEQ-7 standard, only two alternatives (along with source removal) were carried through in the FS. As stated earlier, no specific alternatives were evaluated for surface water because when surface soil/sludge/sediment is remediated, contact with surface water is not expected to result in significant human exposure. In addition, no alternatives were evaluated for soil vapor. Remediation of contaminated soil/sludge/sediment

and groundwater from the BWOR Facility, which are the sources of soil vapor, will also address the vapor-phase contamination.

9.1 COMPONENTS OF ALTERNATIVES

All remedial alternatives, except No Further Action, have site-wide elements. These site-wide elements are described here and are not repeated in the descriptions of alternatives that follow. These elements include ICs, engineering controls, site preparation, site re-grading, and long-term monitoring. The present net worth cost of implementing the site-wide elements is $526,667. The following assumptions are provided for the site-wide elements.

Institutional controls. ICs are defined in Section 75-10-701(11), MCA, as a restriction on the use of real property that mitigates the risk posed to public health, safety, and welfare and the environment. Although ICs do not remediate the contamination, they can be effective for managing human exposure to contaminants. The effectiveness of ICs depends on the mechanisms used and the durability of the institutional control. ICs may be layered to improve effectiveness. ICs are considered easy to implement and inexpensive to implement and maintain, although long-term enforcement may increase costs. Specific ICs that will be used at the BWOR Facility are listed below, and IC templates are provided in Appendix B.

Land Use Controls: Based on DEQ's evaluation of the reasonably anticipated future use of the Facility described in Section 6.1, DEQ has determined that the current and reasonably anticipated future use of the BWOR Facility is commercial/industrial. ICs, such as restrictive covenants, will be used to prohibit or limit future residential use. The stabilized WWP and SSP areas will require an IC to ensure they are protected in perpetuity and to require periodic inspection, maintenance (if necessary), and reporting. Based on the soil vapor study and benzene groundwater plume, construction of new buildings in those areas of the BWOR Facility that have the potential for vapor intrusion will be prohibited. Based on the soil vapor investigation and benzene groundwater plume, the areas for new building restrictions encompass approximately 11.4 acres (4.4 acres for the benzene groundwater plume plus 7 acres based on the soil vapor investigation) of the BWOR Facility and include: 1) the ROLA, 2) the western portion of the RPA, 3) the GLA, 4) the PSY in the vicinity of soil vapor sample SG-08, 5) the NFA in the vicinity of soil vapor sample SG-13, and 6) the portions of the benzene groundwater plume and associated buffer zone not included in these other areas (Figure 6) (EDGE & AMEC, 2016).

Groundwater Use Restrictions: ICs will be used to limit groundwater use at the BWOR Facility until SSCLs are met, or to limit property use during the time of active remediation or to otherwise protect the integrity of the remedy. The groundwater at the BWOR Facility has been classified as Class IV groundwater and it not suitable for human consumption, irrigation, or stock watering. Additionally, there are no residential or industrial wells at the BWOR Facility. Because groundwater exceeding SSCLs is present in a limited area, the FS included calculation of the potential radius of influence for a theoretical industrial well installed in the vicinity of well MW-98-3 (the well with the highest benzene concentrations) to determine a buffer zone of 80 feet surrounding the existing benzene groundwater plume for purposes of groundwater use restrictions (Figure 6).

Engineering Controls. Engineering controls are measures that help manage environmental and health risks by reducing exposure to contamination levels or limiting exposure pathways. Engineering controls encompass a variety of engineered remedies such as fencing to contain and/or reduce exposure to contamination and/or physical barriers intended to limit access to property. Although engineering controls do not remediate the contamination at the BWOR Facility, they can be effective for managing exposure to contaminants. The effectiveness of engineering controls depends on the mechanisms used and the durability of the engineering control. The initial cost of some engineering controls can be high, and generally engineering controls require some long-term maintenance. Examples of engineering controls that will be used at the BWOR Facility include fencing, signage, and possibly other security measures. One such measure, property perimeter fencing, is currently present at the BWOR Facility.

Site Preparation. Site preparation is those tasks required to mobilize a general contractor to the BWOR Facility and organize for remedial action. This may include establishing a site management office trailer with related support (power, communications, parking, toilet, etc.), posting signs, and removing debris or waste, which can impede remedial action (EDGE & AMEC, 2016).

As displayed on Figure 2, Production Tanks #4, #5, and #8 remain onsite in the NSTA and TEL, and contain a total of 3,043 barrels of non-RCRA hazardous waste. An initial site preparation task is to remove the tank contents from each tank and dispose of the contents offsite. Offsite disposal options include re-use as fuel in multi-fuel boilers, re-use as refinery feedstock, or disposal at licensed facility as non-RCRA waste (EDGE & AMEC, 2016).

Re-grading. The original refinery berms, barriers, ponds and pits were constructed by cut and fill at the BWOR Facility. The surface soil/sludge/sediment at the Facility is sodic and drains poorly. As a result, surface water drainage is poor and storm water can accumulate in low-spots. Historic refinery spills and leaks also accumulated in some of these areas. Since the refinery closed in 1977, the soil/sludge/sediment in these surface depressions has been weathered and most of these areas meet SSCLs.

Once contaminated materials or products are removed, the underlying soil/sludge/sediment often requires further action. The actions of backfilling excavations or depressions and site re-grading provide: 1) eliminating empty pits and excavations and unintended depressions, 2) minimizing the infiltration of surface water to the underlying groundwater, and 3) controlling and enhancing surface water drainage.

Site re-grading may require the importing of clean fill material. DEQ has previously approved a borrow area located on adjacent property and transport costs from this borrow location is minimal (EDGE & AMEC, 2016). General re-grading that is not attributable to a single alternative is included in the site-wide elements cost estimate.

After re-grading (or backfilling of any depressions and excavations), the disturbed ground surface will be re-vegetated using plant species native to the area. Re-vegetated areas must

achieve a vegetative cover equal to 85% of the vegetation cover of adjacent lands that have not been previously disturbed within three years of the initial seeding.

Long-term Monitoring. Monitoring is a common element to all remedial alternatives except No Further Action. However, the monitoring requirements may vary for each remedial alternative. The general objective of monitoring is to evaluate the effectiveness of the remedy, determine when SSCLs are achieved, and ensure the ongoing protection of public health, safety and welfare and of the environment.

Long-term monitoring has two key components: long-term monitoring and performance monitoring. Long-term monitoring is independent of remedial alternatives and is used to evaluate the nature and extent of the groundwater plume. Performance monitoring is specific to individual remedial alternatives and is used to evaluate the effectiveness of the remedy. As part of performance monitoring, routine inspections and maintenance of the existing WWP and SSP protective caps will be conducted.

9.1.1 Alternative 1 – No Further Action

DEQ requires that all other options be compared against the baseline, no action alternative. No further cleanup is considered under this alternative. Contamination would remain onsite and would continue to affect soil/sludge/sediment, groundwater, surface water, and soil vapor. No additional asphaltic materials would be removed. No ICs would be implemented and no engineering controls would be put in place.

Alternative 1 is not protective of human health and the environment in the short-term or long-term. BWOR Facility occupants, visitors, and wildlife would continue to have the potential for exposure to unacceptable levels of contamination in the soil/sludge/sediment and benzene in groundwater above SSCLs, and asphaltic materials would continue to pose a risk of entrapment for wildlife. Therefore, Alternative 1 does not meet ERCLs. Unacceptable risks would remain and would not be mitigated. This alternative would not be effective and reliable in the short-term and long-term because unacceptable levels of contamination would remain and human and ecological receptors would continue to have the potential for exposure to the contaminants. Alternative 1 is easily implemented, but does not use treatment or resource recovery technologies. The total present worth cost for implementing no further action at the BWOR Facility is $0.

9.1.2 Alternative 2 – Stabilization/Solidification with Capping

Stabilization/Solidification (S/S) with capping is an alternative for soil/sludge/sediment and/or asphaltic materials. Soil/sludge/sediment and/or asphaltic materials would be mixed with agents (in situ or ex situ) that encapsulate or immobilize the contaminants in a chemical matrix, significantly reducing the potential for exposure and continued migration into the environment. A soil cap or liner system would be required to protect the S/S material and to provide for long-term protection of the immobilized contaminant mass. Groundwater would not be addressed and would remain at unacceptable levels. Therefore, Alternative 2 alone is not protective of human health and the environment, and ERCLs will not be met. However, this alternative could be used in conjunction with other alternatives to meet the protectiveness and ERCLs compliance criteria.

As demonstrated by some of the interim remedial actions at the BWOR Facility, this alternative can be effective and reliable for addressing soil/sludge/sediment and asphaltic materials in the short–term and long-term with proper maintenance. However, other alternatives would be needed to address groundwater contamination. This technology is technically and administratively implementable at the BWOR Facility and could be completed in two years. The total present worth cost for implementing S/S with capping at the BWOR Facility is $548,228.

9.1.3 Alternative 3 – Asphalt Product Recovery

Asphalt product recovery is the separation of asphalt from asphaltic materials and pre-treatment of the recovered material to produce an asphalt product with a commercial value. The recovered and processed material can then be used as feedstock at an asphalt plant, as was done with BWOR Facility material as an interim remedial action in 2004, or blended with other asphalt prior to re-refining. Alternative 3 is a waste minimization and recycling process that could address 15,663 barrels of remaining asphaltic materials. Additionally, the sale of the resulting asphalt product has the potential to subsidize the cost of asphaltic materials remediation.

It is estimated that 80% of the asphaltic materials with a commercial value can be recovered. This will leave an estimated 20% (approximately 3,130 barrels) of the original volume that would need to be addressed. The FS cost estimate for Alternative 3 considers two ways to remediate this asphaltic residual using two other technologies being considered for the BWOR Facility:

3a. S/S with capping (Section 9.1.2); and
3b. Excavation and offsite landfill disposal (Section 9.1.4).

As demonstrated by interim remedial actions at the BWOR Facility, this alternative is effective and reliable for addressing asphaltic materials, but other alternatives would be needed to address other soil/sludge/sediment and groundwater contamination. Under Alternative 3, groundwater would not be addressed, and contaminated soil/sludge/sediment would remain onsite at unacceptable levels. Therefore, Alternative 3 is not protective of human health and the environment on its own and will not meet ERCLs or fully mitigate risks. However, this alternative could be used in conjunction with other alternatives and meet the protectiveness, ERCLs compliance, and mitigation of risk criteria.

Alternative 3 is technically and administratively implementable at the BWOR Facility. This alternative is a proven remediation technology which could be completed in two years. The total present worth cost for implementing Alternative 3a at the BWOR Facility is $399,921, and for implementing Alternative 3b at the BWOR Facility is $356,473.

9.1.4 Alternative 4 – Excavation and Offsite Landfill Disposal

Under this alternative, soil/sludge/sediment would be excavated within the remediation areas identified at the BWOR Facility and disposed offsite at a permitted landfill. Alternative 4 would significantly reduce the amount of contamination in soil/sludge/sediment. However, asphaltic

materials and contaminated groundwater would remain. Therefore, Alternative 4 by itself is not protective of human health and the environment in the short-term and long-term, but could be combined with other alternatives to meet the protectiveness criteria. Alternative 4 does not meet ERCLs on its own, but could be combined with other alternatives to meet ERCLs.

Alternative 4 would remove all contaminants in the soil/sludge/sediment that exceed SSCLs; therefore, there would be some significant mitigation of risk. This alternative is considered highly effective at removing contaminated soil/sludge/sediment to the depths it is found at the BWOR Facility. Because waste would be disposed of at a licensed engineered offsite landfill, regulatory requirements for the offsite disposal facility would effectively control the contamination. Unlike Alternative 5, this alternative would address metals contamination.

Alternative 4 is technically and administratively implementable at the BWOR Facility. Because no RCRA hazardous waste has been found at the Facility, an in-state Class II landfill could receive this material. The equipment and services to remove and transport the contaminated soil/sludge/sediment are commercially available and the action can be completed within the initial two-year period of remedial action. The total present worth cost for implementing Alternative 4 at the BWOR Facility is $342,456.

9.1.5 Alternative 5 – Excavation and Onsite Landfarming

Under this alternative, soil/sludge/sediment would be excavated from identified remediation areas at the BWOR Facility and placed in an onsite landfarm where contaminated soils would be tilled to add oxygen and enhance the degradation of contamination through biological processes. Alternative 5 would significantly reduce contaminant concentrations of petroleum hydrocarbons in soil/sludge/sediment site-wide. However, this alternative may not address asphaltic materials, and will not address metals contamination in soil/sludge/sediment or groundwater contamination at the BWOR Facility. Therefore, contaminants would remain at unacceptable concentrations. Alternative 5 by itself would not be protective of human health and the environment and would not meet ERCLs, but could be combined with other alternatives to meet the protectiveness criteria and ERCLs.

Alternative 5 relies on biological processes to degrade contaminants in soil/sludge/sediment to less harmful ones. However, these processes may not degrade asphaltic materials and will not degrade metals contamination. Therefore, there would be some mitigation of risk although asphaltic materials and metals would remain and groundwater contamination would not be addressed. Biological processes have been demonstrated as effective for degrading petroleum hydrocarbons in soil/sludge/sediment. Alternative 5 is technically and administratively implementable at the BWOR Facility. The concentrations of petroleum hydrocarbons present in the soil/sludge/sediments may be treated to below SSCLs within the initial two-year period of remedial action, but could also take longer. Options to optimize treatment timeframes would occur during remedial design. The equipment and services to install and operate an onsite landfarm are commercially available. The total present worth cost for implementing Alternative 5 at the BWOR Facility is $287,947.

9.1.6 Alternative 6 – Excavation and Offsite Landfarming

Under this alternative, soil/sludge/sediment would be excavated from identified remediation areas at the BWOR Facility and placed in an offsite landfarm where contaminated soils would be tilled to add oxygen and enhance the degradation of contamination through biological processes. Alternative 6 would significantly reduce contaminant concentrations of petroleum hydrocarbons in soil/sludge/sediment site-wide. However, this alternative may not address asphaltic materials, and will not address metals contamination in soil/sludge/sediment or groundwater contamination at the BWOR Facility. Therefore, contaminants would remain at unacceptable concentrations. Alternative 6 by itself would not be protective of human health and the environment, but could be combined with other alternatives to meet the protectiveness criteria. By itself, this alternative does not meet ERCLs.

Alternative 6 relies on biological processes to degrade contaminants in soil/sludge/sediment to less harmful ones. However, these processes may not degrade asphaltic materials and will not degrade metals contamination. Therefore, there would be some mitigation of risk although asphaltic materials and metals would remain and groundwater contamination would not be addressed. Biological processes have been demonstrated as effective for degrading petroleum hydrocarbons in soil/sludge/sediment. Alternative 6 is technically and administratively implementable at the BWOR Facility. Commercial offsite landfarm operations are operated in association with Montana landfills in Shelby, Floweree, and Valier. At these locations, landfarming is used to treat contaminants until the soil/sludge/sediment is acceptable for use in landfill operations such as daily cover. The total present worth cost for implementing Alternative 6 at the BWOR Facility is $407,685.

9.1.7 Alternative 7 – Monitored Natural Attenuation

Monitored natural attenuation (MNA) relies on slow natural processes to breakdown and attenuate groundwater contamination. MNA also relies on processes such as dispersion, dilution, and adsorption. Several decades could be required for groundwater to reach SSCLs under Alternative 7, although reducing the contamination source may accelerate natural attenuation. Therefore, this alternative by itself is not protective of human health and the environment in the short-term and long-term, but could be combined with other alternatives to meet the protectiveness criteria. ERCLs would not be met for potentially several decades under Alternative 7. If Alternative 7 was used alone, contamination in soil/sludge/sediment and asphaltic materials would remain. Therefore, this alternative alone is not effective and reliable in the short-term and long-term.

Alternative 7 is easily implementable and uses naturally occurring processes to attenuate the remaining contaminated groundwater. Documented declining contaminant concentrations and water quality indicators establish that natural attenuation is occurring at the BWOR Facility. An analysis of natural attenuation at the BWOR Facility is presented in Appendix D of the FS (EDGE & AMEC, 2016). Periodic groundwater monitoring would be conducted until the groundwater SSCLs are met (assumed to be 30 years for the purpose of the cost estimate). The total present worth cost for implementing Alternative 7 at the BWOR Facility is $84,447.

9.2 SHARED AND DISTINGUISHING FEATURES

9.2.1 ERCLs

None of the alternatives are expected to meet all applicable or relevant federal and state ERCLs individually. However, various combinations of the alternatives will comply with all ERCLs. Appendix C contains the complete list of ERCLs identified for the BWOR Facility.

9.2.2 Long-Term Reliability of Remedy

Alternatives 2, 5, 6, and 7 rely on ICs to help mitigate risk to human health at the BWOR Facility. ICs are considered moderately reliable because they rely on human actions. All technology options being considered in the alternatives are considered reliable over the long-term but each depends upon proper design, implementation, and maintenance.

9.2.3 Estimated Time for Design and Construction

All components within each alternative could be designed within one year or less and could be constructed within two years or less.

9.2.4 Estimated Time to Reach Cleanup Levels

Cleanup levels will not be met in the short-term or long-term for either groundwater or soil/sludge/sediment under any of the alternatives individually. However, in some combinations, it is possible to meet cleanup levels for both soil/sludge/sediment and groundwater in the long-term at the BWOR Facility. Please see Section 11.2, which is the discussion of the selected remedy, for specifics on timeframes for cleanup.

9.2.5 Cost

The cost estimate for each alternative is based on estimates of capital costs as well as operation and maintenance costs. Section 9.1 identified the estimated costs associated with each alternative. Section 10.7 details the comparison of alternative costs. A three percent discount rate is used in the cost estimates (EDGE & AMEC, 2016). Detailed cost estimates for the selected final remedy alternatives are provided in Appendix D.

9.2.6 Use of Presumptive Remedies

A presumptive remedy is a technology that EPA has determined, based upon its experience, generally will be the most appropriate remedy for a specified type of site. EPA establishes presumptive remedies to accelerate site-specific analysis of remedies by focusing feasibility study efforts (EPA, 1993 and 1993a). Although the BWOR Facility is not a CERCLA site, DEQ considered the presumptive remedy guidance as part of the alternatives analysis. The alternatives evaluated for BWOR Facility do not include a presumptive remedy.

9.3 EXPECTED OUTCOMES

The residual source area at the BWOR Facility poses a current and future risk to human health and the environment by continuing to contaminate groundwater and soil vapor, and the asphaltic material presents a continuing entrapment (safety) hazard. Remediating the contaminated soil/sludge/sediment and asphaltic materials by removal will reduce contaminant concentrations of petroleum hydrocarbons in groundwater, soil/sludge/sediment, and soil vapor, as well as remove the entrapment hazard posed by the asphaltic material.

Although the groundwater is not currently in use at the BWOR Facility, ingestion and direct contact with contaminated groundwater pose future risks to human health. Groundwater use and the installation of wells near or where groundwater exceeds SSCLs will be prohibited through the use of ICs in the form of restrictive covenants, until groundwater is remediated to the cleanup level for benzene.

Currently, inhalation of contaminated soil vapor is considered a risk to human health. SSCLs for soil vapors at the BWOR Facility were not calculated for reasons previously discussed in this ROD. Remediation of soil/sludge/sediment and groundwater to SSCLs will also eliminate any continuing source for contamination of soil vapor and therefore will ultimately cleanup soil vapor contamination.

Inhalation of contaminated indoor air is considered a future risk to human health if new buildings are constructed above the benzene plume in groundwater. Restrictive covenants will be required to prevent new building construction and soil/sludge/sediment excavation where there is a potential for contaminated soil vapors to pose unacceptable risks.

10.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

The alternatives are evaluated in the following section using the seven cleanup criteria provided for in Section 75-10-721, MCA, and described in Section 9.0. Protectiveness of public health, safety, and welfare and the environment and compliance with ERCLs are threshold criteria that must be met in order for a remedy to be further considered or selected. In the comparative analysis, DEQ also evaluates the remaining criteria to select the best overall alternatives for each media. This evaluation includes considerations of present and reasonably anticipated future uses of the Facility and the use of ICs. A list of the alternatives and their corresponding numbers is also provided to aid in this analysis.

- Alternative 1 – No Further Action
- Alternative 2 – Stabilization/Solidification with Capping
- Alternative 3 – Asphalt Product Recovery
- Alternative 4 – Excavation and Offsite Landfill Disposal
- Alternative 5 – Excavation and Onsite Landfarming
- Alternative 6 – Excavation and Offsite Landfarming
- Alternative 7 – Monitored Natural Attenuation

None of these alternatives alone can be used to remediate the entire BWOR Facility. Due to the size of the Facility, the extent of contamination, and the affected media, some of the remedial alternatives listed above are specific to affected material and areas, such as the location of asphaltic materials. Also, although no alternatives were evaluated for soil vapor, remediation of contaminated soil/sludge/sediment and groundwater, which are the sources of soil vapor, will also address the vapor-phase contamination.

10.1 PROTECTIVENESS

The criterion requiring overall protection of public health, safety, and welfare and the environment addresses whether an alternative provides adequate short-term and long-term protection from unacceptable risks. Protection may be achieved by eliminating, reducing, or controlling exposure to unacceptable levels of hazardous or deleterious substances present at the BWOR Facility. None of the alternatives alone provides adequate protection of public health, safety, and welfare and the environment over the short or long-term as the public could be exposed to unacceptable concentrations of and exposures to COCs in soil, and the onsite residual source would continue to contribute contamination to the groundwater. Alternatives can be combined to ensure protectiveness.

Alternative 1 is not protective. However, Alternatives 2, 3, 4, and 7, when combined with other alternatives to address all media, may provide adequate protection in the long-term. Although benzene would remain in groundwater for some time, there is no risk of exposure to it in Class IV groundwater with the use of ICs, along with ICs to eliminate the exposure pathway for contaminated soil vapor. Alternatives 5 and 6 (landfarming options), even when combined with alternatives to address the asphaltic materials and groundwater, would not provide adequate protection in the short-term and long-term because metals would remain in the treated soil/sludge/sediment.

