Focused Feasibility Study – V4

Coleman Oil Company Wenatchee, Washington

Prepared for:

Coleman Oil Company, LLC
335 Mill Road
Lewiston, Idaho 83501

July 5, 2023

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HydroCon Project No: 2017-074
July 5, 2023

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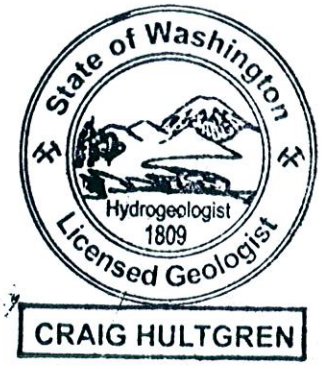

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Acronyms

AST	Aboveground Storage Tank
bgs	below ground surface
BNSF	Burlington Northern – Santa Fe Railroad
BTEX	benzene, toluene, ethylbenzene, and total xylenes
cPAHs	carcinogenic polynuclear aromatic hydrocarbons
COC	Chemical of Concern
Coleman Oil	Coleman Oil Company
CUL	MTCA Method A Industrial cleanup level
CSM	conceptual site model
CVB	Control valve building
DRPH	diesel range petroleum hydrocarbons
Ecology	Washington Department of Ecology
EDB	1,2-dibromoethane
EDC	1,2-dichloroethane
EEC	Environmental Engineering & Consulting, Inc.
EPA	Environmental Protection Agency
GAC	Granular activated carbon
gpm	gallons per minute
GRPH	gasoline range petroleum hydrocarbons
HydroCon	HydroCon Environmental LLC
µg/L	micrograms per liter
mg/Kg	milligrams per Kilogram
LCS/LCSD	Laboratory Control Sample/ Laboratory Control Sample Duplicates
LNAPL	light nonaqueous-phase liquid
MDL	method detection limit
MNA	Monitored Natural Attenuation
MRL	method reporting limit
MTBE	Methyl tert-butyl ether
MTCA	Model Toxics Control Act
ORPH	oil range petroleum hydrocarbons
PAH	polynuclear aromatic hydrocarbons
PCS	petroleum contaminated soil
PID	photoionization detector
PUD	Public Utilities District (Chelan County Public Utility District)
R99	R99 Renewable Diesel

Acronyms (continued)

REC	recognized environmental concerns
ROW	Right of Way
SAP	Sampling and Analysis Plan
SCO	Sediment Cleanup Objective
SRI	Supplemental Remedial Investigation
SVE	soil vapor extraction
TEE	Terrestrial Ecological Evaluation
TEQ	Toxic Equivalent Concentration
UST	Underground Storage Tank

EXECUTIVE SUMMARY

The focused feasibility study (FFS) is designed to provide an evaluation of the feasibility of proposed environmental cleanup alternatives at the Site and is a companion document for the previous Supplemental Remedial Investigation (SRI). This FFS is "focused" in that extensive interim remedial actions have been implemented at the Site, some of which (e.g., product recovery, pumping and treating groundwater, groundwater monitoring, frequent monitoring of river conditions) will continue to be implemented as selected alternatives. These interim remedial actions have been evaluated and documented in previous reports and will be summarized rather than extensively evaluated in this report. This report provides a list of remedial technologies that may be considered for use at the Site and provides a comparison of the alternatives.

Summary of Site Conditions

Diesel range and gasoline range petroleum hydrocarbons (DRPH and GRPH) exceeding MTCA Method A Industrial cleanup levels (CULs) are present in subsurface soil, groundwater, and shoreline soils. R99 Renewable Diesel (R99) in groundwater extends from the release area to the north-northeast to approximately MW21, a distance of 550 feet. Most soil within the groundwater interface (commonly referred to as the smear zone) is impacted primarily by DRPH and GRPH transported by groundwater. The origin of GRPH is primarily at the former Tank Farm B area.

Prior to remedial excavation, GRPH in groundwater extended from the former Control Valve Building (CVB) and former Tank Farm B area (MW13R) to at least MW21 and was generally coincident with the R99 plume in downgradient areas. A significant reduction of GRPH in groundwater has resulted from remedial action. Gasoline releases are due to historic releases not associated with the R99 release. The area with the highest concentrations of GRPH was near monitoring well MW13R, which is located within the footprint of former Tank Farm B and next to (north of) the former CVB. Both of these areas on the Site had historic handling of gasoline and other petroleum products. Both the CVB and Tank Farm B were removed in 2019.