Because of the characteristics of asphaltic materials, Alternative 3 is more protective for that media in that an estimated 80% of the volume currently onsite would be removed from the BWOR Facility and beneficially re-used. Combining Alternatives 3, 4, and 7 would remove all soil/sludge/sediment contamination from the BWOR Facility in the short-term while groundwater is managed in the long-term. Although similarly protective, Alternatives 2, 3, and 7 when combined would result in a significant amount of material remaining onsite, requiring additional remediation and ICs in order to be protective.

Combined, Alternatives 2, 3, and 4 would provide adequate protection for soil/sludge/sediment within three years. Alternatives 5 and 6 would provide protection within 10 years for soil/sludge/sediment but not for asphaltic materials, and not for metals in surface soil/sludge/sediment. With additional source removal, Alternative 7 would reduce benzene concentrations to below SSCLs within approximately 30 years (EDGE & AMEC, 2016).

ICs are a common element to the evaluated remedial alternatives. Further, ICs would be necessary for short-term and long-term protectiveness regardless of which alternatives are selected because of the existence of the stabilized WWP and SSP areas.

10.2 COMPLIANCE WITH ERCLS

This criterion evaluates whether each alternative will meet applicable or relevant state and federal ERCLs identified for the BWOR Facility. None of the alternatives attains ERCLs individually. However, these alternatives can be combined to achieve ERCLs.

With Alternative 1, asphaltic materials and soil/sludge/sediment contamination would remain, providing an ongoing contaminant source that may increase the timeframe for groundwater to reach SSCLs. Therefore, it does not meet ERCLs. Alternatives 2 through 6 will comply with ERCLs for all media except groundwater when combined with other alternatives in 3 to 10 years. Alternative 7, along with source removal, is estimated to meet ERCLs in approximately 30 years or less.

10.3 MITIGATION OF RISK

This criterion evaluates mitigation of exposure to risks to public health, safety, and welfare and the environment to acceptable levels. None of the active alternatives mitigate all of the identified risks.

Under Alternative 1, asphaltic materials, contaminated soil/sludge/sediment, and contaminated groundwater would remain at the BWOR Facility posing an unacceptable risk. Alternatives 2, 3, 4, 5, and 6 each mitigates some risk. Some combinations of those alternatives will remediate contaminated soil/sludge/sediment and asphaltic materials. Alternative 7 combined with the ICs associated with the groundwater will manage risk and prevent exposure until the benzene meets the SSCL.

10.4 EFFECTIVENESS AND RELIABILITY

Each alternative is evaluated, in the short-term and the long-term, based on whether acceptable risk levels are maintained and further releases are prevented. None of the alternatives alone are effective and reliable at addressing the contaminated media that exceeds SSCLs across the Facility, but are effective and reliable on particular areas or media. When multiple alternatives are implemented together, the combined result is effective and reliable across the Facility.

Alternative 1 is not effective and reliable in the short-term and long-term because unacceptable levels of contamination would remain, and contaminants would continue to be released to the environment. Alternative 2, 3, and 4 are effective and reliable for removing or stabilizing all contamination including metals from the soil/sludge/sediment. Alternatives 5 and 6 are comparably effective with all contaminants, except metals and asphaltic materials.

Alternatives 2 and 3 have been utilized as interim remedial actions at the BWOR Facility and their effectiveness and reliability have been demonstrated. Alternatives 4, 5, and 6 have been shown to be both effective and reliable for soil/sludge/sediment remediation. Alternative 7 combined with the ICs, prohibiting use of groundwater and construction of buildings (to address potential indoor air exposure), is effective and reliable in preventing exposure until benzene meets the SSCL.

10.5 PRACTICABILITY AND IMPLEMENTABILITY

Under this criterion, alternatives are evaluated with respect to whether this technology and approach could be applied at the BWOR Facility.

All the alternatives are technically practicable and implementable at the BWOR Facility.

10.6 TREATMENT OR RESOURCE RECOVERY TECHNOLOGIES

This criterion addresses use of treatment technologies or resource recovery technologies, if practicable, giving due consideration to engineering controls. These technologies are generally preferred to simple disposal options (see Section 75-10-721(2)(c)(iv), MCA).

Alternatives 1, 4, and 7 do not use treatment or resource recovery technologies. Alternative 3 is a waste minimization technology with a potentially significant resource recovery benefit. The remaining Alternatives 2, 5, and 6 include some form of treatment technology.

10.7 COST EFFECTIVENESS

Under Section 75-10-721, MCA, cost-effectiveness is determined through an analysis of incremental costs and incremental risk reduction, and other benefits of alternatives considered, taking into account the total anticipated short-term and long-term costs of remedial action alternatives considered, including the total anticipated cost of operation and maintenance activities.

Costs are estimated and actual costs may vary. Estimates are refined once DEQ issues the ROD and remedial design is completed.

Alternatives 1, 3, and 7 are less costly than the other alternatives (Appendix A). However, these three alternatives by themselves do not sufficiently reduce risks associated with contaminated soil/sludge/sediments. Because of the economic value of recovered asphalt, Alternative 3 is less costly than an asphalt materials treatment/disposal option, such as Alternatives 2 or 4.

Alternatives 4 and 6 are more costly in the short-term but less costly in the long-term. In these alternatives, contaminated materials are removed from the BWOR Facility for treatment or disposal and therefore are not subject to continuing long-term operation and maintenance costs (assumed to be 30 years for purposes of the cost estimate).

Alternatives 2 and 5 are onsite treatment or disposal options with Alternative 5 being the more cost effective of the two. Alternative 5 requires the construction and operation of a small onsite landfarm that will operate for a minimum of two years. Alternative 2 results in the construction of a long-term stabilization/solidification structure on the BWOR Facility. Although three other such structures were constructed as interim remedial actions, creating another such structure will incrementally increase the long-term operation and maintenance cost (assumed to be 30 years for purposes of the cost estimate).

11.0 SELECTED REMEDY

11.1 SUMMARY OF THE RATIONALE FOR THE SELECTED REMEDY

DEQ's selected remedy for the BWOR Facility is a combination of alternatives set forth below.

- Asphalt product recovery (Alternative 3b): The selected remedy for the asphalt with commercial value is product recovery and the selected remedy for the waste residual material is excavation and offsite disposal at a licensed and permitted landfill.

- Excavation and offsite landfill disposal for soil/sludge/sediment (Alternative 4): The selected remedy for soil/sludge/sediment exceeding SSCLs includes excavation and offsite disposal at a licensed and permitted landfill.

- MNA for onsite dissolved benzene plume (Alternative 7): The selected remedy for groundwater is MNA after source removal included in Alternative 4. The FS estimated the SSCL for benzene will be met within approximately 30 years or less when combined with source removal.

- Site-Wide Elements:

    - ICs: The selected remedy partially relies on the placement of DEQ-approved restrictive covenants on the properties that make up the BWOR Facility to limit the future use of the properties to commercial/industrial. This includes property owned by the Town of Kevin, BNSF, Glen Habets, and Habets Grain, Inc. In addition, a restrictive covenant to prohibit use of the groundwater where it exceeds SSCLs, as well as within the established buffer zone of the benzene plume, is necessary (see Figure 6). Construction of new buildings will be prohibited in those areas of the BWOR Facility that have the potential for vapor intrusion related to the groundwater plume and areas of soil vapor impacts (Figure 6). These areas will be surveyed during remedial design so that their use can be properly restricted. In addition, a restrictive covenant will be placed on the properties where the stabilized WWP and SSP are located to prohibit the use of those areas and limit disturbances of their protective caps (Figure 4).
    - Engineering Controls: The selected remedy partially relies on engineering controls to manage exposure to contaminants at the BWOR Facility. Examples of engineering controls that will be used at the BWOR Facility include fencing, pit netting, and signage. Facility perimeter fencing is currently present at the BWOR Facility.
    - Site Preparation: The BWOR Facility requires preparation and organization prior to implementing the final remedy. In addition, the contents of Production Tanks #4, 5, and 8 will be removed from the Facility for offsite re-use or disposal.
    - Re-grading: The site-wide elements also includes re-grading portions of the BWOR Facility to allow for better surface water drainage. Disturbed areas will also be re-vegetated.

- Long-Term Monitoring: Monitoring is necessary to evaluate the effectiveness of the remedy. Long-term and remedy performance monitoring are independent of remedial alternatives and used to evaluate the nature and extent of the contamination to evaluate if the remedy is effective. Long-term monitoring mirrors the proposed MNA monitoring for the benzene plume, but it may be adjusted during or following remedial design if necessary.

Costs and assumptions used in calculating the total present value of the selected remedy are provided in Appendix D and Section 11.3. These are estimates only and are subject to change during remedial design and implementation. The cost estimates are based on the assumption that the alternatives will meet the estimated cleanup timeframes (as identified in the individual alternative discussions) and these are preliminary estimates only. They are used to ensure that the costs of each alternative are compared and evaluated based upon consistent information. Actual costs and cleanup timeframes may vary and cost estimates will be further refined during remedial design.

As described in Section 2.4, numerous IRAs were conducted at the BWOR Facility between 1995 and 2010. Those IRAs helped reduce the threat to public health, safety, and welfare and the environment and contributed to the selected remedy because they reduced concentrations of COCs in soil/sludge/sediment and groundwater and direct contact risks to humans and wildlife. Many of those IRAs resulted in removal of hazardous or deleterious substances from the BWOR Facility (such as asphaltic material recovery, removal of asbestos-containing materials, and free product recovery). These recovery and removal IRAs are consistent with the final remedy. Two of the IRAs, stabilization of the WWP and the SSP, resulted in features that are still present at the BWOR Facility.

In 1996, UTCC stabilized the contents of the WWP using Portland cement and kiln dust and a temporary cap was placed over the pond (Virogroup, 1997). In 1997, UTCC permanently capped the WWP to protect the solidified material from the effects of freeze/thaw and rain water infiltration as well as to provide a physical barrier to direct contact with humans or wildlife. This permanent cap included installation of a flexible membrane liner and geonet combination, four to six feet of fill, and an 18 inch topsoil cover. A minimum of seven feet of cover was placed over the WWP. The cap was then re-vegetated with a native grass mixture (Virogroup, 1998).

In 1998, UTCC stabilized the contents of the SSP using Portland cement and kiln dust. UTCC also permanently capped the SSP to protect the solidified material from the effects of freeze/thaw and rain water infiltration as well as to provide a physical barrier to direct contact with humans or wildlife. This permanent cap included installation of a flexible membrane liner and geonet combination, seven feet of fill, and an 18 inch topsoil cover. The cap was then re-vegetated with a native grass mixture (Virogroup, 1999).

DEQ evaluated these two IRAs using the criteria found in § 75-10-721, MCA, to determine whether these IRAs are consistent with the final remedy.

<u>Protectiveness:</u> The WWP and SSP are functioning as designed and are therefore achieving protectiveness of public health, safety, and welfare and of the environment. DEQ evaluated the

need for fencing of the WWP and SSP to ensure protectiveness and determined that since both areas were solidified/stabilized and capped with at least five feet of cover material and the caps are functioning as designed, fencing of the WWP and SSP is not necessary to ensure protectiveness.

Compliance with ERCLs: The WWP and SSP were constructed consistent with solid waste and reclamation ERCLs. Both have a cover designed to minimize infiltration and erosion, more than two feet of cover over the stabilized material, and are re-vegetated with native grass.

Mitigation of Risk: By eliminating the potential for direct exposure to the soil/sludge/sediment and improvement of groundwater quality, the solidification of these materials in the SSP and WWP has mitigated risk to public health, safety, and welfare and of the environment.

Effectiveness and Reliability: Having been in place for 18-20 years, these IRAs have demonstrated that they are effective and reliable in the short-term. They show no signs of instability and are expected to remain effective and reliance in the long-term. In addition, the selected remedy includes routine monitoring and maintenance of the caps, as well as ICs to protect the integrity of the caps.

Practicability and Implementability: Because these IRAs were successfully implemented and have been in place for 18-20 years, they meet this criteria.

Treatment or Resource Recovery Technologies: These IRAs included the stabilization of soil/sludge/sediment with Portland cement and kiln dust.

Cost-Effectiveness: These IRAs were already implemented and have been established as effective; therefore, cost-effectiveness is established.

Based on this analysis, the WWP and SSP meet the CECRA criteria and these two features are included in the selected remedy. Long-term maintenance and the use of these areas must be restricted in order to protect the integrity of the remedy. A land survey of the WWP and SSP boundaries was included with the FS for the purpose of identifying ICs.

The selected remedy will reduce risks to public health, safety, and welfare and the environment through the following:

- The selected remedy will meet both threshold criteria: overall protection of public health, safety, and welfare and the environment, and compliance with ERCLs. The remedy accomplishes overall protection through removal of asphalt materials and soil/sludge/sediment, prohibit groundwater use until the SSCL is met for benzene, and restrict new building construction in areas of potential soil vapor contamination. It also includes implementation of ICs.

- The selected remedy mitigates risk to public health, safety, and welfare and the environment to an acceptable level because contaminated soil/sludge/sediment and groundwater will be remediated or attenuated, thereby reducing the potential for exposure or impact.

- The selected remedy provides short-term and long-term effectiveness and reliability because contaminated soil/sludge/sediment will be removed from the Facility for disposal at a landfill. Similarly, asphaltic materials and production tank contents will be removed from the Facility. Removal of those source materials will allow for long-term effectiveness of groundwater contamination naturally attenuating.

- The selected remedy is technically practicable and readily implementable. Excavation and offsite disposal for soil/sludge/sediment is commonly implemented in environmental cleanup due to its timeliness and controlled or predictable outcome. Previous groundwater monitoring at BWOR Facility indicates that MNA is already occurring and will continue and decrease benzene concentrations in the onsite dissolved groundwater plume to concentrations less than the SSCL.

- The selected remedy uses resource recovery as an element of the remedy; asphaltic materials with an economic value will be recovered and re-used. The use of engineering controls such as fencing is also included in the selected remedy.

- The selected remedy is cost-effective and balances incremental costs and incremental risk reduction, focusing on offsite disposal and re-use, combined with MNA for contaminated groundwater.

Based on the available data and using DEQ's expertise, DEQ finds that the selected remedy best meets the selection criteria and provides the appropriate balance considering site-specific conditions and criteria identified in CECRA.

11.2 DETAILED DESCRIPTION OF THE SELECTED REMEDY

DEQ selected a combination of alternatives to address asphaltic materials, soil/sludge/sediment, groundwater, and soil vapor. These include asphalt product recovery; excavation and offsite disposal of waste residue from asphaltic materials that cannot be recovered; soil/sludge/sediment excavation and offsite disposal; MNA for the groundwater plume; and site-wide elements including ICs, engineering controls, site preparation, re-grading, and long-term monitoring. Soil vapor will be addressed by cleanup of potential sources in soil/sludge/sediment and groundwater. The selected remedy is detailed below.

11.2.1 Site-Wide Elements

These elements include ICs, engineering controls, site preparation, ground surface re-grading and re-vegetation, and long-term monitoring. The total present worth cost for implementing the site-wide elements at the BWOR Facility is $526,667 as shown on Table D-1 of Appendix D. This table and all others in Appendix D are taken directly from the FS (EDGE & AMEC, 2016). ICs, site preparation (including removal of former production tanks), long-term monitoring and maintenance of existing WWP and SSP caps, and site re-grading, are included with this cost estimate. The cost of engineering controls was not designated in the FS but engineering controls, including maintenance of the fence at the BWOR Facility, may be necessary and will be

specified during remedy design. A summary of site-wide elements included in the cost estimate are provided below.

11.2.1.1 Long-Term Monitoring

Long-term and remedy performance monitoring are independent of remedial alternatives and used to evaluate the nature and extent of the contamination to evaluate if the remedy is effective. Long-term monitoring may include the MNA monitoring for the benzene plume, but it may be adjusted during or following remedial design if necessary. Long-term monitoring will include routine monitoring and maintenance of the existing WWP and SSP protective caps.

11.2.1.2 Institutional Controls

The selected remedy partially relies on the placement of a DEQ-approved restrictive covenant on the properties that make up the BWOR Facility to limit the future use of the properties to commercial/industrial. This includes property owned by the Town of Kevin, BNSF, Glen Habets, and Habets Grain, Inc. In addition, a restrictive covenant to prohibit use of the groundwater where it exceeds the SSCL for benzene, as well as within the established buffer zone of the benzene plume, is necessary (Figure 6). The benzene groundwater plume and 80-foot buffer zone are estimated to be an area of 4.4 acres (EDGE & AMEC, 2016). In conjunction with that restriction, construction of new buildings will be prohibited in those areas of the BWOR Facility that have the potential for vapor intrusion related to the groundwater plume and those areas where soil vapor impacts were identified during the soil vapor study. The area for new building restrictions encompasses approximately 11.4 acres (including the 4.4 acre benzene groundwater plume and buffer zone) and includes the ROLA, western portion of the RPA, GLA, PSY in the vicinity of soil vapor sample SG-08, the NFA in the vicinity of soil vapor sample SG-13, and the footprint of the benzene groundwater plume and associated buffer zone where it extends outside of these areas (Figure 6).

Two areas of the BWOR Facility (stabilized WWP and SSP) have been established during IRAs for onsite disposal of remediated materials. Restrictive covenants prohibiting the use of these areas and limiting cap disturbances, except for those necessary to inspect and maintain the caps, is also necessary.

Figure 3 identifies the properties within the BWOR Facility that will require ICs. Below is a list of those properties with the applicable ICs for each. Model restrictive covenants are provided in Appendix B for each of the four different combinations of ICs for the BWOR Facility properties. Below in parentheses is the identification for the model restrictive covenant that applies to that property. The provisions in these ICs are required to be implemented on the properties unless new or different information arises during remedial design indicating a modification is appropriate (i.e., the area of groundwater exceeding SSCLs is no longer present on a property).

- Town of Kevin: no future residential use (IC2)
- BNSF: no future residential use (IC2)
- Glen Habets: no future residential use; no disturbance of the portion of the WWP on that property; and an area with a prohibition on constructing new buildings (IC4)

- Habets Grain, Inc. #1: no future residential use; an area prohibiting the use of groundwater or installation of wells without DEQ approval until SSCLs are met; and areas with a prohibition on constructing new buildings (IC1)
- Habets Grain, Inc. #2: no future residential use (IC2)
- Habets Grain, Inc. #3: no future residential use; no disturbance of the portion of the WWP on that property and the SSP; an area prohibiting the use of groundwater or installation of wells without DEQ approval until SSCLs are met; and areas with a prohibition on constructing new buildings (IC3)

11.2.1.3 Site Preparation

The site-wide elements cost estimate includes a budget for preparing and organizing the BWOR Facility for remedial action. Such tasks can include establishing a site management office trailer with electricity and other temporary infrastructure, posting signs, and removing debris that would impede remedial action. In addition, site preparation will also include removing the contents of Production Tanks #4, 5, and 8 and disposing of the contents offsite by either re-use by third parties or disposal at licensed landfill as non-RCRA waste (EDGE & AMEC, 2016).

11.2.1.4 Site Re-grading

The site-wide elements cost estimate also includes re-grading portions of the BWOR Facility to allow for better surface water drainage. The areas to be re-graded to promote improved surface water drainage will be more specifically determined during remedial design. When the BWOR Facility was a refinery, berms, barriers, ponds, and pits were constructed, leading to poor surface drainage and the accumulation of rain water in low spots across the BWOR Facility. Once asphaltic materials and soil/sludge/sediment exceeding SSCLs is removed, the BWOR Facility will be backfilled where necessary, partially re-graded, and re-vegetated to improve the overall site conditions and reduce exposure pathways to some degree. Re-vegetated areas must achieve a vegetative cover equal to 85% of the vegetation cover of adjacent lands that have not been previously disturbed within three years of the initial seeding in order to meet ERCLs. DEQ has previously approved a borrow area on adjacent property, thereby reducing cost of clean fill material. The cost of excavation, backfill, and regrading that is associated with a single alternative (e.g. Alternative 4) was not included with the site-wide elements, but rather that remedial alternative.

11.2.2 Asphaltic Materials

An estimated 15,663 barrels of asphaltic materials remain at the BWOR Facility (EDGE & AMEC, 2016) (Figure 4). Asphalt product recovery will separate asphalt from waste residue to produce an asphalt product with commercial value. The income generated from sale of the recovered product will offset the overall cost for this remedy by an estimated $291,200 (Appendix D, Table D-2). Once asphalt product has been removed from the asphaltic materials, an estimated 20% of the original volume (3,130 barrels) will remain as a residual material. For remediation of the residual waste (including an asphaltic materials or sludge identified during implementation of the remedy), DEQ has chosen excavation and offsite disposal at a licensed and permitted landfill (the location will be selected during remedial design) (Alternative 3b). The

FS estimated that this remedy can be completed in two years. Detailed assumptions used for estimating costs for this preferred remedy are provided in Appendix D, Table D-2. The estimated cost for this alternative is $356,473.

11.2.3 Soil/Sludge/Sediment

The selected remedy for soil/sludge/sediment exceeding SSCLs includes excavation and offsite disposal at a licensed and permitted landfill of an estimated 4,976 yd^3 of contaminated soil/sludge/sediment (Figures 7 and 8). Confirmation soil samples will be used to demonstrate SSCLs have been met. Excavation and offsite disposal of impacted soil/sludge/sediments from the BWOR Facility would eliminate future exposure from contaminated soil/sludge/sediment and eliminate the leaching to groundwater risk. This remedy was chosen because it is more cost effective than onsite stabilization/solidification with capping and, unlike the landfarming alternatives, this preferred remedy has a more predictable and controllable completion timeframe and addresses all contaminants including metals. Detailed assumptions used for estimating costs for this preferred remedy are provided in Appendix D, Table D-3. The total estimated cost for this alternative is $342,456.

11.2.4 Groundwater

The selected remedy for groundwater is MNA after source removal included in Alternative 4. The FS estimated the SSCL for benzene will be met within approximately 30 years or less when combined with source control. Benzene contamination has generally exhibited a decreasing concentration trend and is estimated to exceed the SSCL over an area of approximately 1.8 acres in the central portion of the BWOR Facility (EDGE & AMEC, 2016). As identified in the cost estimate (Appendix D, Table D-4), the MNA remedy includes the installation and development of one new down-gradient well (MW-9). For cost estimation purposes, it was assumed that three groundwater monitoring wells (MW-9, MW-98-1, and MW-98-3) will be sampled twice per year (at high and low groundwater conditions) during the first two years. For cost estimate purposes, it was assumed that for years 3 to 30, the same three wells will continue to be sampled twice per year (at high and low groundwater conditions) every three years. The precise details of the long-term groundwater monitoring program will be developed after the ROD is issued during remedial design. In the meantime, low hydraulic conductivity of the BWOR Facility's mostly clay soils will limit the downgradient migration of benzene in groundwater and limit the contaminant plume to the central portion of the BWOR Facility. ICs will provide adequate protectiveness while benzene naturally degrades in groundwater to below the SSCL. Detailed assumptions used for estimating costs for this preferred remedy are provided in Appendix D, Table D-4. The estimated cost for this alternative is $84,447.

11.2.5 RAOs and Performance Standards

DEQ has established its RAOs for each contaminated media in Section 8.0.

SSCLs for groundwater are provided in Table 1. SSCLs for soil/sludge/sediment are provided in Table 2. Section 7.0 details the development of SSCLs for the BWOR.

11.3 COST ESTIMATE FOR THE SELECTED REMEDY

Appendix D presents detailed summaries of the costs and assumptions for each component of the selected remedy.

The total present worth value of the selected remedy is $1,310,043. These cost estimates were based on the information presented in the FS and provided in Appendix D of this ROD. Changes in the cost elements are likely to occur during the engineering design of the selected remedy or possibly as a result of new information during implementation. This is a feasibility-level engineering cost estimate expected to be within plus fifty to minus thirty percent of the actual project cost.

11.3.1 Cost Uncertainties

Remedial design will play an important role in determining final costs for the BWOR Facility remedy and will be more reflective of actual costs than the estimated costs presented in this ROD. Uncertainties that may affect the costs of the selected remedy include but are not limited to:

- The time required for MNA and performance monitoring may increase or decrease the costs of the monitoring.

- Increases or decreases in the number of wells to be monitored as part of long-term groundwater monitoring may increase or decrease the costs of monitoring.

- Costs associated with excavation are based on volume estimates calculated from existing data and the extent of excavation will be determined based on acceptable confirmation sample results. Depending on the volume of material ultimately excavated, the costs may increase or decrease.

- Costs associated with confirmation sampling may increase or decrease the cost if not reflective of what is included in the cost estimates.

- Costs associated with agency oversight of the remedial actions were not included in the cost estimates for the selected remedy. Costs associated with agency oversight may increase the cost of the selected remedy.

11.4 ESTIMATED OUTCOMES OF SELECTED REMEDY

The selected remedy uses a combination of ICs; soil/sludge/sediment removal, asphaltic materials and production tank contents removal, and MNA for groundwater to control exposures and protect public health, safety, and welfare and the environment over the long-term. The remedy will reduce contaminant concentrations. Successful removal of contaminated soil/sludge/sediment in the residual source area will reduce the continuing source of contamination contributing to groundwater and soil vapor concentrations. Institutional and engineering controls, along with monitoring and maintenance, will prevent exposure to

contaminated soils that are stabilized/solidified and capped onsite in perpetuity and to groundwater until SSCLs are achieved.

It will likely take one year for remedial design and two years for construction. After designs are complete, current estimates indicate that the asphaltic materials and soil/sludge/sediment will take approximately two years to remove from the Facility for proper re-use or disposal. Long-term monitoring, including MNA monitoring, will continue until groundwater concentrations are below cleanup levels and all other SSCLs are met. That is estimated to be 30 years for the purpose of estimating costs.

Land uses are not expected to change as a consequence of the remedial action. Land use is expected to remain commercial/industrial at the BWOR Facility. ICs in the form of restrictive covenants will ensure that BWOR Facility properties are restricted to commercial/industrial uses. In addition, ICs will prohibit the construction or development of structures overlying the benzene plume and areas of soil vapor contamination. ICs will also prohibit disturbance of the WWP/SSP capped areas. ICs will also prohibit the installation of groundwater wells where benzene exceeds the SSCL and where pumping from wells could affect the migration of the groundwater plume.

Cleanup of the contamination associated with the BWOR Facility is expected to produce a positive effect for ecological receptors as well. In particular, removal of the asphaltic material will reduce the risk of entrapment for wildlife.

12.0 STATUTORY DETERMINATIONS

Under Section 75-10-721, MCA, of CECRA, DEQ must select a remedy that will attain a degree of cleanup of the hazardous and deleterious substance and control of a threatened release or further release of that substance that assures protection of public health, safety, and welfare and of the environment. In approving or carrying out remedial actions performed under Section 75-10-721, MCA, DEQ must require cleanup consistent with applicable state and federal ERCLs, and may consider substantive state and federal ERCLs that are relevant to site conditions. In addition, DEQ must select a remedy considering present and reasonably anticipated future uses, giving due consideration to ICs. The selected remedy must mitigate risk, be effective and reliable in the short- and long-term, be practicable and implementable, and use treatment or resource recovery technologies, if practicable, giving due consideration to engineering controls. The selected remedy must also be cost effective. Finally, DEQ considers the acceptability of the remedy to the affected community, as indicated by community members and the local government. DEQ has considered all public comment received during the public comment period on the Proposed Plan, has responded to these comments in Part 3 of the ROD, and made changes to the selected remedy based upon those public comments.

The selected remedy is protective of public health, safety, and welfare and the environment, complies with ERCLs, mitigates risk, is effective in the short- and long-term, is practicable and implementable, uses treatment and resource recovery technologies, and is cost-effective.

The following sections discuss how the selected remedy meets the CECRA statutory requirements.

12.1 PROTECTION OF PUBLIC HEALTH, SAFETY, AND WELFARE AND THE ENVIRONMENT

CECRA provides that protection of public health, safety, and welfare and the environment is a threshold criterion in selecting a remedy. DEQ has determined that the selected remedy appropriately protects public health, safety, welfare and the environment through the following:

- Removal of asphaltic material (including product tank contents) and contaminated soil/sludge/sediment from the Facility will provide for protection of human health and the environment.

- MNA, in combination with onsite source remediation, will be protective of human health and the environment.

- Implementation of the soil/sludge/sediment and groundwater remedies will address soil vapor.

- Placement of restrictive covenants on each property within the BWOR Facility boundaries will restrict the properties to commercial/industrial use.

- Placement of restrictive covenants on the property overlying the benzene groundwater plume and established buffer zone, as well as the identified areas of soil vapor contamination will prohibit the construction or development of structures to address potential vapor intrusion issues. This restriction above the benzene plume is limited to the time while benzene exceeds the SSCL; once MNA is complete, the restriction can be removed. Restrictive covenants associated with the WWP and SSP IRA locations will prohibit disturbance of the caps and will require permanent restrictions and O&M requirements.

- Restrictive covenants on property overlying the benzene plume in groundwater and the established buffer zone surrounding the plume will protect the public from ingestion of groundwater, and prevent the migration of contamination through pumping, should an industrial well be installed before benzene concentrations are reduced to meet SSCLs.

- Implementation of the final remedy will ensure protection of the limited ecological receptors at the BWOR Facility.

12.2 COMPLIANCE WITH ERCLS

The final determination of ERCLs is included in Appendix C of this ROD. The selected remedy will comply with all applicable and relevant ERCLs. Some significant ERCLs compliance issues are discussed below.

For the COCs in groundwater, the contaminant-specific ERCLs for the remedial action are the carcinogenic standards specified in DEQ-7. Removal of soil/sludge/sediment exceeding SSCLs followed by MNA will lead to compliance with applicable DEQ-7 standards within a reasonable timeframe.

The selected remedy requires excavation and disposal of soil/sludge/sediment exceeding SSCLs and the residue from the asphaltic materials at an offsite licensed and permitted landfill. That facility will meet solid waste permitting requirements. In addition the onsite stabilized areas (WWP and SSP) were constructed in compliance with solid waste ERCLs and will be maintained to ensure the caps remain in place.

12.3 MITIGATION OF RISK

The selected remedy for soil/sludge/sediment was selected over other alternatives because it is expected to achieve timely, substantial, and long-term risk reduction through excavation and offsite disposal, and is expected to allow the property to be used for the reasonably anticipated future land use, which is commercial/industrial. The selected remedy for groundwater was selected over the other alternatives because, after remaining source removal, it is expected to achieve substantial risk reduction through cost effective natural processes that have already reduced contamination in recent decades since the removal of free product from the BWOR Facility. Until that occurs, restrictive covenants will limit the installation of wells and prohibit construction of new buildings in certain areas until SSCLs are met. In addition, restrictive covenants will limit the use and disturbance of the stabilized WWP and the SSP areas. The selected remedy reduces the risk within a reasonable timeframe and is cost-effective because it attains the highest level of risk reduction compared to cost. In addition, asphaltic materials will be removed to the maximum extent practicable, and the cleanup includes long-term monitoring and maintenance of the stabilized WWP and SSP and groundwater, as well as ICs to mitigate risk.

12.4 EFFECTIVENESS AND RELIABILITY

The selected remedy will remove contamination from soil/sludge/sediment by excavation and offsite disposal, remove asphaltic materials where found throughout the BWOR Facility and remaining production tank contents, and allow natural processes to reduce or remove contamination from groundwater. The preferred remedy provides for long-term reliability of the remedy because soil/sludge/sediment exceeding SSCLs will be disposed offsite and confirmation sampling will be used to demonstrate that SSCLs have been met.

12.5 PRACTICABILITY AND IMPLEMENTABILITY

The selected remedy is technically practicable and implementable at the BWOR Facility because the technologies are routinely used successfully in the environmental field, and portions of the selected remedy have been successfully demonstrated as effective previously at BWOR Facility.

12.6 USE OF TREATMENT OR RESOURCE RECOVERY TECHNOLOGIES

The selected remedies for soil/sludge/sediment and groundwater do not use treatment technologies. Asphalt product recovery is a resource recovery technology.

12.7 COST EFFECTIVENESS

The selected remedy is cost-effective, taking into account the total short- and long-term costs of the actions, including O&M activities for the entire period during which the activities will be required. The selected remedy provides overall risk reduction proportionate to the costs. To the extent that the estimated cost of the selected remedy exceeds the costs of the other alternatives, the difference in cost is reasonably related to the greater overall reduction in risk provided by the selected remedy and the reliability. The detailed evaluation of the balance of these criteria among the alternatives considered is set forth in the FS and in Section 10, Comparative Analysis of Alternatives, of this ROD.

13.0 DOCUMENTATION OF NOTABLE CHANGES FROM PREFERRED ALTERNATIVE OF PROPOSED PLAN

The Proposed Plan for the BWOR Facility was released for public comment on November 17, 2015. The Proposed Plan identified a combination of Alternative 3b (asphalt product recovery) to address the asphaltic materials at the Facility; Alternative 4 (excavation and offsite landfill disposal) to address soil/sludge/sediment exceeding SSCLs; and Alternative 7 (MNA, along with source removal) for groundwater exceeding the SSCL for benzene. The preferred remedy also included ICs, long-term monitoring, site preparation, engineering controls, and site re-grading. DEQ has reviewed and responded to all written comments for the Proposed Plan submitted during the public comment period (see Part 3). DEQ incorporated some of those comments into the ROD when appropriate. However, there were no changes necessary to the final remedy selected in this ROD.

14.0 ADMINISTRATIVE RECORD REFERENCES

DEQ cited, relied upon, or considered the following documents in selecting the remedy for the BWOR Facility. It does not include legal citations such as those found in the MCA, ARM, United States Code, and Code of Federal Regulations (CFR). Any document, model, or other reference identified in the Final RI report (ViroGroup, 1994), PRAO-PRG Report and Addendum (EDGE & AMEC, 2005 and 2015), and the Final FS report (EDGE & AMEC, 2016) are also incorporated herein as part of the administrative record.

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PART 3

RESPONSIVENESS SUMMARY

1.0 INTRODUCTION

The Montana Department of Environmental Quality (DEQ) solicited public comment on the Proposed Plan (DEQ, 2015b) for the Big West Oil Refinery (BWOR) Facility in Kevin, Montana, during a public comment period that ran from November 17, 2015, to December 30, 2015. (The public comment period was originally scheduled to end on December 16, 2015, but at the request of United Technologies Canada Corporation (UTCC), DEQ extended the public comment period to December 30, 2015.) DEQ also held a public meeting and hearing in Kevin on December 2, 2015. At the public hearing, people were offered the opportunity to submit oral comments but no one provided any oral comments during that hearing. DEQ received written comments from two individuals or organizations during the public comment period (DEQ, 2015c).

1.1 Community Involvement Background

The Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA) provides for the public to have input into the DEQ decision-making process with respect to the final cleanup of state Superfund facilities. At the BWOR, DEQ has involved the community, including local officials and residents, in various aspects of the investigation and cleanup. Most recently, DEQ held a public meeting at the Kevin Depot Center as described above, to summarize DEQ's preferred final remedy for BWOR Facility and provide Kevin officials and citizens the opportunity ask questions and submit oral comments on the Proposed Plan. DEQ also sought written public comment on the Proposed Plan, prepared this written responsiveness summary, and incorporated those changes, if necessary, into the Record of Decision (ROD).

1.1.1 Notification of Public Comment Period

Press notices were posted on DEQ's website and were published in the Great Falls Tribune, a daily newspaper, to announce the public comment period for the Proposed Plan. The public meeting was also announced in the Great Falls Tribune. DEQ sent notice of the public comment period and meeting to the approximately 100 addresses or post office boxes in Kevin and to stakeholders on its mailing list for BWOR. DEQ sent letters regarding the opportunity for public comment to the Mayor of Kevin, the Toole County Commissioners, the Toole County Environmental Health Department**,** UTCC, Glen Habets, and Habets Grain, Inc. DEQ also posted the documents and notice of the public comment period and public meeting/hearing on its website.

1.1.2 Administrative Record

The administrative record is the set of documents DEQ cited, relied upon, or considered when determining the final remedy. References to the administrative record are found in Part 2, Section 14.0 of the ROD. The complete files for BWOR, including the documents that comprise the administrative record for the ROD, are available for public review at the DEQ office in Helena.

1.1.3 Document Repositories

The complete files for the BWOR Facility are located at:

Montana Department of Environmental Quality
Waste Management and Remediation Division

Contaminated Site Cleanup Bureau
1225 Cedar Street
Helena, MT 59601 Business Hours: Monday – Friday, 8:00 am – 5:00 pm
Telephone: (406) 444-6444

A copy of the ROD can also be found at:

Kevin City Government Office
211 Front Street
Kevin, MT 59454 Business Hours: Monday – Friday, 9:00 am – 1:00 pm
(406) 337-2141

1.1.4 Updates

To inform citizens and local government officials of the proposed final remedy, DEQ sent an informational mailing briefly summarizing the Proposed Plan and details of the public comment period and public meeting. These reports contained information on recently released documents, upcoming activities and meetings, completion of activities, sampling results and other information. Informational updates were sent to individuals on the mailing list for the BWOR Facility and local media, as well as to city and county officials and liable persons. Informational updates will be sent during remedial design and implementation.

1.1.5 Toll-free Hotline

DEQ Superfund maintains a toll-free number (1-800-246-8198) for people who want to contact DEQ about the BWOR Facility or other Superfund facilities. DEQ Waste Management and Remediation Division staff members direct calls to appropriate project officers. The toll-free number is answered in person during business hours.

1.1.6 Mailing List

DEQ maintains a mailing list that is periodically updated. DEQ has solicited additions to the mailing list in informational updates and at public meetings. In accordance with state law, the mailing list is generally not released to the public.

1.2 Explanation of Responsiveness Summary

All comments received during the public comment period on the Proposed Plan have been reviewed and considered by DEQ in the decision-making process and are addressed in this Responsiveness Summary. To assist in developing responses, DEQ added its own numbering to comments where appropriate to add clarity. While the comments are summarized here for brevity rather than include them verbatim, DEQ considered each and every comment submitted in its entirety (including all attachments, references, and supporting documents that were provided). Those verbatim comments (including the supporting documentation submitted with the comments) and the transcript from the December 2, 2015, public hearing are part of the administrative record and are referenced in Part 2, Section 14.0 of the ROD.

2.0 RESPONSES TO WRITTEN COMMENTS

Comment 1: The commenter indicated that he had purchased the refinery property in 1977 and DEQ had kept it from being used during that time. He indicated he wanted to keep these items: all the tanks on the property including the three north of Highway 215; all the asphalt stored in tanks south of Highway 215; all the buildings on the property; and all the equipment on the property including the water and gas lines. He also indicated he wanted the chain link fence to remain in place and be maintained.

DEQ Response: On April 11, 1995, the commenter signed an Interim Measures Administrative Order on Consent (AOC), Docket No. SF95-0002, with DEQ, which is still in effect (DEQ, 1995). In the AOC, the commenter was identified as a liable person responsible for conducting remedial actions at the BWOR Facility. That AOC allowed the commenter to remove "all items, equipment and materials of which they intend to retain possession" that specifically included "tanks, pipes, and scrap metals." The AOC also provides that the commenter "waive(s) and relinquish(es) any and all interest, ownership and claim of ownership in and to all of the personal property, items, and equipment" that were not removed by May 15, 1995 (for the portion of the BWOR Facility north of Highway 215) and by May 15, 1996 (for the portion of the BWOR Facility south of Highway 215). The only exception to this is one 35,000 barrel tank and one 5,000 barrel tank on the north portion of the BWOR Facility which were anticipated to be used as part of remedial efforts. In the AOC, the commenter also specifically agreed that he would not remove any materials that contain any petroleum products. In signing the AOC, the commenter waived the right to claim ownership of the personal property identified in the comment. The commenter is also subject to two additional orders: the Stabilization and Access Unilateral Administrative Order, Docket No. 94-0001, issued by DEQ on November 2, 1994 (DEQ, 1994); and the Stabilization, Access, and information Administrative Order, Docket No. SF-89-00005, issued by DEQ on August 24, 1989 (DEQ, 1989c). Both of these orders, which are still in effect, require the commenter to repair and maintain fencing according to particular specifications. Finally, the AOC allows the commenter to use the property so long as he did not spread or exacerbate the contamination or cause new releases.

Comment 2: The commenter indicated he would likely use the refinery property for commercial use.

DEQ Response: The current property owner's stated intention regarding future use of the property is one of the factors DEQ considers in determining the reasonably anticipated future use of the facility and was included in DEQ's consideration here. Please refer to Section 6.1 of Part 2 of the ROD for more information.

Comment 3: The commenter indicated that it was largely in agreement with the remedy selected in the Proposed Plan and indicated that, to the extent it needs more detail with regard to the scope of the preferred remedy in developing the remedial design, it understood it could rely on the feasibility study for such detail.

DEQ Response: The scope of the selected remedy is identified in the ROD and includes sufficient detail to develop the remedial design. The Feasibility Study and Proposed Plan included discussion of the conceptual design of various alternatives for purposes of evaluation of those alternatives against one another and the CECRA criteria. The alternative descriptions and associated cost estimates from the Proposed Plan have been carried forward to the ROD. The conceptual designs of the various alternatives, including cost estimates developed from the conceptual designs, are not necessarily the

final design of the selected remedy. If UTCC wishes to utilize details from the conceptual design included in the Feasibility Study in its development of the remedial design for the selected remedy, it may do so if appropriate. However, final design specifications will be determined in the remedial design and are subject to DEQ approval and DEQ is not bound by the specifications identified in the Feasibility Study.

Comment 4: The commenter indicated its disagreement with DEQ's characterizations of the history of the BWOR Facility and suggested that DEQ revise certain portions of the document to identify the multiple rounds of drafting and revisions for the Feasibility Study and preliminary remedial action report as well as the length of time associated with those redrafts and revisions.

DEQ Response: DEQ does not typically include an identification of the multiple iterations of documents that may have occurred or the timeframes associated with them in a ROD unless it is relevant in some manner to the agency's final decision. The revisions and dates are part of the BWOR Facility file, but do not have a bearing on DEQ's selection of the remedy at this Facility and therefore do not need to be discussed further in the ROD.

Comment 5: The commenter asked that DEQ establish an account and use $150,000 from the settlement of the Flying J bankruptcy to cover DEQ's oversight costs beginning in January 2016.

DEQ Response: This is not a comment on the Proposed Plan and is not relevant to DEQ's selection of the final remedy. However, DEQ does note that the commenter is subject to an Administrative Order for Investigation and Corrective Action, Docket No. SF-89-00003, dated June 23, 1989 (DEQ, 1989), which requires the commenter to "reimburse the State for all response costs incurred by the State at or in connection with the Facility."

Comment 6: The commenter indicated that it is not appropriate to identify asphaltic material as a contaminant of concern (COC) or to establish a site-specific cleanup level (SSCL) based on visual observation because asphaltic material does not exceed human-health based SSCLs. The commenter indicated that asphaltic material is not free product because it is not liquid and passed the paint filter test. The commenter provided a number of legal citations to support its argument, and asked that DEQ delete the SSCL for asphaltic material.