An area of shoreline soil is impacted by DRPH and GRPH from impacted groundwater discharging to the Columbia River approximately 400 feet north of the release area. Four seeps (SL01 through SL04) were discovered during site reconnaissance and have been sampled and monitored. The soil along the shoreline is composed predominantly of coarse material including gravel, cobbles and boulders with some fine grain sediments within the matrix.

The extent of petroleum in river sediments near the four seeps has been defined and it appears that the sediments no longer have exceedances of sediment above management standards in 2019.

Conceptual Site Model

A conceptual site model (CSM) has been developed for the Site. There is a complete exposure pathway for the soil-to-groundwater pathway since contaminated soil is impacting groundwater. The direct contact pathway is complete for areas where contaminated soil and/or groundwater is present at depths of 15 feet or less and includes most of the northern half of the Property. The vapor pathway is potentially complete if the Property is developed in the future and COCs are still present above CULs. The Public Utility District (PUD) buildings to the north of the Property may also be subject to vapor intrusion however, these structures are rarely occupied.

Initial Remedial Alternatives Evaluation

Remedial measures that were initially evaluated in the FFS in 2019 included the following:

- Alternative 1. No Action
- Alternative 2. Excavation and Disposal
- Alternative 3. Groundwater Pump and Treat
- Alternative 4. Biodegradable solvent
- Alternative 5. In-situ chemical oxidation
- Alternative 6. Monitored Natural Attenuation
- Alternative 7. Barrier Wall
- Alternative 8. Soil Vapor Extraction

After 3 years of groundwater monitoring after the implementation of the 2019 remedial excavation at the CVB and Tank Farm B, it is apparent that the need for performing soil vapor extraction is not necessary. Since the majority of the remaining contamination is below the vadose zone, HydroCon has revised Alternative 8 to include Institutional Controls rather than Soil Vapor Extraction as a candidate for use at the site. The use of institutional controls will likely be necessary for the uplands area as soil contamination above one or more regulatory cleanup levels remains at a depth above the 15-foot direct contact pathway.

As an overall remedial approach, physical removal of petroleum contaminated soil (PCS) is not practical due to the large boulders present in the shallow alluvial soil at the site and the volume of clean overburden soil overlying the thin layer of contamination. In the majority of the uplands area, bedrock is present at a depth less than 15 feet bgs. Most of the remaining contaminated soil above the CUL is near and/or a couple feet below the contact of the Chumstick formation (bedrock). However, localized remedial excavation of PCS in the unsaturated zone (and below) near the former Tank Farm B and Control Valve Building was successful at removing a large source of GRPH and associated volatile organic compounds (VOCs) from the site. However, a remaining source of GRPH near MW14 appears to be present. It's likely that the removal of this source would reduce the concentration of GRPH and associated VOCs in groundwater seen in MW14 and the wells downgradient. If successful, it would result in DRPH being the only COC above the CUL in groundwater remaining at the site.

Each of the alternatives were compared and rated with the following criteria:

- Protectiveness
- Permanence
- Long-term effectiveness
- Implementation risk
- Reasonableness of cost

As explained in detail in the text below, hydrogen peroxide (H202) is currently being applied to the treated water prior to discharge into selected Upland sumps to increase the dissolved oxygen concentration. The concentration required to increase the oxygen content is very low compared to what would be used if Alternative 5 – In-situ chemical oxidation was intended. Therefore, HydroCon considers the use of H202 as an oxygen augmentation tool and not an oxidant. These alternatives appeared to be attractive, in part, because over two years of monitoring indicates that contaminant volume is decreasing and is not migrating. Additionally, the more aggressive remedial actions have aspects that could chemically or physically change the state of the contaminant to be amenable to movement with water (Alternative 4 and 5) or are cost prohibitive due to physical and logistical aspects (Alternatives 2 and 7) depending on the location and size of the remedial action.