DEQ Response: In selecting remedial actions under CECRA, § 75-10-721, MCA, requires DEQ to ensure the protection of not only human health (which is the basis for the SSCLs referred to by the commenter) but also of public safety and welfare and the environment. While the asphaltic material at the BWOR Facility may not exceed human health-based SSCLs, it still poses a safety risk to people as well as a threat to birds and other animals and it must be addressed as part of the final cleanup. During a May 9, 1988, visit to the BWOR Facility, DEQ noted the bodies of both a dog and a duck in one of the asphalt pits at the property (DEQ, 1988). DEQ received a letter from a Kevin resident on May 12, 1988, indicating that the resident's dog had died after getting into one of the asphalt pits at the BWOR Facility (Blount, 1988). In letters dated November 7, 1988, DEQ requested of Glen Habets, UTCC, and Flying J Inc. that two sludge pits be fenced (DEQ, 1988a and 1988b and 1988c). A May 8, 1989, letter from the Kevin Mayor identified concerns about the sludge pits after several area dogs were trapped in the sludge pits and died (Fagan, 1989). In 1989 and 1994 administrative orders, DEQ required of Glen Habets to install fencing around any unfenced pits and to control site access at all times (DEQ, 1989c and 1994). EPA Region VIII issued a unilateral administrative order (RCRA (7003) VIII-98-03) to Glen Habets and Habets Grain, Inc. on March 25, 1998 requiring protective

netting of asphalt ponds which present an imminent and substantial endangerment to wildlife after a site visit identified 22 dead oiled birds around the asphalt ponds (EPA, 1998). The asphaltic material is a petroleum product which is a "hazardous or deleterious substance" as defined by § 75-10-701(8)(d), MCA, and it has been released to the environment, as demonstrated by its presence in soil. The reference to the asphaltic material being "free product" in the Proposed Plan was simply a regulatory definition indicating that it must be managed in accordance with particular laws and rules. If the asphaltic material were not identified as "free product" such identification would not mean that the material poses no threat to public health, safety, or welfare or the environment. In other words, whether the asphaltic material is called "free product" or not is not determinative to whether it has to be addressed as part of the final remedy. Rather, whether the asphaltic material poses an actual or potential risk to public health, safety, or welfare or the environment is what determines whether it must be addressed. The only place in the Proposed Plan where the asphaltic material was referenced in any manner as "free product" was in Table 2. Referencing the asphaltic material as free product that must be addressed does not mean the asphaltic material cannot be managed the same as soil and sediment contamination. A cleanup based upon "visible" simply means that when asphaltic materials in soil are encountered during remediation, those materials must be addressed. To address this comment, DEQ has removed the reference to "free product" from Table 2.

The commenter provided a number of legal citations that define free product as a liquid. DEQ reviewed all these citations and agrees that the referenced citations discuss free product in terms of a liquid. However, the commenter provided no authority that free product is limited to liquid. In selecting final remedies under CECRA, DEQ has consistently interpreted that free product can be liquid or solid. For example, DEQ has previously made the regulatory determination that sludge in soil was to be treated as free product in the ROD for the KRY Site which was issued in June 2008 (DEQ, 2008). That ROD required removal of the free product in soil (i.e., sludge) to the maximum extent practical and the cleanup level was based on visual observation. This is the same definition and cleanup level that DEQ has applied at this Facility. The determinations made in the KRY Site ROD were affirmed in Montana's First District Court. DEQ's interpretation is consistent with some other states that have also interpreted free product to be liquid or solid. For example, Iowa defines "free product" as "a hazardous substance that is present as a non-aqueous phase liquid (e.g., liquid not dissolved in water) or is present as a solid in its original form as a product or waste material." (567-IAC 137.2). New Jersey defines "free product" as applying to "solids, liquids, and semi-solids." (N.J.A.C. 7:26E-1.8). CECRA requires DEQ to select a remedy to ensure the protection of public health, safety, and welfare and the environment, and DEQ has determined that the asphaltic material in soil at the BWOR Facility poses a risk that must be addressed as part of the final cleanup whether or not that asphaltic material is called "free product." Again, to address the commenter's concern, DEQ has removed the reference to "free product" from Table 2.

<u>Comment 7:</u> The commenter objects to the use of a visual standard as the SSCL for asphaltic material. Asphaltic material is not free product and there is no state or federal regulation requiring its removal. Visible is a subjective unscientific term, and DEQ regulations require that SSCLs be based upon a calculation.

<u>DEQ Response:</u> Please see response to comment 6 regarding asphaltic material and free product. In addition, CECRA itself requires the removal of asphaltic materials if DEQ determines they may pose a risk to public health, safety, or welfare or the environment. The commenter cites to ARM 17.55.113 which allows for the calculation of SSCLs. At the BWOR Facility, DEQ allowed the commenter to calculate SSCLs in the PRAO-PRG Report and Addendum. However, not all SSCLs must be

calculated in order for DEQ to apply them at a facility. For example, SSCLs based upon DEQ-7 numeric water quality standards are used at this Facility. Allowing the calculation of SSCLs and also applying cleanup levels that are regulatory-based is not inconsistent. How "visible" asphaltic material will be identified and addressed will be further described in remedial design documents; however, a cleanup based upon "visible" simply means that when asphaltic material is encountered during remediation, it must be addressed. Finally, DEQ notes that the commenter acknowledges in later comments that it intends to remove asphaltic material in specific locations, providing further support that removal using "visible" criteria is not so subjective that the commenter cannot adequately prepare remedial design for remedy implementation.

Comment 8: The commenter indicated its understanding that asphaltic material refers to those materials originally located onsite in surface pits and tanks. Referencing Figure 6 in the Proposed Plan, the commenter indicated its understanding that the asphaltic material located in surface pits #2, #7, and the North Fenced Area (NFA), and tanks AT-1, AT-2, AT-3, and AT-6 are all that are required to be removed at an estimated cost of $356,473. The commenter also indicated its intention to remove the asphaltic material in these areas.

DEQ Response: As stated in a previous response, DEQ has determined that the asphaltic material at the BWOR Facility poses a risk that must be addressed as part of the final cleanup. This requirement applies to asphaltic material wherever it is encountered throughout the BWOR Facility, whether mixed with soil or in the identified asphalt pits. While Figure 6 from the Proposed Plan has been reproduced as Figure 4 in Part 2 of the ROD, the identification of asphaltic materials on the figure does not limit UTCC to remediation of only these areas. This figure, along with all other figures depicting the extent of contamination at the BWOR Facility, is a conceptual figure used for calculating cost estimates and does not represent the final remedy design. For example, Figure 4 of the ROD does not include the small amounts of asphaltic materials surrounding the former location of Asphalt Pit #8 identified during a visit on October 25, 2011, where asphaltic material appeared to have migrated to the surface after asphalt recovery and excavation efforts were completed in Pit #8. However, this material will have to be addressed as part of the final cleanup at the BWOR Facility. DEQ identified this contamination to the UTCC representative (also present onsite) while in the field, and later discussed it with UTCC in a conference call on August 29, 2012, where UTCC indicated it fully intended to address the remaining asphaltic materials at the BWOR Facility. To help address the commenter's concern, DEQ representatives will be present during remedial activities and work with UTCC to identify what asphaltic materials needs to be removed.

Comment 9: The commenter stated its understanding that the re-grading included in the site-wide elements does not require general regrading of the entire approximately 80-acre facility.

DEQ Response: DEQ agrees that the purpose of the re-grading is to minimize ponding and promote drainage. Re-grading will be used where needed and those areas will be more specifically identified as part of remedial design. DEQ does not expect that the entire BWOR Facility will require re-grading.

Comment 10: The commenter indicated that there are instances where the term "medium" is used rather than "soil/sludge/sediment" and asked for clarification that "soil" was interchangeable with "soil/sludge/sediment."

DEQ Response: As a point of clarification, DEQ is not revising the Proposed Plan. Rather, any comments that warrant revisions are addressed in the ROD. DEQ has addressed this comment by

ensuring that consistent terminology is used throughout the ROD.

Comment 11: The commenter indicated that C19-C36 aliphatics were not identified as a contaminant of potential concern (COPC) for extractable petroleum hydrocarbons and should be deleted from the list of COPCs for soil/sludge/sediment in Section 5.5.3 of the Proposed Plan.

DEQ Response: DEQ agrees that C19-C36 aliphatics was not retained as a COPC in the Preliminary Remedial Action Objective-Preliminary Remediation Goal (PRAO-PRG) Report and its Addendum (EDGE & AMEC, 2005 and 2015a). Therefore, DEQ has addressed this comment by not including C19-C36 aliphatics in the section listing COPCs in the ROD.

Comment 12: The commenter provided some edits to Section 6.0 of the Proposed Plan and indicated that boring SB11-A is part of the Product Storage Yard (PSY) rather than the Asphalt Tank Area so the paragraph should reference twelve operating areas. The listing of areas should include the PSY and the areas identified as "NSSA" should be "NSTA."

DEQ Response: DEQ agrees and these comments were addressed in the ROD.

Comment 13: The commenter indicated that the phrasing used in the second paragraph of Section 6.2 of the Proposed Plan was misleading because cancer risks and non-cancer hazard quotients were not calculated for the COPCs. Rather, target cancer risks and target hazard quotients were determined to allow for the calculation of SSCLs.

DEQ Response: DEQ agrees and this comment was addressed in the ROD.

Comment 14: When summarizing the COCs that exceed SSCLs, the commenter indicated that lead should be included at the NFA and NSTA and C9-C18 aliphatics should be identified at the NFA.

DEQ Response: DEQ agrees and this comment was addressed in the ROD.

Comment 15: The commenter indicated that the cost associated with Alternative 3a should be $359,921.

DEQ Response: DEQ's interpretation of the cost estimate originally included in Appendix H of the Feasibility Study, and later used in the Proposed Plan, is that the asphalt recovery, offsetting sales income, and residue disposal alone have a net cost of $359,921. As indicated in that cost estimate for Alternatives 3a and 3b, "remedial oversight – either option" of $40,000 would be added to $359,921 for a total estimated cost of $399,921 as indicated in Section 8.1.2.3 of the Proposed Plan. Cost estimates included in the Feasibility Study, Proposed Plan, and ROD, are simply estimates and will likely require adjustment during remedial design, which occurs after the ROD is issued. However, Alternative 3a was not selected as part of the preferred final remedy and therefore was not included in the ROD. Therefore, this comment does not need to be addressed.

Comment 16: The commenter indicated that Table 2 should be revised to indicate the SSCL for copper in surface soil/sludge/sediment as 27,657 milligrams per kilogram.

DEQ Response: DEQ agrees and this comment was addressed in the ROD.

Comment 17: The commenter indicated that the maximum detection of C9-C18 aliphatics in subsurface soil/sludge/sediment is below the SSCL at boring location SB-15R and therefore SB-15R should not be identified as an area requiring cleanup.

DEQ Response: DEQ agrees and this comment was addressed in the ROD.

TABLES

Table 1
Site-Specific Cleanup Levels for Groundwater
Big West Oil Refinery Facility

Contaminant of Concern	Units	SSCL	Source of SSCL
Volatile Organic Compounds (VOCs)			
Benzene	µg/L	5	DEQ-7
Petroleum Hydrocarbons			
Free Product	inches	1/8	*

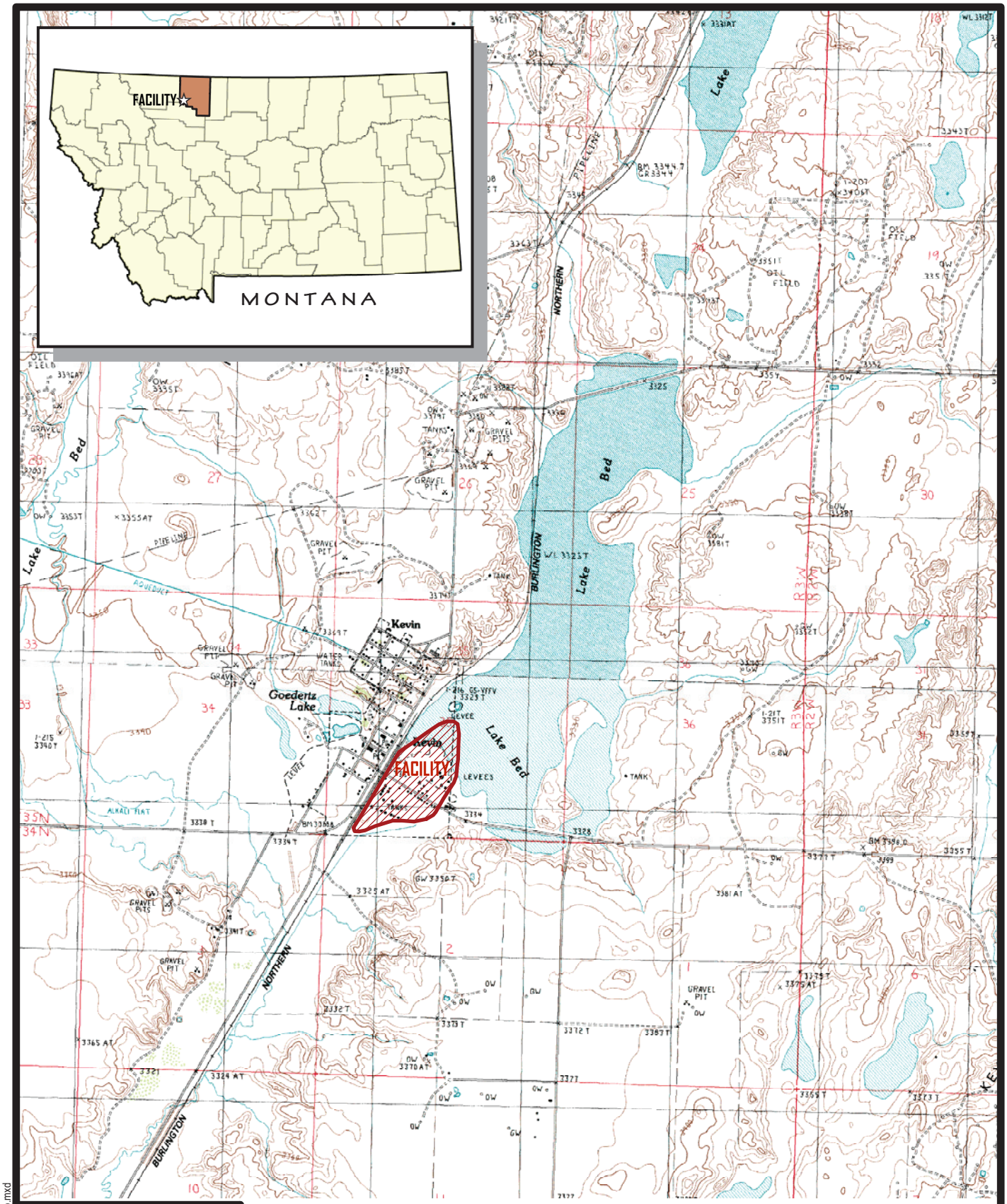
Notes:
SSCL - Site-specific cleanup level
µg/L - micrograms per liter
DEQ-7 - Montana DEQ Circular DEQ-7, Montana Numeric Water Quality Standards (DEQ, 2012)
* - 40 CFR 280.64 and ARM 17.56.607 require removal of free product to the maximum extent practicable; determined by DEQ to be 1/8 inch or less. See Section 7.1.2.1 of the ROD for more information.

Table 2
Site-Specific Cleanup Levels for Soil/Sludge/Sediment
Big West Oil Refinery Facility

Contaminant of Concern (COC)	Surface Soil Commercial/Industrial Worker SSCL (mg/kg)	Subsurface Soil Construction Worker SSCL (mg/kg)
2-Hexanone	NA	606
2-methylnaphthalene	2,015*	83
Benzene	NA	246
B2PAHs	4.31	26.91
C5-C8 aliphatics	NA	1,177
C9-C12 Aliphatics	NA	1,956
C9-C10 Aromatics	NA	4,112
C9-C18 Aliphatics	8,550	9,920
C11-C22 Aromatics	10,379*	10,379
Cadmium	208*	315
Copper	27,657*	27,657
Lead	500	500
Mercury	48	18
Pyrene	4,986*	4,986
TRPH	35,428*	35,428
Zinc	NA	68,450

Notes:
SSCL - Site-specific cleanup level
Surface soil - surface to two feet below ground surface
Subsurface soil - greater than two feet below ground surface
mg/kg - milligrams per kilogram
* - Cleanup levels are based on construction worker exposure rather than commercial/industrial worker exposure because that SSCL is more protective.
NA - Not applicable because these compounds are not COCs for this exposure pathway. SSCL exceedences requiring remedial action are provided in the ROD, Section 7.0 and Figures.

FIGURES



NORTH

0 1,500 3,000 Feet

Source: USGS 7.5 Minute Quadrangles Kevin North and Kevin South

Prepared/Date: EJM 11/21/11
Checked/Date: DJ 11/28/11

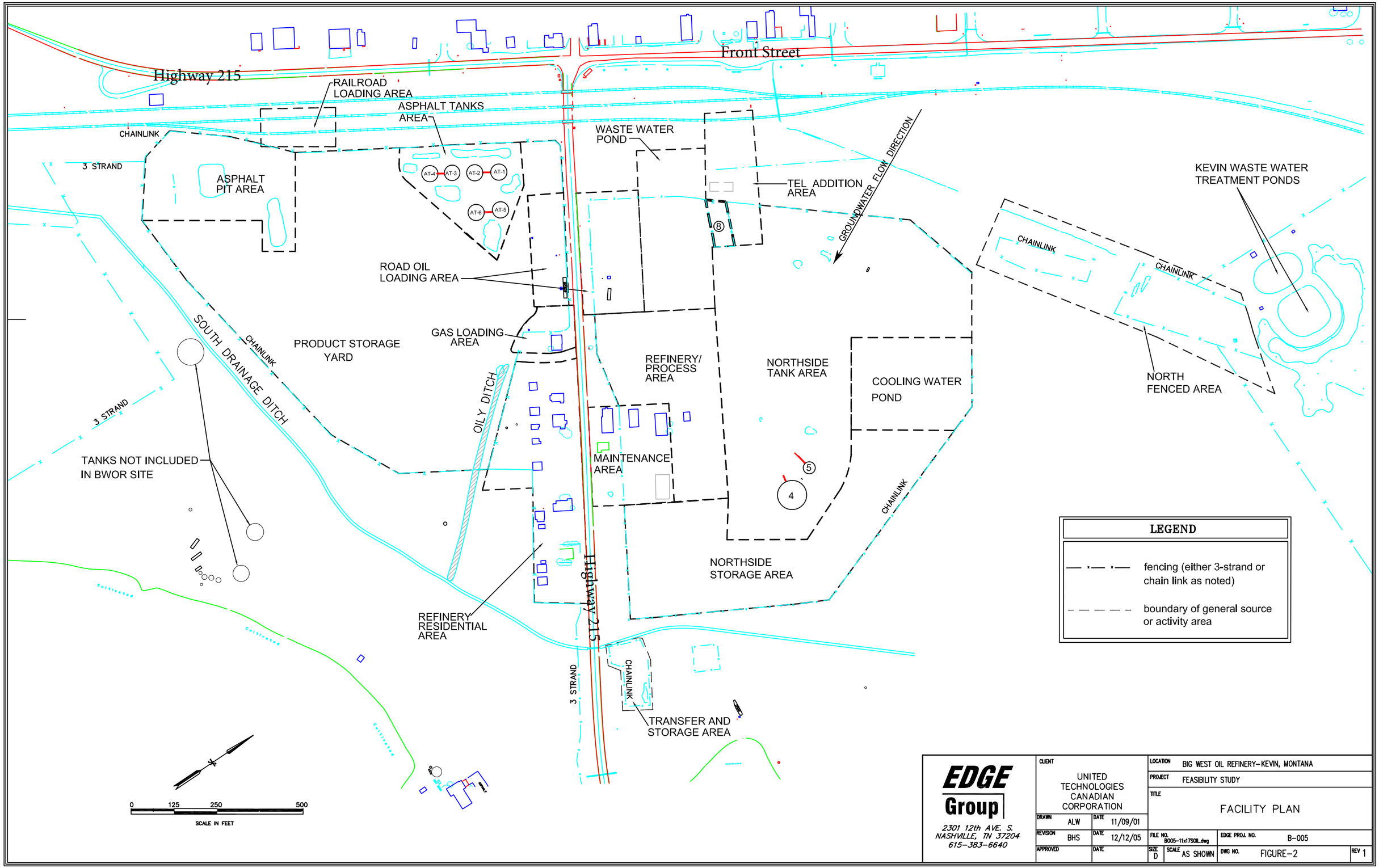
UTCC
Big West Oil Refinery
Kevin, Montana

amec

Facility Location Map

Project 566810000 Figure 1

P:\Kevin Refinery\GIS\Projects\Site_map.mxd



LEGEND

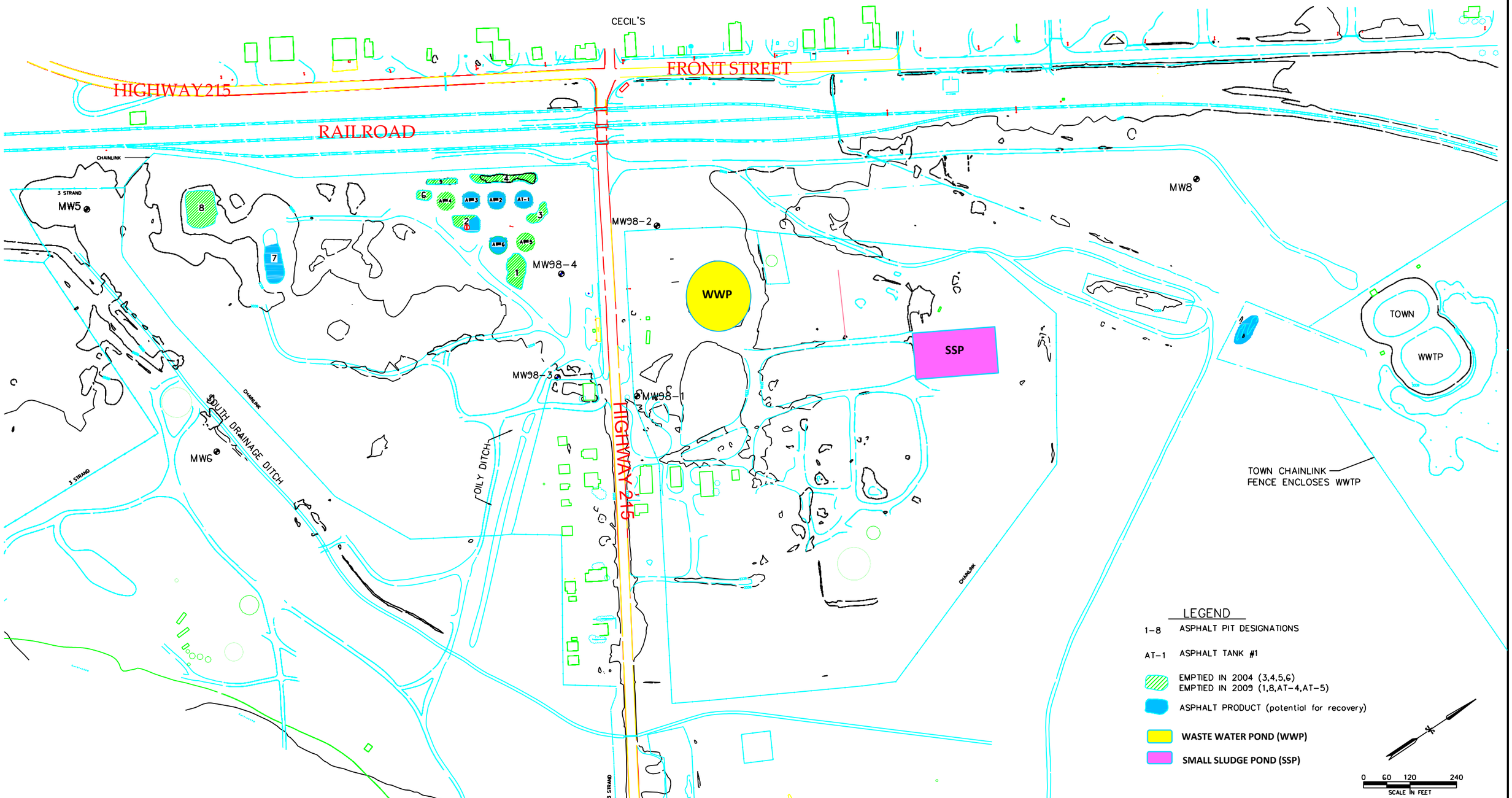
— · — · —	fencing (either 3-strand or chain link as noted)
– – – – –	boundary of general source or activity area

EDGE Group
2301 12th AVE. S.
NASHVILLE, TN 37204
615-383-6640

CLIENT	UNITED TECHNOLOGIES CANADIAN CORPORATION	LOCATION	BIG WEST OIL REFINERY-KEVIN, MONTANA
		PROJECT	FEASIBILITY STUDY
		TITLE	FACILITY PLAN
DRAWN	ALW	DATE	11/09/01
REVISION	BHS	DATE	12/12/05
APPROVED		DATE	
FILE NO.	B005-11x17SOIL.dwg	EDGE PROJ. NO.	B-005
SIZE	D	SCALE	AS SHOWN
DWG NO.	FIGURE-2	REV	1

Figure 3. Property Ownership Map for Big West Oil Refinery Facility

Map Source: Montana Cadastral Mapping Project, courtesy of Montana State Library.



EDGE Group
605 Berry Road
NASHVILLE, TN 37204
615-383-6640

CLIENT	UNITED TECHNOLOGIES CANADIAN CORPORATION	LOCATION	BIG WEST OIL REFINERY - KEVIN, MONTANA
		PROJECT	FEASIBILITY STUDY
		TITLE	ASPHALTIC MATERIALS LOCATIONS
DRAWN	BLC	DATE	07/01/07
REVISED	BDL	DATE	06/21/13
APPROVED	SBM	DATE	11/06/15
FILE NO.	Figure 15.DWG	EDGE PROJ. NO.	B-005
SIZE	D	SCALE	1" =240'
DWG NO.	FIGURE 4	REV	1

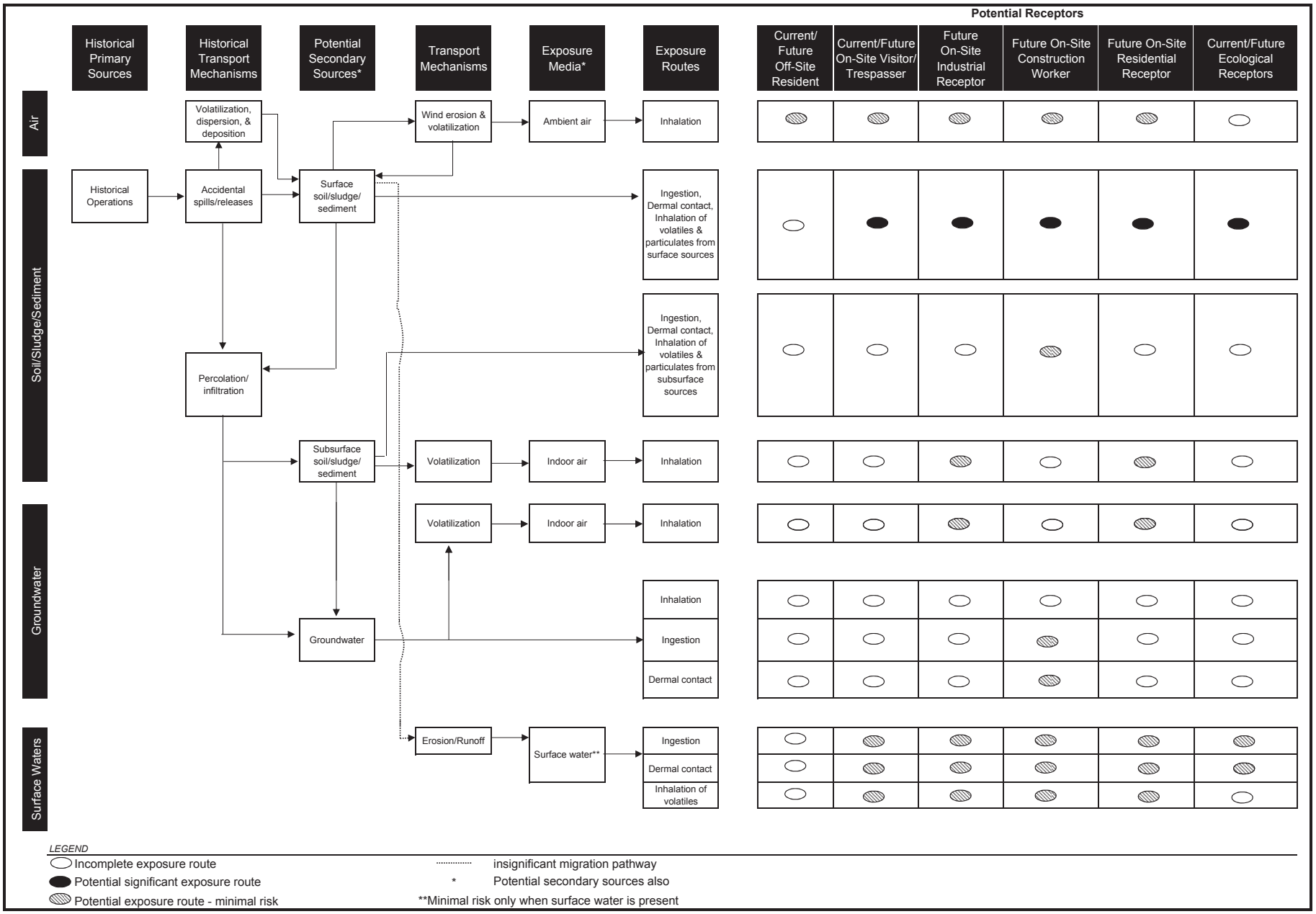
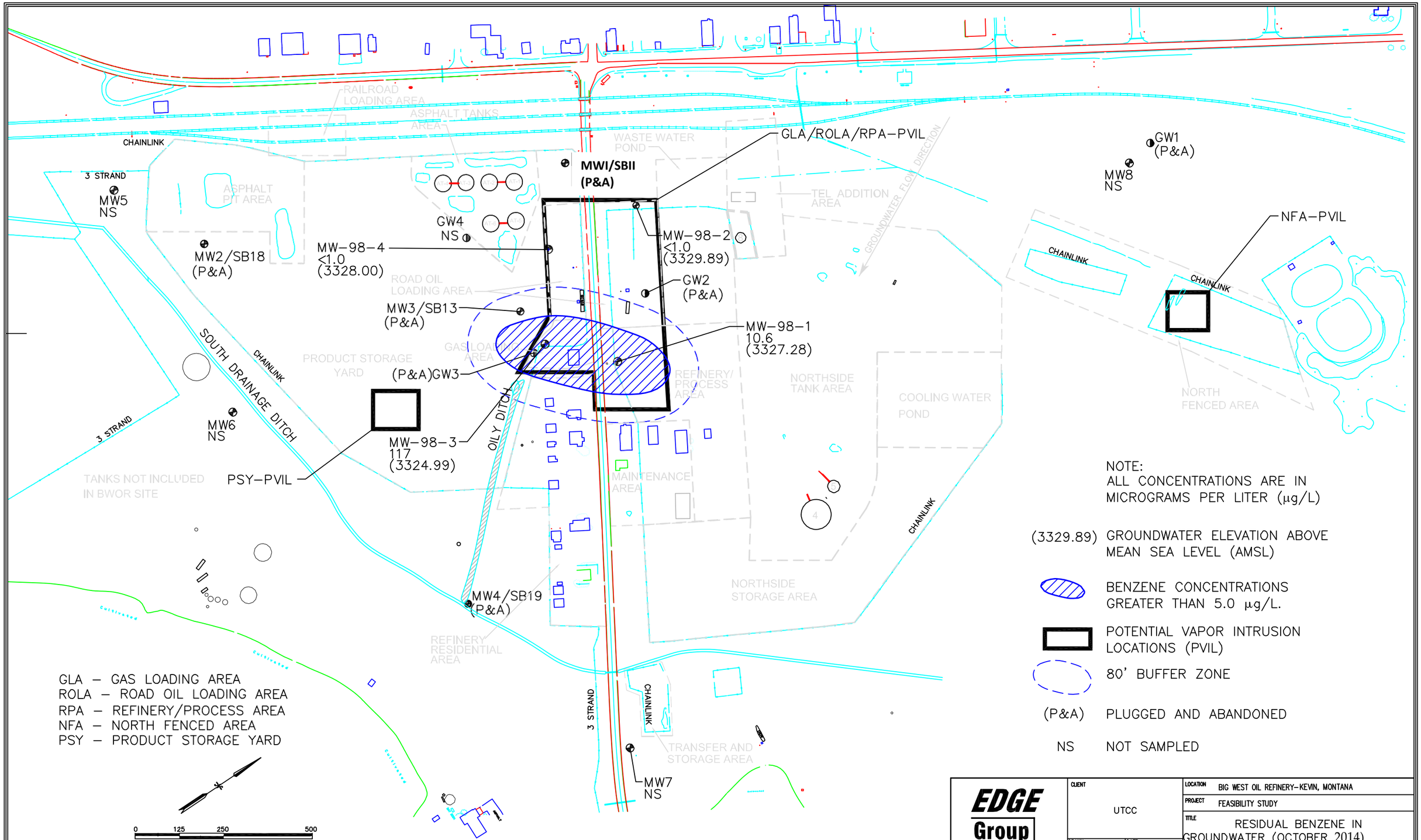


Figure 5. Site Conceptual Exposure Model



GLA – GAS LOADING AREA
ROLA – ROAD OIL LOADING AREA
RPA – REFINERY/PROCESS AREA
NFA – NORTH FENCED AREA
PSY – PRODUCT STORAGE YARD

NOTE:
ALL CONCENTRATIONS ARE IN MICROGRAMS PER LITER (µg/L)

(3329.89) GROUNDWATER ELEVATION ABOVE MEAN SEA LEVEL (AMSL)

BENZENE CONCENTRATIONS GREATER THAN 5.0 µg/L.

POTENTIAL VAPOR INTRUSION LOCATIONS (PVIL)

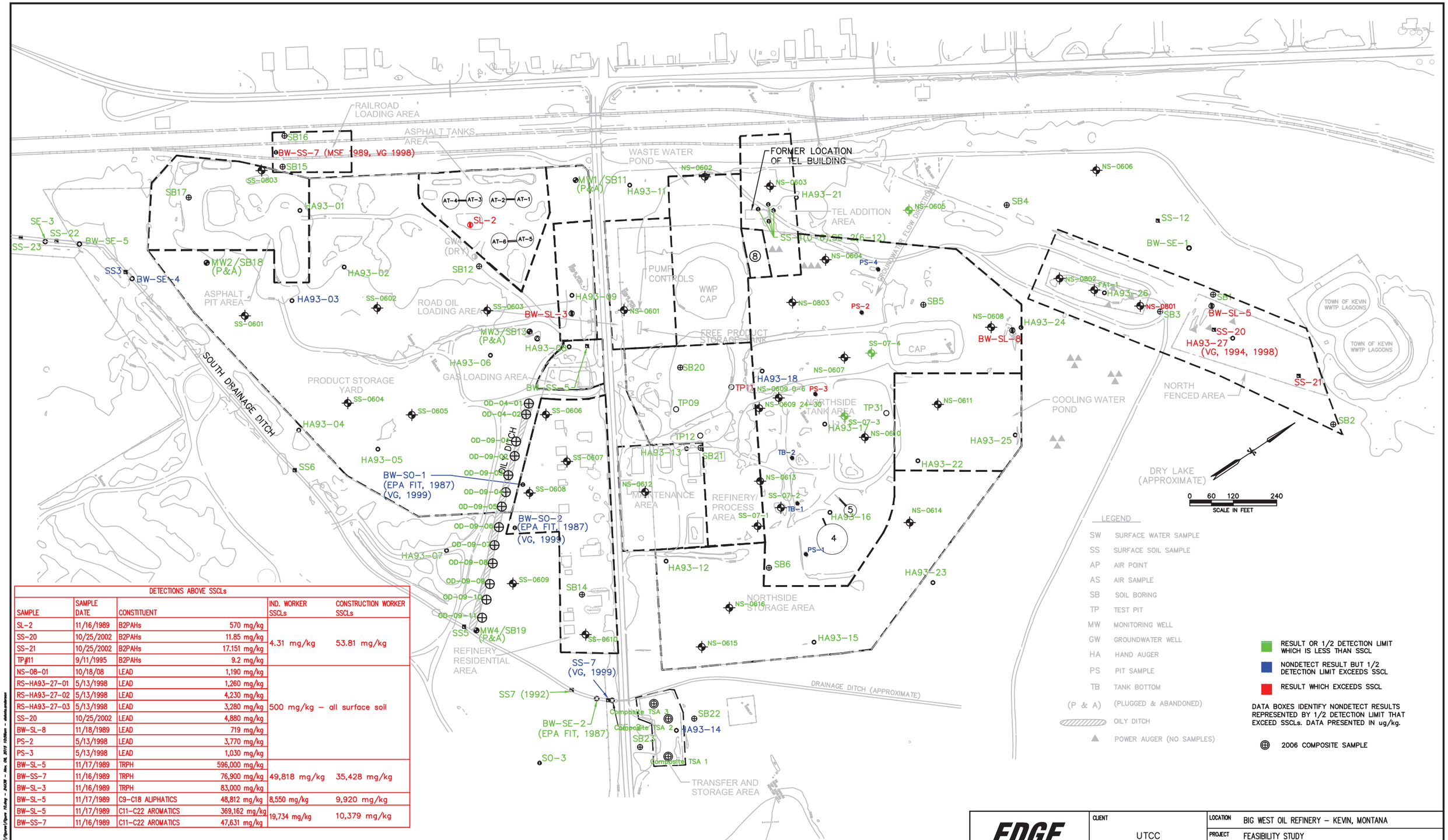
80' BUFFER ZONE

(P&A) PLUGGED AND ABANDONED

NS NOT SAMPLED

EDGE Group
2301 12th AVE. S.
NASHVILLE, TN 37204
C15-383-CC40

CLIENT	UTCC	LOCATION	BIG WEST OIL REFINERY-KEVIN, MONTANA
		PROJECT	FEASIBILITY STUDY
		TITLE	RESIDUAL BENZENE IN GROUNDWATER (OCTOBER 2014)
DRAWN ALW	DATE 11/09/01		
REVISION JTM	DATE 03/17/15	FILE NO. Figure 6.dwg	EDGE PROJ. NO. B-005
APPROVED SBM	DATE 03/17/15	SIZE D / SCALE AS SHOWN	DWG NO. FIGURE 6 / REV 1



DETECTIONS ABOVE SSCLs					
SAMPLE	SAMPLE DATE	CONSTITUENT		IND. WORKER SSCLs	CONSTRUCTION WORKER SSCLs
SL-2	11/16/1989	B2PAHs	570 mg/kg	4.31 mg/kg	53.81 mg/kg
SS-20	10/25/2002	B2PAHs	11.85 mg/kg		
SS-21	10/25/2002	B2PAHs	17.151 mg/kg		
TP#11	9/11/1995	B2PAHs	9.2 mg/kg		
NS-08-01	10/18/08	LEAD	1,190 mg/kg	500 mg/kg – all surface soil	
RS-HA93-27-01	5/13/1998	LEAD	1,260 mg/kg		
RS-HA93-27-02	5/13/1998	LEAD	4,230 mg/kg		
RS-HA93-27-03	5/13/1998	LEAD	3,280 mg/kg		
SS-20	10/25/2002	LEAD	4,880 mg/kg		
BW-SL-8	11/18/1989	LEAD	719 mg/kg		
PS-2	5/13/1998	LEAD	3,770 mg/kg		
PS-3	5/13/1998	LEAD	1,030 mg/kg		
BW-SL-5	11/17/1989	TRPH	596,000 mg/kg	49,818 mg/kg	35,428 mg/kg
BW-SS-7	11/16/1989	TRPH	76,900 mg/kg		
BW-SL-3	11/16/1989	TRPH	83,000 mg/kg		
BW-SL-5	11/17/1989	C9-C18 ALIPHATICS	48,812 mg/kg	8,550 mg/kg	9,920 mg/kg
BW-SL-5	11/17/1989	C11-C22 AROMATICS	369,162 mg/kg	19,734 mg/kg	10,379 mg/kg
BW-SS-7	11/16/1989	C11-C22 AROMATICS	47,631 mg/kg		

EDGE Group
2301 12th AVE. S.
NASHVILLE, TN 37204
615-383-6640

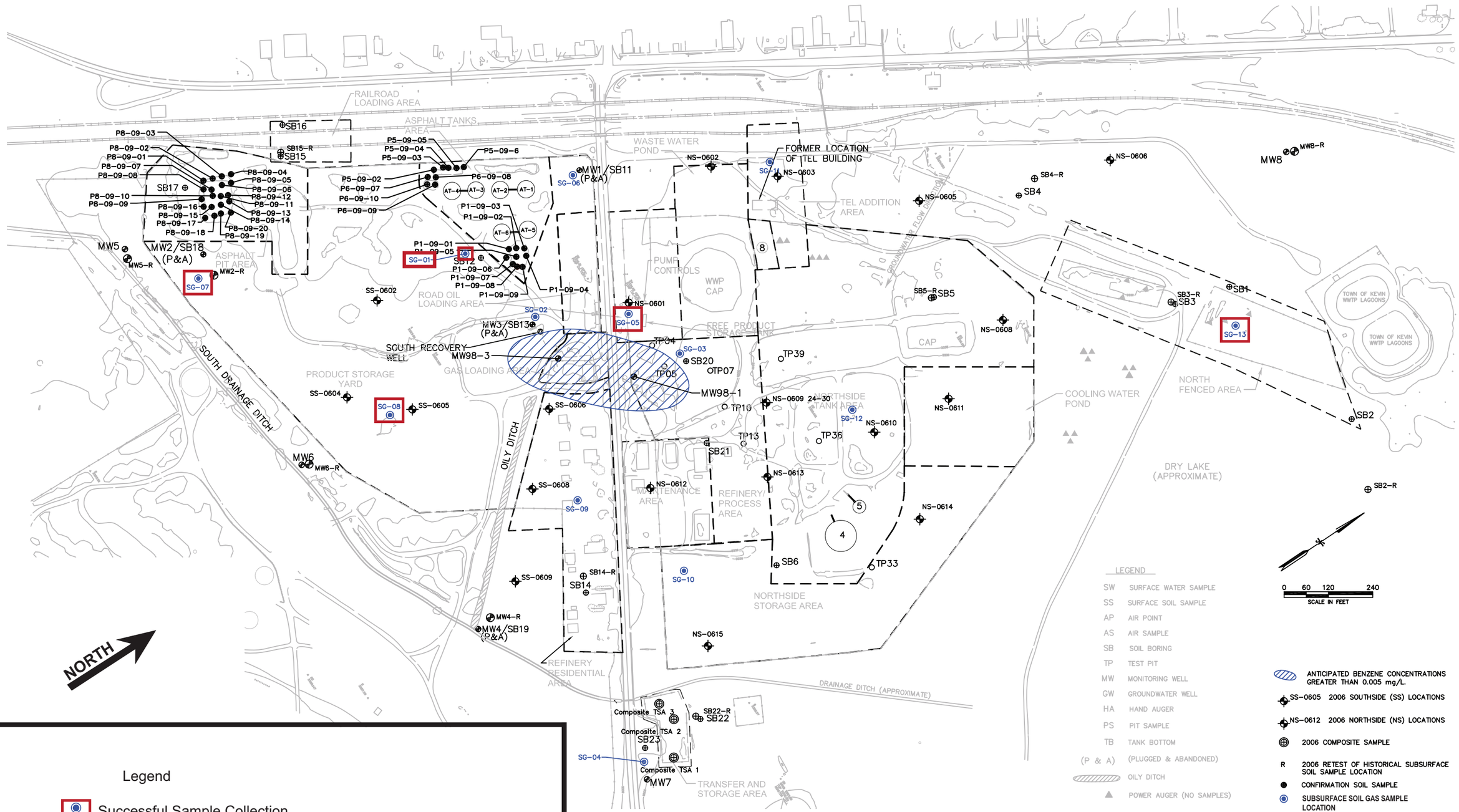
CLIENT	UTCC	LOCATION	BIG WEST OIL REFINERY – KEVIN, MONTANA
		PROJECT	FEASIBILITY STUDY
		TITLE	EVALUATION OF INDUSTRIAL AND CONSTRUCTION WORKER SSCLs FOR SURFACE SOIL/SLUDGE/SEDIMENT
DRAWN ALW	DATE 11/09/01		
REVISION JMR	DATE 05/04/11	FILE NO. B005-1-36x24(2004).dwg	EDGE PROJ. NO. B-005
APPROVED SBM	DATE 11/04/15	SIZE D / SCALE AS SHOWN	DWG NO. FIGURE 7 / REV 1