Restoration Time Frame

Diesel and gasoline are the predominant contaminants present at the Site. While gasoline is relatively volatile and typically degrades at a faster rate, diesel oil may degrade at a very slow rate. For these reasons the restoration time frame is expected to be lengthy. It is excessively costly and difficult to excavate at depths where soil contamination is present in the north end of the site or put in barrier walls to control the contaminants. The oil is not strongly toxic and it is buried at depth helping to alleviate risks posed to human health and the environment. Offsite water supplies do not appear to be compromised by the contaminant. Removal of the majority of available free product and a decreasing trend in COC concentrations in groundwater over the last several years along with the absence of sheen observations in the Columbia River has demonstrated that the interim remedial actions has proven to be effective at protecting the Columbia River and cleaning the Site to where the focus is now on diminishing the dissolved phase of COCs in groundwater to concentrations below their respective CULs. Continued operation of the current remedial system is expected to be effective at containing the plume, protecting the Columbia River, and reducing contaminant concentrations in the subsurface. The degradation process of diesel produces polar metabolites which are quantified as DRPH in the Northwest TPH-Diesel (NWTPH-Dx) analytical method. This complicates estimating time frames for achieving groundwater cleanup. Further discussion of this is provided below.

Limited remedial excavation/disposal, source control, groundwater pump and treat and monitoring measures have already been implemented at the Site. Groundwater pump and treat along with oxygen enrichment is further prescribed until a transition can be done to implement MNA for control of contamination on the Site. In addition, consideration of performing localized remedial excavation near MW14 to remove the remaining source of GRPH and related VOCs is recommended. Based on review

of the actions already taken (and those prescribed), HydroCon feels that the restoration time frame would be enhanced by these efforts and should not pose a significant issue for the preliminary alternative regimen selected.

Based on the results of the evaluation, a combined remedy consisting of localized remedial excavation near MW14 to remove the source of GRPH and associated VOCs from the site, continued operation of the groundwater pump and treat/recirculation system for up to 2 years to assess the effects of the remedial excavation and the continued monitoring of the remediation system, Columbia River and site pumping wells are recommended as the preliminary remedial actions.

HydroCon recommends that once it's documented that groundwater quality has improved from the remedial excavation action, the remediation system should be turned off and observe if a rebound in contaminant concentrations in groundwater is observed. If concentrations rebound, the recirculation system should be turned back on. If no rebound is observed, the site should transition to MNA monitoring along with pursuit of institutional controls.

1.0 INTRODUCTION

HydroCon Environmental, LLC (HydroCon), has prepared this revised Focused Feasibility Study (FFS) Report on behalf of Coleman Oil Company (Coleman Oil) to present and evaluate cleanup alternatives at the Coleman Oil fuel storage facility at 3 Chehalis Street in Wenatchee, Washington (herein referred to as the Property). The FFS has been prepared to meet the requirements of Exhibit B – Scope of Work and Schedule of Agreed Order No. DE 15389 entered into by Coleman Oil Company, LLC; Coleman, Services IV, LLC; and Ecology with an effective date of October 30, 2017 (Agreed Order). The Agreed Order is a continuation of previous and ongoing significant oil spill response activities and removal actions conducted under the Administrative Order on Consent for Removal Activities issued by the U. S. Environmental Protection Agency (EPA) on May 5, 2017 (EPA Docket No. CWA-10-2017-0114). The initial version of the FFS was prepared on October 18, 2019 and Ecology decided that a decision on the selection of remedial alternatives should be postponed until enough time had passed to assess the effectiveness of the groundwater pump and treat recirculation system.

The Site, as defined under the Washington State Model Toxics Control Act Cleanup Regulation (MTCA), Chapter 173-340 of the Washington Administrative Code (WAC §173-340-200), comprises the portion of the Property and adjacent properties where hazardous substances have come to be located in soil, groundwater, and surface water at concentrations suspected to exceed applicable cleanup levels as a result of releases at the Property.

1.1 Document Purpose and Objectives

The purpose of the FS is to evaluate alternatives for cleanup, taking into consideration the findings in the SRI and associated reports. The FS will be used by to solicit public and agency comments and select a cleanup action for the Site under WAC 173-340-360 and 173-340-390. The FS is one of the sequential requirements leading to Site cleanup under MTCA, and a task identified as a deliverable in the Agreed Order Scope of Work. This report provides further environmental information and evaluation of cleanup alternatives in support of the Agreed Order toward remedial action at the Site.