DETECTIONS ABOVE SSCLs			
SAMPLE	SAMPLE DATE	CONSTITUENT	CONSTRUCTION WORKER SSCL
NS-0601	11/29/06	C5-C8 ALIPHATICS 4,210 mg/kg	1,177 mg/kg
		C9-C12 ALIPHATICS 3,060 mg/kg	1,956 mg/kg

EDGE Group
2301 12th AVE. S.
NASHVILLE, TN 37204
615-383-6640

CLIENT: UTCC		LOCATION: BIG WEST OIL REFINERY – KEVIN, MONTANA	
		PROJECT: FEASIBILITY STUDY	
		TITLE: EVALUATION OF CONSTRUCTION WORKER DIRECT CONTACT SSCLs SUBSURFACE SOIL/SLUDGE/SEDIMENT	
DRAWN: ALW	DATE: 11/09/01		
REVISION: RES	DATE: 05/04/11	FILE NO. B005-1-36x24(2004).dwg	EDGE PROJ. NO. B-005
APPROVED: SBM	DATE: 11/04/15	SIZE: D / SCALE: AS SHOWN	DWG NO. FIGURE 8 / REV 1

P:\Kevin Refinery\Adobe\Geoprobe_Locs.ai



Legend

SG-05 Successful Sample Collection

Not To Scale - Map Source Edge Group

Prepared/Date: EJM 11/21/11
Checked/Date: DJ 11/28/11

UTCC
Former Big West Oil Refinery
Kevin, Montana

amec

Soil Vapor Sample Map

Project 566810000 FIGURE 9

APPENDIX A

LEAD CLEANUP LEVEL CALCULATION TABLES

Table A-1

Calculation of Site-Specific Cleanup Level (SSCL) for Commercial/Industrial Worker at 10 ug/dL

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	187
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	270
SSCL		**mg/kg**	**1,940**

PbB - Blood lead level
ug/dL - micrograms per deciliter
ug - micrograms
g - grams
yr - year
mg/kg - miligrams per kilogram

Table A-2

Calculation of Site-Specific Cleanup Level (SSCL) for Commercial/Industrial Worker at 5 ug/dL

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	5
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	187
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	270
SSCL		**mg/kg**	**669**

PbB - Blood lead level
ug/dL - micrograms per deciliter
ug - micrograms
g - grams
yr - year
mg/kg - miligrams per kilogram

Table A-3

Calculation of Site-Specific Cleanup Level (SSCL) for Construction Worker at 10 ug/dL

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dus	g/day	0.100
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	124
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	270
SSCL		**mg/kg**	**1,463**

PbB - Blood lead level
ug/dL - micrograms per deciliter
ug - micrograms
g - grams
yr - year
mg/kg - miligrams per kilogram

Table A-4

Calculation of Site-Specfic Cleanup Level (SSCL) for Construction Worker at 5 ug/dL

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	5
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor du	g/day	0.100
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	124
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	270
SSCL		**mg/kg**	**505**

PbB - Blood lead level
ug/dL - micrograms per deciliter
ug - micrograms
g - grams
yr - year
mg/kg - miligrams per kilogram

APPENDIX B

MODEL RESTRICTIVE COVENANTS

DECLARATION OF RESTRICTIVE COVENANTS ON REAL PROPERTY [IC1: Property with Groundwater Exceeding SSCLs and a Vapor Intrusion Concern; Includes Residential Use Restrictions]

THIS DECLARATION OF RESTRICTIVE COVENANTS ON REAL PROPERTY is made by [insert property owner's name] as of _____, 2016.

RECITALS

WHEREAS, [insert property owner's name] is the owner of certain real property (the Subject Property) located in Toole County, Montana, more particularly described as:

[insert property description here]

WHEREAS, the Subject Property is within the Big West Oil Refinery Facility and the Montana Department of Environmental Quality (DEQ) has determined that releases or threatened releases of hazardous or deleterious substances that may pose an imminent or substantial endangerment to public health, safety or welfare or the environment exist and that these hazardous or deleterious substances have come to be located upon the Subject Property;

WHEREAS, DEQ, under the authority of the Montana Comprehensive Environmental Cleanup and Responsibility Act, §§ 75-10-701 et seq., MCA, has selected a remedy to abate the imminent and substantial endangerment posed by the hazardous or deleterious substances;

WHEREAS, the site-specific cleanup levels selected as part of the final remedy were based upon the Subject Property being used, now and in the future, for commercial/industrial purposes and are not protective of residential use;

WHEREAS, DEQ has issued UTC Canada Corporation (UTCC) an administrative order and UTCC is implementing DEQ's selected remedy;

WHEREAS, within the Subject Property, there are areas where groundwater exceeds the site-specific cleanup levels selected in the remedy and an area surrounding the groundwater plume where a well installed within the pumping radius of influence of the groundwater plume could affect the plume. The portion of the Subject Property with groundwater concerns, referred to as the Groundwater Restriction Area, has been surveyed and is more particularly described as follows:

[insert surveyed Groundwater Restriction Area description here]

WHEREAS, within the Subject Property, there are areas where groundwater exceeds the site-specific cleanup levels selected in the remedy and identified soil vapor contamination that

has the potential for vapor intrusion if a structure were constructed in those areas. The portion of the Subject Property with potential vapor intrusion concerns, referred to as the Vapor Intrusion Area, has been surveyed and is more particularly described as follows:

[insert surveyed Vapor Intrusion Area description here]

WHEREAS, the selected remedy requires that [insert property owner's name] restrict use of the Subject Property in order to mitigate the risk to the public health, safety or welfare or the environment and DEQ requires that such restrictions be recorded as provided for in § 75-10-727, MCA;

NOW, THEREFORE, [insert property owner's name] hereby agrees and declares:

1. Within the Groundwater Restriction Area, no wells may be installed without the express prior written approval of DEQ. Groundwater within the Groundwater Restriction Area may not be used for any purpose other than for remediation purposes (including but not limited to monitoring) without the express prior written approval of DEQ. The integrity of any monitoring wells must be maintained and no seals may be removed on any closed wells.

2. No residential development or use shall occur upon the Subject Property, including but not limited to construction of homes; accommodations for caretakers, watchmen, or custodians; any permanent or temporary structures which allow overnight use; or any temporary or permanent mobile home or camper. It is [insert property owner's name]'s intention that this restriction be interpreted as broadly as possible to prohibit any type of residential use of the Subject Property whatsoever.

3. Within the Vapor Intrusion Area, no excavation of soil or construction of any permanent or temporary structure of any kind whatsoever is allowed. It is [insert property owner's name]'s intention that this restriction be interpreted as broadly as possible to prohibit any type of construction on the Vapor Intrusion Area whatsoever.

4. No action shall be taken, allowed, suffered, or omitted on the Subject Property if such action or omission is reasonably likely to create a risk of migration of hazardous or deleterious substances or a potential hazard to public health, safety, or welfare or the environment.

5. [Insert property owner's name] agrees to provide DEQ and its representatives and contractors and all representatives and contractors of any person conducting remedial actions approved by DEQ on the Subject Property access at all reasonable times to the Subject Property.

6. At all times after [insert property owner's name] conveys its interest in all or any portion of the Subject Property and no matter what person or entity holds title to or is in possession of the Subject Property, [insert property owner's name] shall retain the right to enter the Subject Property at reasonable intervals and at reasonable times of the day in order to inspect for violations of the Restrictive Covenants contained herein. In addition, if [insert property owner's name] conveys all or any portion of its interest in the Subject Property, UTCC retains the right and obligation to enforce these Restrictive Covenants.

7. DEQ shall be entitled to enforce these covenants as an intended beneficiary thereof. [Insert property owner's name] specifically agrees that the remedy of "specific performance" shall be available to DEQ in such proceedings.

8. The provisions of this Declaration governing the use restrictions of the Subject Property shall run with the land and bind all holders, owners, lessees, occupiers, and purchasers of all or any portion of the Subject Property. These restrictive covenants apply in perpetuity and every subsequent instrument conveying an interest in all or any portion of the Subject Property shall include these Restrictive Covenants.

9. [Insert property owner's name] shall cause the requirements of these Restrictive Covenants to be placed in all instruments that convey an interest in the Subject Property and shall file this document with the Toole County, Montana, clerk and recorder.

10. The rights provided to DEQ in this declaration include any successor agencies of DEQ.

IN WITNESS WHEREOF, [insert name of property owner] has executed this Declaration of Restrictive Covenants on Real Property as of the first date written above.

_____

By:

State of _____)
:ss.
County of _____)

On this __ day of _____, 2016, personally appeared _____, before me, a Notary Public for the State of _____, known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same, as the owner of the property being restricted here.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal the day and year hereinabove first written.

_____
NOTARY PUBLIC FOR THE STATE OF _____
(SEAL) Residing at _____
My Commission Expires: _____

DECLARATION OF RESTRICTIVE COVENANTS ON REAL PROPERTY
[IC2: Property with Residential Use Restrictions Only]

THIS DECLARATION OF RESTRICTIVE COVENANTS ON REAL PROPERTY is made by [insert property owner's name] as of _____, 2016.

RECITALS

WHEREAS, [insert property owner's name] is the owner of certain real property (the Subject Property) located in Toole County, Montana, more particularly described as:

[insert property description here]

WHEREAS, the Subject Property is within the Big West Oil Refinery Facility and the Montana Department of Environmental Quality (DEQ) has determined that releases or threatened releases of hazardous or deleterious substances that may pose an imminent or substantial endangerment to public health, safety or welfare or the environment exist and that these hazardous or deleterious substances have come to be located upon the Subject Property;

WHEREAS, DEQ, under the authority of the Montana Comprehensive Environmental Cleanup and Responsibility Act, §§ 75-10-701 et seq., MCA, has selected a remedy to abate the imminent and substantial endangerment posed by the hazardous or deleterious substances;

WHEREAS, the site-specific cleanup levels selected as part of the final remedy were based upon the Subject Property being used, now and in the future, for commercial/industrial purposes and are not protective of residential use;

WHEREAS, DEQ has issued UTC Canada Corporation (UTCC) an administrative order and UTCC is implementing DEQ's selected remedy;

WHEREAS, the selected remedy requires that [insert property owner's name] restrict use of the Subject Property in order to mitigate the risk to the public health, safety or welfare or the environment and DEQ requires that such restrictions be recorded as provided for in § 75-10-727, MCA;

NOW, THEREFORE, [insert property owner's name] hereby agrees and declares:

1. No residential development or use shall occur upon the Subject Property, including but not limited to construction of homes; accommodations for caretakers, watchmen, or custodians; any permanent or temporary structures which allow overnight use; or any temporary or permanent mobile home or camper. It is [insert property owner's name]'s intention that this restriction be

interpreted as broadly as possible to prohibit any type of residential use of the Subject Property whatsoever.

2. No action shall be taken, allowed, suffered, or omitted on the Subject Property if such action or omission is reasonably likely to create a risk of migration of hazardous or deleterious substances or a potential hazard to public health, safety, or welfare or the environment.

3. [Insert property owner's name] agrees to provide DEQ and its representatives and contractors and all representatives and contractors of any person conducting remedial actions approved by DEQ on the Subject Property access at all reasonable times to the Subject Property.

4. At all times after [insert property owner's name] conveys its interest in all or any portion of the Subject Property and no matter what person or entity holds title to or is in possession of the Subject Property, [insert property owner's name] shall retain the right to enter the Subject Property at reasonable intervals and at reasonable times of the day in order to inspect for violations of the Restrictive Covenants contained herein. In addition, if [insert property owner's name] conveys all or any portion of its interest in the Subject Property, UTCC retains the right and obligation to enforce these Restrictive Covenants.

5. DEQ shall be entitled to enforce these covenants as an intended beneficiary thereof. [Insert property owner's name] specifically agrees that the remedy of "specific performance" shall be available to DEQ in such proceedings.

6. The provisions of this Declaration governing the use restrictions of the Subject Property shall run with the land and bind all holders, owners, lessees, occupiers, and purchasers of all or any portion of the Subject Property. These restrictive covenants apply in perpetuity and every subsequent instrument conveying an interest in all or any portion of the Subject Property shall include these Restrictive Covenants.

7. [Insert property owner's name] shall cause the requirements of these Restrictive Covenants to be placed in all instruments that convey an interest in the Subject Property and shall file this document with the Toole County, Montana, clerk and recorder.

8. The rights provided to DEQ in this declaration include any successor agencies of DEQ.

IN WITNESS WHEREOF, [insert name of property owner] has executed this Declaration of Restrictive Covenants on Real Property as of the first date written above.

_____
By:

State of _____)
:ss.
County of _____)

On this __ day of _____, 2016, personally appeared _____, before me, a Notary Public for the State of _____, known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same, as the owner of the property being restricted here.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal the day and year hereinabove first written.

_____
NOTARY PUBLIC FOR THE STATE OF _____
(SEAL) Residing at _____
My Commission Expires: _____

DECLARATION OF RESTRICTIVE COVENANTS ON REAL PROPERTY [IC3: Property with Groundwater Exceeding SSCLs and a Vapor Intrusion Concern with Stabilized Wastewater Treatment Pond and Small Sludge Pond; Includes Residential Use Restrictions]

THIS DECLARATION OF RESTRICTIVE COVENANTS ON REAL PROPERTY is made by [insert property owner's name] as of _____, 2016.

RECITALS

WHEREAS, [insert property owner's name] is the owner of certain real property (the Subject Property) located in Toole County, Montana, more particularly described as:

[insert property description here]

WHEREAS, the Subject Property is within the Big West Oil Refinery Facility and the Montana Department of Environmental Quality (DEQ) has determined that releases or threatened releases of hazardous or deleterious substances that may pose an imminent or substantial endangerment to public health, safety or welfare or the environment exist and that these hazardous or deleterious substances have come to be located upon the Subject Property;

WHEREAS, DEQ, under the authority of the Montana Comprehensive Environmental Cleanup and Responsibility Act, §§ 75-10-701 et seq., MCA, has selected a remedy to abate the imminent and substantial endangerment posed by the hazardous or deleterious substances;

WHEREAS, the site-specific cleanup levels selected as part of the final remedy were based upon the Subject Property being used, now and in the future, for commercial/industrial purposes and are not protective of residential use;

WHEREAS, DEQ has issued UTC Canada Corporation (UTCC) an administrative order and UTCC is implementing DEQ's selected remedy;

WHEREAS, within the Subject Property, there are areas where groundwater exceeds the site-specific cleanup levels selected in the remedy and an area surrounding the groundwater plume where a well installed within the pumping radius of influence of the groundwater plume could affect the plume. The portion of the Subject Property with groundwater concerns, referred to as the Groundwater Restriction Area, has been surveyed and is more particularly described as follows:

[insert surveyed Groundwater Restriction Area description here]

WHEREAS, within the Subject Property, there are areas where groundwater exceeds the

site-specific cleanup levels selected in the remedy and identified soil vapor contamination that has the potential for vapor intrusion if a structure were constructed in those areas. The portion of the Subject Property with potential vapor intrusion concerns, referred to as the Vapor Intrusion Area, has been surveyed and is more particularly described as follows:

[insert surveyed Vapor Intrusion Area description here]

WHEREAS, within the Subject Property, there is a disposal area containing remediated materials. That area must be protected in order to ensure the integrity of the remedy. The portion of the Subject Property containing the disposal area, referred to as the [insert Wastewater Treatment Pond Area or Small Sludge Pond Area], has been surveyed and is more particularly described as follows:

[insert surveyed Wastewater Treatment Pond Area or Small Sludge Pond Area description here]

WHEREAS, the selected remedy requires that [insert property owner's name] restrict use of the Subject Property in order to mitigate the risk to the public health, safety or welfare or the environment and DEQ requires that such restrictions be recorded as provided for in § 75-10-727, MCA;

NOW, THEREFORE, [insert property owner's name] hereby agrees and declares:

1. No residential development or use shall occur upon the Subject Property, including but not limited to construction of homes; accommodations for caretakers, watchmen, or custodians; any permanent or temporary structures which allow overnight use; or any temporary or permanent mobile home or camper. It is [insert property owner's name]'s intention that this restriction be interpreted as broadly as possible to prohibit any type of residential use of the Subject Property whatsoever.

2. Within the Groundwater Restriction Area, no wells may be installed without the express prior written approval of DEQ. Groundwater within the Groundwater Restriction Area may not be used for any purpose other than for remediation purposes (including but not limited to monitoring) without the express prior written approval of DEQ. The integrity of any monitoring wells must be maintained and no seals may be removed on any closed well.

3. Within the Vapor Intrusion Area, no excavation of soil or construction of any permanent or temporary structure of any kind whatsoever is allowed. It is [insert property owner's name]'s intention that this restriction be interpreted as broadly as possible to prohibit any type of construction on the Vapor Intrusion Area whatsoever.

4. Within the [insert Wastewater Treatment Pond Area or Small Sludge Pond Area], no soil or soil caps may be disturbed in any manner without the express prior written approval of DEQ. This restriction includes, but is not limited to irrigation, drilling, excavation, or construction of any structures, containments, footings for any purpose, or similar below ground appurtenances. It is [insert property owner's name here]'s that this prohibition be applied as broadly as possible to ensure that there is no use of the [insert Wastewater Treatment Pond Area or Small Sludge Pond Area] that may disturb the soil or soil caps in order to ensure the integrity and effectiveness of the remedy.

5. No action shall be taken, allowed, suffered, or omitted on the Subject Property if such action or omission is reasonably likely to create a risk of migration of hazardous or deleterious substances or a potential hazard to public health, safety, or welfare or the environment.

6. [Insert property owner's name] agrees to provide DEQ and its representatives and contractors and all representatives and contractors of any person conducting remedial actions approved by DEQ on the Subject Property access at all reasonable times to the Subject Property.

7. At all times after [insert property owner's name] conveys its interest in all or any portion of the Subject Property and no matter what person or entity holds title to or is in possession of the Subject Property, [insert property owner's name] shall retain the right to enter the Subject Property at reasonable intervals and at reasonable times of the day in order to inspect for violations of the Restrictive Covenants contained herein. In addition, if [insert property owner's name] conveys all or any portion of its interest in the Subject Property, UTCC retains the right and obligation to enforce these Restrictive Covenants.

8. DEQ shall be entitled to enforce these covenants as an intended beneficiary thereof. [Insert property owner's name] specifically agrees that the remedy of "specific performance" shall be available to DEQ in such proceedings.

9. The provisions of this Declaration governing the use restrictions of the Subject Property shall run with the land and bind all holders, owners, lessees, occupiers, and purchasers of all or any portion of the Subject Property. These restrictive covenants apply in perpetuity and every subsequent instrument conveying an interest in all or any portion of the Subject Property shall include these Restrictive Covenants.

10. [Insert property owner's name] shall cause the requirements of these Restrictive Covenants to be placed in all instruments that convey an interest in the Subject

Property and shall file this document with the Toole County, Montana, clerk and recorder.

11. The rights provided to DEQ in this declaration include any successor agencies of DEQ.

IN WITNESS WHEREOF, [insert name of property owner] has executed this Declaration of Restrictive Covenants on Real Property as of the first date written above.

_____
By:

State of _____)
:ss.
County of _____)

On this __ day of _____, 2016, personally appeared _____, before me, a Notary Public for the State of _____, known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same, as the owner of the property being restricted here.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal the day and year hereinabove first written.

_____
NOTARY PUBLIC FOR THE STATE OF _____
(SEAL) Residing at _____
My Commission Expires: _____

DECLARATION OF RESTRICTIVE COVENANTS ON REAL PROPERTY [IC4: Property Containing Stabilized Wastewater Treatment Pond and a Vapor Intrusion Concern; Includes Residential Use Restrictions]

THIS DECLARATION OF RESTRICTIVE COVENANTS ON REAL PROPERTY is made by [insert property owner's name] as of _____, 2016.

RECITALS

WHEREAS, [insert property owner's name] is the owner of certain real property (the Subject Property) located in Toole County, Montana, more particularly described as:

[insert property description here]

WHEREAS, the Subject Property is within the Big West Oil Refinery Facility and the Montana Department of Environmental Quality (DEQ) has determined that releases or threatened releases of hazardous or deleterious substances that may pose an imminent or substantial endangerment to public health, safety or welfare or the environment exist and that these hazardous or deleterious substances have come to be located upon the Subject Property;

WHEREAS, DEQ, under the authority of the Montana Comprehensive Environmental Cleanup and Responsibility Act, §§ 75-10-701 et seq., MCA, has selected a remedy to abate the imminent and substantial endangerment posed by the hazardous or deleterious substances;

WHEREAS, the site-specific cleanup levels selected as part of the final remedy were based upon the Subject Property being used, now and in the future, for commercial/industrial purposes and are not protective of residential use;

WHEREAS, DEQ has issued UTC Canada Corporation (UTCC) an administrative order and UTCC is implementing DEQ's selected remedy;

WHEREAS, within the Subject Property, there is a disposal area containing remediated materials. That area must be protected in order to ensure the integrity of the remedy. The portion of the Subject Property containing the disposal area, referred to as the Wastewater Treatment Pond Area, has been surveyed and is more particularly described as follows:

[insert surveyed Wastewater Treatment Pond Area description here]

WHEREAS, within the Subject Property, there are areas with identified soil vapor contamination that has the potential for vapor intrusion if a structure were constructed in those areas. The portion of the Subject Property with potential vapor intrusion concerns, referred to as the Vapor Intrusion Area, has been surveyed and is more particularly described as follows:

[insert surveyed Vapor Intrusion Area description here]

WHEREAS, the selected remedy requires that [insert property owner's name] restrict use of the Subject Property in order to mitigate the risk to the public health, safety or welfare or the environment and DEQ requires that such restrictions be recorded as provided for in § 75-10-727, MCA;

NOW, THEREFORE, [insert property owner's name] hereby agrees and declares:

1. No residential development or use shall occur upon the Subject Property, including but not limited to construction of homes; accommodations for caretakers, watchmen, or custodians; any permanent or temporary structures which allow overnight use; or any temporary or permanent mobile home or camper. It is [insert property owner's name]'s intention that this restriction be interpreted as broadly as possible to prohibit any type of residential use of the Subject Property whatsoever.