1.2 Document Organization

This FFS is organized in the following sections:

- **Section 2, Background Information**. This section discusses the Site location and description, property ownership and operations, the geologic and hydrogeologic setting of the Site, and a summary of contaminant distribution.

- **Section 3, Purpose and Scope.** The purpose and scope of the FFS is presented.
- **Section 4, Previous Investigations.** Environmental investigations and remedial actions conducted on the Site are summarized in this section.
- **Section 5, Nature and Extent of Contamination.** This section summarizes the nature and extent of soil, groundwater and sediment contamination.
- **Section 6, Conceptual Site Model.** An updated conceptual site model is presented included a summary of the areal and vertical extent of contamination, the chemicals and media of concern, presents a Site definition, provides a preliminary exposure assessment, and describes points of compliance.
- **Section 7, Remedial Alternatives and Selection.** This section develops and evaluates cleanup action alternatives and discusses cleanup regulations and levels, the screening of remedial technologies, and the selected cleanup alternative.
- **Section 8, Conclusions.** This section presents the preliminary recommended alternatives for the Site.
- **Section 9, Qualifications.** This section discusses document limitations.
- **Section 10, References.** This section lists references used to prepare this document.

2.0 BACKGROUND INFORMATION

This section provides a summary of the Property location and description, geologic setting, historical land use, environmental history, and contaminants and media of concern at the Site. This section provides a summary of this information, additional information can be found in the referenced documents.

2.1 Site Description

The Property is located at 3 East Chehalis Street in Wenatchee, Washington (Figure 1). The Chelan County Assessor (2017) online records listed the street address as 600 South Worthen Street with a legal description of Manufacturers Amended Block 4 Lots 1-9, 1.27 acres. The Property was listed in the Chelan County Assessor (2017) online records as County Assessor Property Identification No. 10398, Treasurer Map Property Identification No. (Property ID) 55798, and Chelan County Assessor Parcel No. 222011693005 with a listed owner of Coleman Services V LLC.

The Site comprises the following four parcels:

- Chelan County Parcel No. 222011693005 with a listed owner of Coleman Services V LLC (Coleman property);
- Chelan County Parcel No. 222010693001 with a listed owner of Chelan County Public Utilities District (PUD) (substation to north of Coleman property);
- Chelan County Parcel No. 222011693105 with a listed owner of Chelan County PUD (shoreline east of Coleman Property); and
- Chelan County Parcel No. 222011693100 with a listed owner of Chelan County PUD (shoreline to northeast of Coleman property).

The property and adjacent properties are within the City of Wenatchee's industrial zoning district as of July 14, 2017[1].

[1] http://www.wenatcheewa.gov/home/showdocument?id=17440

2.2 Property Ownership and Operational History

The historical information provided herein regarding the Property was acquired from Blue Mountain Environmental Consulting (2007) and Farallon (2017b). Additional information can also be found in HydroCon 2018a.

The Property was first owned and occupied by Standard Oil Company and was a bulk fuel facility from 1921 to 2017. The Chelan County Assessor (2017) online records indicated that North Central Petroleum, Inc. purchased the Property in 1980. Coleman Services IV, LLC purchased the Property in January 2007 from North Central Petroleum, Inc. (Chelan County Assessor 2017).

The facilities have primarily consisted of different configurations of above ground storage tanks and associated equipment, offices, warehouse storage, loading racks, a UST and a card lock station.

Demolition of most of the Site features occurred during the period between 2010 and 2019. The bulk fuel facility was decommissioned in 2017 as part of Coleman Oil's spill response and remedial action. Currently, only the UST, card lock pump island, and a fenced truck parking area to the south of the card lock are used in fueling operations conducted at the Property. The configuration of the Site as of 2017 is shown on Figure 2.

2.3 Geologic & Hydrogeologic Setting

The Property is located in the Wenatchee Valley approximately 150 feet west south-west of the Columbia River at an elevation of approximately 660 feet above mean sea level (Figure 1). The topography of the Property slopes very gently to the north north-east parallel to the Columbia River.