2. Within the Wastewater Treatment Pond Area, no soil or soil caps may be disturbed in any manner without the express prior written approval of DEQ. This restriction includes, but is not limited to irrigation, drilling, excavation, or construction of any structures, containments, footings for any purpose, or similar below ground appurtenances. It is [insert property owner's name here]'s that this prohibition be applied as broadly as possible to ensure that there is no use of the Wastewater Treatment Pond Area that may disturb the soil or soil caps in order to ensure the integrity and effectiveness of the remedy.

3. Within the Vapor Intrusion Area, no excavation of soil or construction of any permanent or temporary structure of any kind whatsoever is allowed. It is [insert property owner's name]'s intention that this restriction be interpreted as broadly as possible to prohibit any type of construction on the Vapor Intrusion Area whatsoever.

4. No action shall be taken, allowed, suffered, or omitted on the Subject Property if such action or omission is reasonably likely to create a risk of migration of hazardous or deleterious substances or a potential hazard to public health, safety, or welfare or the environment.

5. [Insert property owner's name] agrees to provide DEQ and its representatives and contractors and all representatives and contractors of any person conducting remedial actions approved by DEQ on the Subject Property access at all reasonable times to the Subject Property.

6. At all times after [insert property owner's name] conveys its interest in all or any portion of the Subject Property and no matter what person or entity holds title to or is in possession of the Subject Property, [insert property owner's name] shall retain the right to enter the Subject Property at reasonable intervals and at reasonable times of the day in order to inspect for violations of the Restrictive Covenants contained herein. In addition, if [insert property owner's name] conveys all or any portion of its interest in the Subject Property, UTCC retains the right and obligation to enforce these Restrictive Covenants.

7. DEQ shall be entitled to enforce these covenants as an intended beneficiary thereof. [Insert property owner's name] specifically agrees that the remedy of "specific performance" shall be available to DEQ in such proceedings.

8. The provisions of this Declaration governing the use restrictions of the Subject Property shall run with the land and bind all holders, owners, lessees, occupiers, and purchasers of all or any portion of the Subject Property. These restrictive covenants apply in perpetuity and every subsequent instrument conveying an interest in all or any portion of the Subject Property shall include these Restrictive Covenants.

9. [Insert property owner's name] shall cause the requirements of these Restrictive Covenants to be placed in all instruments that convey an interest in the Subject Property and shall file this document with the Toole County, Montana, clerk and recorder.

10. The rights provided to DEQ in this declaration include any successor agencies of DEQ.

IN WITNESS WHEREOF, [insert name of property owner] has executed this Declaration of Restrictive Covenants on Real Property as of the first date written above.

_____

By:

State of _____)
:ss.
County of _____)

On this __ day of _____, 2016, personally appeared _____, before me, a

Notary Public for the State of _____, known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same, as the owner of the property being restricted here.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal the day and year hereinabove first written.

_____

NOTARY PUBLIC FOR THE STATE OF _____

(SEAL) Residing at _____

My Commission Expires: _____

APPENDIX C

IDENTIFICATION OF
ENVIRONMENTAL REQUIREMENTS, CRITERIA, OR LIMITATIONS

INTRODUCTION

Remedial actions undertaken pursuant to the Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §§ 75-10-701, et seq., MCA, must "attain a degree of cleanup of the hazardous or deleterious substance and control of a threatened release or further release of that substance that assures protection of public health, safety, and welfare and of the environment." Section 75-10-721(1), MCA. Additionally, the Montana Department of Environmental Quality (DEQ) "shall require cleanup consistent with applicable state or federal environmental requirements, criteria, or limitations" and "may consider substantive state or federal environmental requirements, criteria or limitations that are relevant to the site conditions." Section 75-10-721(2)(a) and (b), MCA.

A distinction exists between "applicable" requirements and those that are "relevant." "Applicable" requirements are those requirements that legally apply at the Big West Oil Refinery (BWOR) Facility regardless of the CECRA action. "Relevant" requirements are those requirements that are not applicable, but address situations or problems sufficiently similar to those at the BWOR Facility and, therefore, are relevant for use at the facility.

Environmental requirements, criteria, and limitations (ERCLs) are grouped into three categories: contaminant-specific, location-specific, and action-specific. Contaminant-specific requirements are those that establish an allowable level or concentration of a hazardous or deleterious substance in the environment or which describe a level or method of treatment for a hazardous or deleterious substance. Location-specific requirements are those that serve as restrictions on the concentration of a hazardous or deleterious substance or the conduct of activities because they are in specific locations. Action-specific requirements are those that are relevant or applicable to implementation of a particular remedy. Action-specific requirements do not in themselves determine the remedy but rather indicate the manner in which the remedy must be implemented. Some ERCLs may fit into more than one category and will not typically be repeated.

CECRA defines cleanup requirements as only state and federal ERCLs. Remedial actions, including but not limited to designs, implementation, operation, and maintenance must, nevertheless, comply with all other applicable laws, including local, state, and federal. Many such laws, while not strictly environmental, have environmental impacts. It remains the responsibility of the entity implementing the remedial action to identify and comply with all other laws.

Many requirements listed here are promulgated as identical or nearly identical requirements in both federal and state law, often pursuant to delegated environmental programs administered by the Environmental Protection Agency (EPA) and the states, such as the requirements of the federal Clean Water Act and the Montana Water Quality Act. ERCLs and other laws that are unique to state law are also identified.

Within this document, DEQ has identified applicable or relevant state and federal ERCLs for the remedial actions at the BWOR Facility. The description of applicable or relevant federal and state

requirements that follows includes summaries of the legal requirements which set out the requirement in a reasonably concise fashion that is useful in evaluating compliance with the requirement. These descriptions are provided to allow the user a basic indication of the requirement without having to refer back to the statute or regulation itself. However, in the event of any inconsistency between the law itself and the summaries provided in this document, the actual requirement is ultimately the requirement as set out in the law, rather than any paraphrase of the law provided here.

CONTAMINANT SPECIFIC REQUIREMENTS

GROUNDWATER

As discussed in Section 5.2.5 of the Record of Decision (ROD), the groundwater at the BWOR Facility is Class IV and is not suitable for drinking water. Therefore, the federal Safe Drinking Water Act, 42 USC §§ 300f et seq. and the National Primary Drinking Water Regulations (40 CFR Part 141) do not apply.

The Montana Water Quality Act, § 75-5-605, MCA (Applicable) provides that it is unlawful to cause pollution of any state waters or place or cause to be placed any wastes where they will cause pollution of any state waters.

ARM 17.30.1006 (Applicable) classifies groundwater into Classes I through IV based upon its specific conductance and establishes the groundwater quality standards applicable with respect to each groundwater classification. Class I is the highest quality class; class IV the lowest. As discussed in Section 5.2.5 of the ROD, the BWOR Facility is classified as Class IV groundwater. The quality of Class IV groundwater must be maintained so that are suitable for some industrial and commercial uses. Concentrations of carcinogenic substances in groundwater within these classes may not exceed the human health standards for groundwater listed in Circular DEQ-7, Montana Numeric Water Quality Standards (DEQ-7), October 2012 (Applicable). In addition, for concentrations of parameters in DEQ-7 which are not listed as carcinogens, no increase of a parameter to a level that would adversely affect existing beneficial uses is allowed. The nitrate nitrogen and nitrate plus nitrite nitrogen standards are each 50 mg/l (unless it is demonstrated to DEQ's satisfaction that the field hydraulic conductivity is less than 0.1 feet per day in an affected or potentially affected groundwater zone and all existing and anticipated uses of groundwater are protected). Finally, for concentrations of parameters for which human health standards are not listed in DEQ-7, no increase of a parameter to a level that would adversely affect existing beneficial uses is allowed.

The DEQ-7 human health standard for the primary COC in groundwater is listed below.

Chemical	DEQ-7 Standard
Benzene	5 µg/L

SURFACE WATER

As discussed in Section 5.2.4 of the ROD, due to the semiarid climate, substantial quantities of surface water are not present at the Facility except immediately following heavy rainfalls when the storm water runoff has not yet infiltrated into the soil or evaporated into the atmosphere. The surface water that is present immediately following a rain event is not connected to any stream or creek. Therefore, no drainage classification or stream standards have been identified.

ARM 17.30.637 (Applicable) requires state surface waters to be free from substances attributable to municipal, industrial, agricultural practices, or other discharges that will:

1. settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;
2. create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials;
3. produce odors, colors or other conditions as to which create a nuisance or render undesirable tastes to fish flesh or make fish inedible;
4. create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; and
5. create conditions which produce undesirable aquatic life.

ARM 17.30.637 also states that pollution resulting from storm drainage and non-point sources must be eliminated or minimized.

AIR QUALITY

The Clean Air Act (42 USC §§ 7401 et seq.) provides limitations on air emissions resulting from cleanup activities or emissions resulting from wind erosion of exposed hazardous substances. Sections 75-2-101, et seq., MCA (Applicable) provides that state emission standards are enforceable under the Clean Air Act of Montana.

ARM 17.8.204 (Applicable) establish monitoring, data collection and analytical requirements to ensure compliance with ambient air quality standards.

ARM 17.8.220 (Applicable) provides that settled particulate matter shall not exceed a 30 day average of 10 grams per square meter.

ARM 17.8.222 (Applicable) provides that lead concentrations in ambient air may not exceed a 90-day average of 1.5 micrograms per cubic meter of air.

ARM 17.8.223 (Applicable) provides that PM-10 concentrations in ambient air shall not exceed a 24 hour average of 150 micrograms per cubic meter of air and an annual average of 50 micrograms per cubic meter of air.

Ambient air standards are also promulgated for sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, and hydrogen sulfide. If emissions of these compounds were to occur at the BWOR Facility in connection with any remedial action, these standards would also be applicable. See ARM 17.8.210, 17.8.211, 17.8.212, 17.8.213, and 17.8.214.

LOCATION-SPECIFIC REQUIREMENTS

The Endangered Species Act: 16 USC §§ 1531 et seq., 50 CFR Part 402, 40 CFR 6.302(h), and 40 CFR 257.3-2 (Relevant) require that any federal activity or federally authorized activity may not jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify a critical habitat. Compliance with this requirement involves consultation with the U.S. Fish and Wildlife Service (USFWS) and a determination of whether there are listed or proposed species or critical habitats present at the Facility, and, if so, whether any proposed activities will impact such wildlife or habitat. As described in Section 7.2 of the ROD, there are no known threatened or endangered species at the Facility. If any threatened or endangered species are encountered during remedial actions, consultation with the USFWS will occur.

Montana Nongame and Endangered Species Conservation Act: §§ 87-5-101 et seq., MCA, (Applicable) provides that endangered species should be protected in order to maintain and to the extent possible enhance their numbers. These sections list endangered species, prohibited acts and penalties. See also § 87-5-201, MCA, (Applicable) concerning protection of wild birds, nests and eggs; and ARM 12.5.201 (Applicable) prohibiting certain activities with respect to specified endangered species. As described in Section 7.2 of the ROD, there are no known endangered species at the Facility. If any threatened or endangered species or critical habitat are subsequently encountered during remedial actions, compliance with these ERCLs is required.

Migratory Bird Treaty Act: 16 USC §§ 703 et seq. (Relevant) establishes a federal responsibility for the protection of the international migratory bird resource and requires continued consultation with the USFWS during remedial design and remedial construction to ensure that the cleanup does not unnecessarily impact migratory birds. Specific mitigative measures may be identified for compliance with this requirement. International migratory birds are attracted to the area around Kevin and, as described in Section 2.2 of the ROD, the EPA issued an order in 1998 requiring protective netting of ponds that presented a threat to wildlife. If any migratory birds are encountered during remedial actions, consultation with the USFWS will occur and additional netting or other measures may be required.

Bald Eagle Protection Act: 16 USC §§ 668 et seq. (Relevant) establishes a federal responsibility for protection of bald and golden eagles, and requires continued consultation with the USFWS during remedial design and remedial construction to ensure that any cleanup does not unnecessarily adversely affect the bald and golden eagle. As described in Section 7.2 of the ROD, eagles have not been identified at the Facility. If any bald or golden eagles are subsequently encountered during remedial actions, consultation with the USFWS will occur.

Historic Sites, Buildings, Objects and Antiquities Act: 16 USC §§ 461 et seq. (Relevant) provides that, in conducting an environmental review of a proposed action, the responsible official shall consider the existence and location of natural landmarks using information provided by the National Park Service pursuant to 36 CFR 62.6(d) to avoid undesirable impacts upon such landmarks. To date, no such landmarks have been identified at the Facility.

Resource Conservation and Recovery Act: 40 CFR § 264.18 (Relevant) provides location standards for facilities where treatment of hazardous waste will occur. Portions of those treatment areas must not be located within 200 feet of a fault which has had displacement in Holocene time and treatment areas in or near a 100 year floodplain must be designed, constructed, operated, and maintained to avoid washout.

Montana Solid Waste Management Act: §§ 75-10-201, et seq., MCA and ARM 17.50.501 et seq. (Applicable) specify requirements that apply to the location of any solid waste management facility.

ARM 17.50.523 (Applicable) requires that waste be transported in such a manner as to prevent its discharge, dumping, spilling or leaking from the transport vehicle.

ARM 17.50.525 (Applicable) states that DEQ may inspect at reasonable hours.

ARM 17.50.1004 (Applicable) addresses Class II landfills in floodplains.

ARM 17.50.1005 (Applicable) prohibits placement of a Class II landfill in a wetland unless special conditions are met.

ARM 17.50.1006 (Applicable) prohibits placement of a Class II landfill within 200 feet of a fault which has had displacement in Holocene time unless special conditions are met.

ARM 17.50.1007 (Applicable) prohibits placement of a Class II landfill in a seismic impact zone (as defined in ARM 17.50.1002(35)) unless special conditions are met.

ARM 17.50.1008 (Applicable) prohibits placement of a Class II landfill in an unstable area, which are defined in ARM 17.50.1002(40) as including locations that are susceptible to events or forces that are capable of impairing the integrity of the landfill structural components responsible for preventing releases from the landfill.

ARM 17.50.1009 (Applicable) provides that a solid waste management facility must be located where a sufficient acreage of suitable land is available for solid waste management, including adequate separation of wastes from underlying groundwater and adjacent surface water. The facility may not cause or contribute to the taking of any endangered or threatened species of

plants, fish, or wildlife or result in the destruction or adverse modification of critical habitat for those species. Also, the facility must manage solid waste, gas, and leachate.

ARM 17.50.1009 (Applicable) requires that Class II landfills be designed, constructed, and maintained with a run-on and run-off control system to address 25 year storm events.

ARM 17.50.1110 (Applicable) prohibits a Class II landfill from causing a discharge of a pollutant into state waters, including wetlands.

ARM 17.50.1116 (Applicable) requires that a solid waste management facility be designed, constructed, and operated in a manner to prevent harm to human health and the environment.

ARM 17.50.1204(1)(b) (Applicable) requires that a Class II landfill be constructed utilizing a composite liner and leachate collection and removal system that is designed and constructed to maintain less than a 30 centimeter depth of leachate over the liner.

ARM 17.50.1205(3) (Applicable) requires that the leachate system provide for accurate monitoring of the leachate level and provide a minimum slop at the base of the overlying leachate collection layer equal to at least two percent.

ARM 17.50.1303 (Applicable) identifies requirements for groundwater monitoring.

ARM 17.50.1312 (Applicable) identifies requirements for monitoring well abandonment.

ARM 17.50.1403 (Applicable) sets forth the closure requirements for Class II landfills. This includes the requirement that the cap be a minimum of 24 inches thick and other criteria, as follows:

1. install a cover that is designed to minimize infiltration and erosion;
1. design and construct the final cover system to minimize infiltration through the closed unit by the use of an infiltration layer that contains a minimum 18 inches of earthen material and has a permeability less than or equal to the permeability of any bottom liner, barrier layer, or natural subsoils or a permeability no greater than 1 X 10-5 cm/sec, whichever is less; and
2. minimize erosion of the final cover by the use of a seed bed layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant.

ARM 17.50.1404 (Applicable) sets forth post closure care requirements for Class II landfills. Post closure care requires maintenance of the integrity and effectiveness of any final cover, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or

otherwise damaging the cover and comply with the groundwater monitoring requirements found at ARM Title 17, chapter 50, subchapter 13.

In addition, § 75-10-212, MCA, (Applicable) prohibits dumping or leaving any debris or refuse upon or within 200 yards of any highway, road, street, or alley of the State or other public property, or on privately owned property where hunting, fishing, or other recreation is permitted. However, the restriction relating to privately owned property does not apply to the owner, his agents, or those disposing of debris or refuse with the owner's consent.

ACTION-SPECIFIC REQUIREMENTS

Air Quality: Dust suppression and control of certain substances that may be released into the air as a result of earth moving, transportation and similar actions may be necessary to meet air quality requirements. These have been included in the contaminant-specific analysis, above, and are not repeated here.

ARM 17.8.304 and 17.8.308 (Applicable) provide that no person shall cause or authorize the production, handling, transportation or storage of any material; or cause or authorize the use of any street, road, or parking lot; or operate a construction site or demolition project, unless reasonable precautions to control emissions of airborne particulate matter are taken. Emissions of airborne particulate matter must be controlled so that they do not exhibit an opacity of 20% or greater averaged over six consecutive minutes.

ARM 17.24.761 (Relevant) specifies a range of measures for controlling fugitive dust emissions during mining and reclamation activities and requires that a fugitive dust control program be implemented.

Groundwater Act: § 85-2-505, MCA (Applicable) precludes the wasting of groundwater. Any well producing waters that contaminate other waters must be plugged or capped, and wells must be constructed and maintained so as to prevent waste, contamination, or pollution of groundwater.

Section 85-2-516, MCA and ARM 36.21.809 (Applicable) states that within 60 days after any well is completed a well log report must be filed by the driller with the Montana Bureau of Mines and Geology.

ARM 17.30.641 (Applicable) provides standards for sampling and analysis of water to determine quality.

ARM 17.30.646 (Applicable) requires that bioassay tolerance concentrations be determined in a specified manner.

ARM 36.21.670-678 and 810 (Applicable) specifies certain requirements that must be fulfilled when abandoning monitoring wells. This includes filing a well log report with the Montana Bureau of Mines and Geology.

Storm Water Runoff: ARM 17.30.1341 to 1344 (Applicable) requires a Storm Water Discharge General Permit for stormwater point sources. Generally, the permit requires the permittee to implement Best Management Practices (BMP) and to take all reasonable steps to minimize or prevent any discharge which has a reasonable likelihood of adversely affecting human health or the environment. However, if there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with the activity, additional protections may be required.

RCRA Subtitle C Requirements and corresponding State requirements: The Resource Conservation and Recovery Act (RCRA), 42 USC §§ 6901 et seq., (Applicable, as incorporated by the Montana Hazardous Waste Act), the Montana Hazardous Waste Act, §§ 75-10-401 et seq., MCA, (Applicable) and the regulations under these acts establish a regulatory structure for the generation, transportation, treatment, storage and disposal of hazardous wastes.

Wastes may be designated as hazardous by either of two methods: listing or demonstration of a hazardous characteristic. There are no known listed wastes at the BWOR Facility. Characteristic wastes are those that by virtue of concentrations of hazardous constituents demonstrate the characteristic of ignitability, corrosivity, reactivity or toxicity, as described at 40 CFR Part 261, Subpart C (Applicable, as incorporated by the Montana Hazardous Waste Act). As discussed in Section 7.3 of the ROD, lead in surface soil/sludge/sediment exceeds site-specific cleanup levels in two areas. The lead-contaminated soil will be further characterized during remedial design. If the soil sample, when subject to the Toxicity Characteristic Leaching Procedure (TCLP), produces a result in excess of the regulatory limit for lead (5 mg/l), then the soil represented by the same is a characteristic hazardous waste and is subject to RCRA regulation as a hazardous waste for disposal purposes. However, previous samples (including at least one sample from a leaded sludge pit area) have been collected at the BWOR for purposes of hazardous waste characterization and none of those samples exceeded TCLP limits. Therefore, it is not anticipated that remedial design samples will result in waste being characterized as hazardous, and no additional RCRA requirements have been identified. If remedial design samples do exceed TCLP limits, DEQ may identify applicable or relevant RCRA ERCLs at that time.

Tanks/Piping/Free Product Removal: ARM 17.56.607 (Relevant) specifies that all free product must be removed to the maximum extent practicable before a release may be considered resolved. ARM 17.56.702 requires that all tanks and connecting piping which are taken out of service permanently must be removed from the ground. This is applicable if any remaining tanks or underground piping are encountered during remedial activities.

Reclamation Requirements (Relevant): Certain portions of the Montana Strip and Underground

Mining Reclamation Act and Montana Hard Rock Mining Act as well as the Mine and Smelter Waste Remediation provisions as outlined below are relevant requirements for activities at the BWOR Facility. While no mining activities have occurred or are occurring at the BWOR Facility, these requirements are relevant for the management and reclamation of areas disturbed by excavation, grading, or similar actions.

ARM 17.24.631 (Relevant): Disturbances to the prevailing hydrologic balance will be minimized. Changes in water quality and quantity, in the depth to groundwater and in the location of surface water drainage channels will be minimized, to the extent consistent with the selected remedial action. Other pollution minimization devices must be used if appropriate, including stabilizing disturbed areas through land shaping, diverting runoff, planting quickly germinating and growing stands of temporary vegetation, regulating channel velocity of water, lining drainage channels with rock or vegetation, mulching, and control of acid-forming, and toxic-forming waste materials.

ARM 17.24.633 (Relevant): Surface drainage from a disturbed area must be treated by the best technology currently available. Treatment must continue until the area is stabilized.

ARM 17.24.635 through 17.24.637 (Relevant): Set forth requirements for temporary and permanent diversions.

ARM 17.24.638 (Relevant): Sediment control measures must be implemented during operations.

ARM 17.24.640 (Relevant): Discharges from diversions must be controlled to reduce erosion and to minimize disturbance of the hydrologic balance.

ARM 17.24.643 through 17.24.646 (Relevant): Provisions for groundwater protection, groundwater recharge protection, and groundwater and surface water monitoring.

ARM 17.24.701 and 702 (Relevant): Requirements for redistributing and stockpiling of soil for reclamation. Also outlines practices to prevent compaction, slippage, erosion, and deterioration of biological properties of soil.

ARM 17.24.703 (Relevant): When using materials other than, or along with, soil for final surfacing in reclamation, the operator must demonstrate that the material (1) is at least as capable as the soil of supporting the approved vegetation and subsequent land use; and (2) the medium must be the best available in the area to support vegetation. Such substitutes must be used in a manner consistent with the requirements for redistribution of soil in ARM 17.24.701 and 702.

ARM 17.24.711 (Relevant): Requires that a diverse, effective and permanent vegetative cover of the same seasonal variety and utility as the vegetation native to the area of land to be affected must be established. This provision would not be relevant and appropriate in certain instances,

for example, where there is dedicated development.

ARM 17.24.713 (Relevant): Seeding and planting of disturbed areas must be conducted during the first appropriate period for favorable planting after final seedbed.

ARM 17.24.714 (Relevant): Mulch or cover crop or both must be used until adequate permanent cover can be established.

ARM 17.24.716 (Relevant): Establishes method of revegetation.

ARM 17.24.717 (Relevant): Relates to the planting of trees and other woody species if necessary, as provided in § 82-4-233, MCA, to establish a diverse, effective, and permanent vegetative cover.

ARM 17.24.718 (Relevant): Requires soil amendments if necessary to establish a permanent vegetative cover.

ARM 17.24.721 (Relevant): Specifies that rills or gullies must be stabilized and the area reseeded and replanted if the rills and gullies are disrupting the reestablishment of the vegetative cover or causing or contributing to a violation of water quality standards for a receiving stream.

ARM 17.24.723 (Relevant): Requires periodic monitoring of vegetation, soils, water, and wildlife.

ARM 17.24.724 (Relevant): Specifies how revegetation success is measured.

ARM 17.24.726 (Relevant): Sets the required methods for measuring vegetative success.

ARM 17.24.731 (Relevant): If toxicity to plants or animals is suspected, comparative chemical analyses may be required.

Section 75-10-1404, MCA (Relevant) provides that lands where waste has been removed must be revegetated using plant species native to the area and must achieve a vegetative cover equal to 85% of the vegetative cover of adjacent lands that were not previously disturbed within three years of the initial seeding.

<u>Noxious Weeds:</u> §§ 7-22-2101 et seq., MCA (Applicable) establishes and authorizes weed control at the local level. Section 7-22-2101(8)(a), MCA defines "noxious weeds." Designated noxious weeds are listed in ARM 4.5.201 and 4.5.206 through 4.5.209 and must be managed consistent with weed management criteria developed under § 7-22-2109(2)(b), MCA and in compliance with § 7-22-2152, MCA (Applicable). In addition, ARM 4.5.210 identifies regulated plants that may not be used for revegetation.

OTHER LAWS (NON-EXCLUSIVE LIST)

CECRA defines as ERCLs only applicable or relevant state and federal environmental laws. Remedial design, implementation, and operation and maintenance must nevertheless comply with all other applicable laws. The following "other laws" are included here to provide a reminder of other potentially legally applicable requirements for actions at the BWOR Facility. They do not purport to be an exhaustive list of such legal requirements, but are included because they set out related concerns that must be addressed and, in some cases, may require some advance planning. They are not included as ERCLs because they are not “environmental laws."

Occupational Safety and Health Regulations

The federal Occupational Safety and Health Act regulations found at 29 CFR 1910 are applicable to worker protection during conduct of all remedial activities.

Montana Occupational Health Act

ARM 17.74.101 addresses occupational noise. In accordance with this section, no worker shall be exposed to noise levels in excess of the levels specified in this regulation. This regulation is applicable only to limited categories of workers and for most workers the similar federal standard in 29 CFR 1910.95 applies.

ARM 17.74.102 addresses occupational air contaminants. The purpose of this rule is to establish maximum threshold limit values for air contaminants under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects. In accordance with this rule, no worker shall be exposed to air contaminant levels in excess of the threshold limit values listed in the regulation. This regulation is applicable only to limited categories of workers and for most workers the similar federal standard in 29 CFR 1910.1000 applies.

Montana Safety Act

Sections 50-71-201-203, MCA, state that every employer must provide and maintain a safe place of employment, provide and require use of safety devices and safeguards, and ensure that operations and processes are reasonably adequate to render the place of employment safe. The employer must also do every other thing reasonably necessary to protect the life and safety of its employees. Employees are prohibited from refusing to use or interfering with the use of safety devices.

Employee and Community Hazardous Chemical Information Act

Sections 50-78-201, 202, and 204, MCA, state that each employer must post notice of employee rights, maintain at the work place a list of chemical names of each chemical in the work place, and indicate the work area where the chemical is stored or used. Employees must be informed of the chemicals at the work place and trained in the proper handling of the chemicals.

APPENDIX D

SELECTED REMEDY COST ESTIMATES

Cost Estimate - Site-wide Elements

TANKS # 4 - # 5 - # 8:

Tank Volumes

# 4 & # 5	# 8	Total Volume	Total Volume
85,806 gal	42,000 gal	127,806 gal	3,043 bbl

			# 4 & # 5	# 8	
a. Hot-oil truck					
b. Drums					
c. Transport & disposal (all in)	$ 42.00	per bbl	$ 85,806	$ 42,000	$ 127,806
d. Demo/salvage tanks #4 and #5	$ 10,000.00	each	$ 20,000	$ -	$ 25,000
Demo/salvage tank #8	$ 5,000.00	each	$ -	$ 5,000	
Total Cost					**$ 152,806**

RAILROAD LOADING AREA:

a. Labor	40 man-hr	$ 58.75	per hr	$ 2,350	
b. PPE	5 man-days	$ 225.00	per day	$ 1,125	
c. Equipment	5 days	$ 2,370.00	per day	$ 11,850	
				$ 15,325	**Total**

SITE-WIDE GRADING FOR DRAINAGE:

Volume and Area

Cut/fill grading	1795	$ 9.75	per CY	$ 17,503	
Erosion & Sediment Control Plan implemention	2.18	$ 1,000.00	per acre	$ 2,182	
Revegatate	2.18	$ 617.25	per acre	$ 1,347	
				$ 18,850	**Total**

Does not include revegetation for specific alternatives

LABOR/ADMIN:

Items	Quantity	Units	Unit Cost	Total Cost	Notes/Source
		Year 1			
Revegetation (general disturbance)	8	AC	$ 617.25	$ 4,938.00	Nygaard
On-site Engineer	26	Week	$ 4,000.00	$ 104,000.00	AMEC
Travel & per Diem	26	Week	$ 1,239.00	$ 32,214.00	AMEC
Office Rental	6	Month	$ 450.00	$ 2,700.00	city-data.com
Utilities	6	Month	$ 100.00	$ 600.00	city-data.com
Disposal Equip. including PPE	1	LS	$ 5,000.00	$ 5,000.00	BWOR experience
Establish Institutional Control	1	LS	$ 20,000.00	$ 20,000.00	KRY
			Task Total:	$ 169,452.00	
		Year 2			
Revegetation (general disturbance)	4	AC	$ 617.25	$ 2,469.00	Nygaard
On-site Engineer	10	Week	$ 4,000.00	$ 40,000.00	AMEC
Travel & per Diem	10	Week	$ 1,030.00	$ 10,300.00	AMEC
Disposal Equip. including PPE	1	LS	$ 2,500.00	$ 2,500.00	BWOR experience
			Task Total:	$ 55,269.00	

Items	Quantity	Units	Unit Cost	Total Cost	Notes/Source
Long-term O&M/Maintenance IRA caps	1	each	$ 1,500.00	$ 1,500	BWOR experience
Institutional Controls - maintenance	1	each	$ 5,000.00	$ 5,000	engineering est.

Present Value for Labor/Admin + Common Elements + Institutional Controls: inspection, maintenance & monitoring
Site-wide Elements = disposing of tank contents, tanks 4-5-8, RLA remediation and site regrading for drainage

Tanks	$ 152,806	
RLA	$ 15,325	
Site-wide Drainage	$ 18,850	
Labor/Admin (Year 1):	$ 169,452	Significant RA,
Labor/Admin (Year 2):	$ 55,269	Field Work
Long-term O&M and Institutional Controls (Years 3-30):	$ 114,965	Present Value (3% discount rate) of $114,965
Common Elements:	$ 526,667	
Unrestricted: Total Present Value:	$ 526,667	

Alternative 3b: Cost Estimate for Asphaltic Materials Recovery

ASPHALTIC MATERIALS RECOVERY:

Alternative assumptions (Commercial estimate for 16,000 barrels)

Raw Asphalt Processing

Vol. - Processed	production rate	work days	time to complete
16,000 bbl	200 bbl/day	80 days	3.1 mon (26d)

a. Mob/Demob					$	2,000		
b. Labor	88 days	$	2,280	per day	$	200,640.00		
c. Equipment	80 days	$	1,600	per day	$	128,000.00		
d. Propane	80 days	$	97,317	LS	$	97,317.00		
					$	427,957	$	26.75 per bbl

Vol. - Processed	residue rate	marketable product	residue to dispose
16,000 bbl	20 %	12,800 bbl	3,200 bbl

Income from Sale of Recovered Product

a. Income	12,800 bbl	$	22.75	per bbl	$	291,200	gross income
b. Transportation		$	-	per bbl	$	(0)	FOB-site, transport by buyer
					$	291,200	net income

3 b. Asphalt Residuals Disposal - Off-site Landfill Disposal

Volume of asphalt	3,200	bbl	665	CY
Area - Pit # 7	31,000	SF	3444	CY
Volume expansion due to handling	10	%		
Total common fill needed	4,249	CY		
NFA 2 (pb) fill	2,222	CY		
Borrow needed @ +10%	4,674	CY	(backfill excavation and pit # 7)	

Items	Quantity	Units	Unit Cost	Total Cost	Notes/Source
Haul asphalt residue +NFA2	3176	CY	$ 23.90	$ 75,896	Nygaard
Landfill Disposal Costs	3176	CY	$ 10.50	$ 33,350	Landfills
Common fill & grade, NFA 2	2222	CY	$ 9.75	$ 21,665	Nygaard
Common fill & grade, Pit #7	4674	CY	$ 9.75	$ 45,571	Nygaard
Erosion & Sediment Control Plan implementation	2	AC	$ 1,000.00	$ 2,000	BWOR
Revegetate	2	AC	$ 617.25	$ 1,235	Nygaard
Lead Sludge & Asphalt Disposal:				**$ 179,716**	

Option 3 b, NET COST:	**Asphalt Recovery**	$ 427,957	
	Sales Income	$ (291,200)	
	Residue Disposal	$ 179,716	
		$ 316,473	**Total**
			19.78 $/bbl

Remedial oversight -

Confirmation sampling and analysis	$	25,000	BWOR IRA experience
Remedial construction documentation and reporting	$	15,000	BWOR IRA experience
	$	**40,000**	**Total**

3 b. Asphalt Residuals Disposal - Off-site Landfill Disposal	$	316,473
Remedial oversight -	$	40,000
Estimated Cost:	**$**	**356,473**

Note:
1. Work can be completed in year 1 & 2
2. 4 asphalt tanks to remain on-site, 2 to be removed by owner

RA completed in 2 years - no NPV calculation

Alternative 4: Cost Estimate for Off-Site Landfill

Off-Site Landfill - SOIL/SLUDGE/SEDIMENT (Surface and Sub-Surface)

Items		Quantity	Units	Unit Cost/ton	Total Cost	Notes/Source
Excavate & Off-Site Transport						Converted CY to ton
SDD	(surface)	0	tons	$ 23.90	$ -	Nygaard/Bay Mat'l
GLA	(surface)	0	tons	$ 23.90	$ -	Nygaard/Bay Mat'l
RPA	(surface)	648	tons	$ 23.90	$ 15,484	Nygaard/Bay Mat'l
ROLA	(surface)	150	tons	$ 23.90	$ 3,584	Nygaard/Bay Mat'l
OUT	(surface)	0	tons	$ 23.90	$ -	Nygaard/Bay Mat'l
TSA	(surface)	0	tons	$ 23.90	$ -	Nygaard/Bay Mat'l
OD	(surface)	0	tons	$ 23.90	$ -	Nygaard/Bay Mat'l
PSY	(surface)	0	tons	$ 23.90	$ -	Nygaard/Bay Mat'l
NSTA	(surface)	2702	tons	$ 23.90	$ 64,552	Nygaard/Bay Mat'l
NFA1	(surface)	140	tons	$ 23.90	$ 3,333	Nygaard/Bay Mat'l
NFA2	(surface)	3333	tons	$ 23.90	$ 79,642	Nygaard/Bay Mat'l
		6,972		**Total:**	**$ 166,596**	

Items		Quantity	Units	Unit Cost/ton	Total Cost	Notes/Source
Landfill Disposal						Converted CY to ton
SDD	(surface)	0	tons	$ 10.50	$ -	Bay Mat'l/Emerald
GLA	(surface)	0	tons	$ 10.50	$ -	Bay Mat'l/Emerald
RPA	(surface)	648	tons	$ 10.50	$ 6,804	Bay Mat'l/Emerald
ROLA	(surface)	150	tons	$ 10.50	$ 1,575	Bay Mat'l/Emerald
OUT	(surface)	0	tons	$ 10.50	$ -	Bay Mat'l/Emerald
TSA	(surface)	0	tons	$ 10.50	$ -	Bay Mat'l/Emerald
OD	(surface)	0	tons	$ 10.50	$ -	Bay Mat'l/Emerald
PSY	(surface)	0	tons	$ 10.50	$ -	Bay Mat'l/Emerald
NSTA	(surface)	2702	tons	$ 10.50	$ 28,366	Bay Mat'l/Emerald
NFA1	(surface)	140	tons	$ 10.50	$ 1,465	Bay Mat'l/Emerald
NFA2	(surface)	3333	tons	$ 10.50	$ 34,997	Bay Mat'l/Emerald
				Total:	**$ 73,206**	

Items		Quantity	Units	Unit Cost	Volume Increase	Total Cost	Notes/Source
Refill Excavations							
SDD	(surface)	0	CY	$ 8.25	1.20	$ -	Nygaard/Bay Mat'l
GLA	(surface)	0	CY	$ 8.25	1.20	$ -	Nygaard/Bay Mat'l
RPA	(surface)	432	CY	$ 8.25	1.20	$ 4,277	Nygaard/Bay Mat'l
ROLA	(surface)	100	CY	$ 8.25	1.20	$ 990	Nygaard/Bay Mat'l
OUT	(surface)	0	CY	$ 8.25	1.20	$ -	Nygaard/Bay Mat'l
TSA	(surface)	0	CY	$ 8.25	1.20	$ -	Nygaard/Bay Mat'l
OD	(surface)	0	CY	$ 8.25	1.20	$ -	Nygaard/Bay Mat'l
PSY	(surface)	0	CY	$ 8.25	1.20	$ -	Nygaard/Bay Mat'l
NSTA	(surface)	1801	CY	$ 8.25	1.20	$ 17,830	Nygaard/Bay Mat'l
NFA1	(surface)	93	CY	$ 8.25	1.20	$ 921	Nygaard/Bay Mat'l
NFA2	(surface)	2222	CY	$ 8.25	1.20	$ 21,998	Nygaard/Bay Mat'l
		4,648			**Total:**	**$ 46,015**	

Items	Quantity	Units	Unit Cost	Total Cost	Notes/Source
Stockpile Surface at ROLA					
Strip 2 ft & stockpile: ROLA cover	86	CY	$ 3.50	$ 301	Nygaard/Bay Mat'l
Total Cost				**$ 301**	

Items	Quantity	Units	Unit Cost	Total Cost	Notes/Source
Excavate & Off-Site Transport					Converted CY to ton
ROLA subsurface	363	tons	$ 23.90	$ 8,674	Nygaard/Bay Mat'l
Total Cost				**$ 8,674**	

Alternative 4: Cost Estimate for Off-Site Landfill

Items		Quantity	Units	Unit Cost	Total Cost	Notes/Source
Landfill Disposal						Converted CY to ton
ROLA	subsurface	363	tons	$ 10.50	**$ 3,812**	Bay Mat'l/Emerald

Items		Quantity	Units	Unit Cost	Volume Increase	Total Cost	Notes/Source
Refill Excavations							
ROLA	cover	86	CY	$ 6.25	NA	$ 538	Nygaard/Bay Materials
ROLA	subsurface	242	CY	$ 8.25	1.20	$ 2,396	Nygaard/Bay Materials
					Total:	**$ 2,933**	

Items		Quantity	Units	Unit Cost/AC	Total Cost	Notes/Source
Revegetation - Surface						converted SF to acres in eq
SDD	(surface)	0	SF	$ 617.25	$ -	Nygaard/Bay Mat'ls
GLA	(surface)	0	SF	$ 617.25	$ -	Nygaard/Bay Mat'ls
RPA	(surface)	5826	SF	$ 617.25	$ 83	Nygaard/Bay Mat'ls
ROLA	(surface)	2500	SF	$ 617.25	$ 35	Nygaard/Bay Mat'ls
OUT	(surface)	0	SF	$ 617.25	$ -	Nygaard/Bay Mat'ls
TSA	(surface)	0	SF	$ 617.25	$ -	Nygaard/Bay Mat'ls
OD	(surface)	0	SF	$ 617.25	$ -	Nygaard/Bay Mat'ls
PSY	(surface)	0	SF	$ 617.25	$ -	Nygaard/Bay Mat'ls
NSTA	(surface)	24304	SF	$ 617.25	$ 344	Nygaard/Bay Mat'ls
NFA1	(surface)	625	SF	$ 617.25	$ 9	Nygaard/Bay Mat'ls
NFA2	(surface)	29997	SF	$ 617.25	$ 425	Nygaard/Bay Mat'ls
				Total:	**$ 896**	

Items		Quantity	Units	Unit Cost/AC	Total Cost	Notes/Source
Revegetation - Surface						converted SF to acres in eq
ROLA	(subsurface)	1634	SF	$ 617.25	$ 23	Nygaard/Bay Materials

349	Excavate surface & haul off-site:	$	166,596	
	Landfill Disposal of surface	$	73,206	
	Excavate subsurface & haul off-site:	$	8,975	
465	Landfill Disposal of subsurface	$	3,812	
	Refill surface & subsurface:	$	48,949	
	Revegetate:	$	919	
	Total:	$	302,456	**Total Cost, Remedial Action**

Estimated Cost: $302,456

RA complete 2 years or less -no NPV calculation

Remedial oversight

Confirmation sampling and analysis	$	25,000	BWOR IRA experience
Remedial construction documentation and reporting	$	15,000	BWOR IRA experience
	$	**40,000**	**Total**

Off-site landfill	$	302,456
Remedial Oversight	$	40,000
Unrestricted: Present Value:	**$**	**342,456**

Note:
1. Work can be completed in year 1 & 2 RA completed in 2 years - no NPV calculation

Alternative 7: Monitored Natural Attenuation

MONITORED NATURAL ATTENUATION

Items - Year 1	Quantity	Units	Unit Cost	Total Cost	Notes/Source
Drill and install shallow monitoring well [1]	1	wells	$ 3,818.00	$ 3,818.00	RS Means
Well protection	1	wells	$ 1,400.00	$ 1,400.00	RS Means
Redevelop existing wells	2	wells	$ 250.00	$ 500.00	engineering est.
Initial testing (3 wells, 2x)	6	wells	$ 375.00	$ 2,250.00	Test America, BTEX + NA
Field work - Labor 2 per (3 day, 2x)	6	days	$ 1,030.00	$ 6,180.00	AMEC
Field work - travel /diem (2 per, 3 day, 2x)	12	days	$ 618.00	$ 7,416.00	AMEC includes expendables
Groundwater monitoring & reporting [2]	2	rounds	$ 1,500.00	$ 3,000.00	includes report, engineering est.
Data Validation & Report	1	each	$ 2,500.00		
			Total Year 1:	$ 24,564.00	

Items - Year 2	Quantity	Units	Unit Cost	Total Cost	Notes/Source
Initial testing (3 wells, 2x)	3	wells	$ 375.00	$ 1,125.00	Test America, BTEX + NA
Field work - Labor 2 per	2	days	$ 1,030.00	$ 2,060.00	AMEC
Field work - travel /diem (2 per, 3 day)	4	days	$ 618.00	$ 2,472.00	AMEC includes expendables
Groundwater monitoring & reporting [3]	1	LS	$ 2,500.00	$ 2,500.00	includes report & DV
			Total Year 2:	$ 8,157.00	

Items Years 3 - 30	Quantity	Units	Unit Cost	Total Cost	Notes/Source
Groundwater monitoring & reporting [4]	10	3-year intervals	$ 8,157.00	$ 81,570.00	year 2 expense

NOTES:

[1] One new downgradient, sentinel, well (MW 9)

[2] 2nd round, year 1 - 3 wells (MW 9, 98-1 & 98-3)

[3] 3nd round, year 2 - 3 wells (MW 9, 98-1 & 98-3)

[4] Sample, analyze & report - 3 wells, every third year (years 5 - 8 - 11 to 30 or to SSCL)

Summary MNA:	$ 24,564	Year 1
	$ 8,157	Year 2
	$ 51,726	Year 3-30 (present value @ 3%)
Total MNA:	$ 84,447	
Unrestricted: Total Present Value:	**$ 84,447**	

Present Value of $51,726.29 - refer to separate PV spreadsheet