The Site soils are consistent with ice-age alluvial deposits underlain by the Chumstick formation bedrock. The alluvium consists primarily of silt and silty sand, with layers of clay, sand, gravel, cobbles and boulders. The thickness of the alluvium ranges from 6 to 31.5 feet with the shallowest thickness in the southern portion of the site and the thickest in the northern portion of the site. This is consistent with the dip of the Chumstick formation. Boring logs and drilling observations indicate that a more massive, well cemented sandstone layer is beneath thin layers of mudstone, shale and sandstone and appears to be acting as an aquitard in this area. The groundwater level is within a few feet of the top of the Chumstick formation and always above the sandstone layer. An exception is at MW22 where the groundwater is approximately 15 feet above the top of the Chumstick formation. This area has been disturbed by previous excavation and has been backfilled with construction and other debris. The MW22 area is not considered part of the Site.

Groundwater flow is generally parallel with the Chumstick formation. The groundwater flow direction and the dip of the sandstone surface are both to the north, northeast except in the area between the Site and the Columbia River where both are more to the east.

Contaminant transport and groundwater flow appears to follow the surface of the Chumstick formation and field observations paired with analytical data suggest that the petroleum contamination penetrates a few feet into the formation and travels laterally within the shaley sandstone and shale/siltstone/mudstone of the Chumstick formation. Beginning at the point of release, product migrated downward via gravity until it reached groundwater. Downgradient migration appears to be controlled by geology (bedrock) along preferential pathways within the subsurface that are likely fractured and/or channelized areas within the Chumstick formation and areas of different porosity in the overlying alluvium. These pathways appear to be complex and localized based on the intermittent presence of light nonaqueous-phase liquid (LNAPL) in monitoring wells installed near the Columbia River near the area of observed sheens and where the four seeps are located. Limited aquifer testing performed in February and August 2018 demonstrated that none of the wells tested are hydraulically connected, except MW10R and MW24.

Based on the lack of observed product in the river since the installation of the current groundwater remediation system (see Section 4.10), it appears that the perched aquifer is not in contact with the Columbia River until the river level rises high enough to come in contact with the seeps. Daily water level monitoring is performed to assess this condition.

2.4 Contaminant Distribution

The results of the Supplemental Remedial Investigation (SRI) [HydroCon 2018c] and subsequent investigations provided significant clarification to the understanding of contaminant distribution at the Site. DRPH and GRPH exceeding MTCA Method A Industrial cleanup levels are present in subsurface soil, groundwater, shoreline soils, and shoreline sediments. R99 in groundwater extends from the release area to the north-northeast to the area between MW21 and MW22, a distance of approximately 550 feet. GRPH, diesel fuel, and motor oil impacted groundwater extends from the former Control Valve Building and former Tank Farm B and extends approximately 650 feet. Soil is impacted by R99 and other fuel products transported by groundwater. Shoreline soil and shoreline sediments are impacted by groundwater discharging to the Columbia River approximately 400 feet north of the release area. Over 200 gallons of R99 (based on product recovery totals) was recovered from the Columbia River with the apparent discharge points being west of monitoring wells BH-2 (south) to MW-10 (north). No product has been recovered from the river since August 2018 (HydroCon 2019a).

GRPH, DRPH, and PAHs commonly associated with coal tar have impacted soil and groundwater at MW22, the northernmost monitoring well. These impacts are interpreted to be due to a source not

associated with the operations at Coleman Oil Company, such as the adjacent Chelan PUD Worthen Substation 500, Cleanup Site ID No.: 14795, Facility/Site ID No.: 44830.

A documented release of DRPH at the adjacent BNSF railway has been documented as well. Limited investigation and monitoring have occurred since discovery. The site is listed as Cleanup Site ID No. 5820/Site ID No. 28673212.

3.0 PURPOSE AND SCOPE

The FFS is designed to provide an evaluation of the feasibility of proposed environmental cleanup alternatives at the Site and is a companion document for the previous Supplemental Remedial Investigation Report and related reports. This FFS is focused in that extensive interim remedial actions have been implemented at the Site, some of which will continue to be implemented as selected alternatives (e.g., product recovery and pumping and treating groundwater, groundwater monitoring, frequent monitoring of river conditions). These interim remedial actions have been evaluated and documented in previous reports and will be summarized rather than extensively evaluated in this report. This report provides a list of remedial technologies that may be considered for use at the Site and provides a comparison of the alternatives.

4.0 PREVIOUS INVESTIGATIONS

This section provides a brief summary of releases, environmental site investigations, and remedial actions implemented thus far. Additional site history is documented in the SRI and subsequent reports.

4.1 2010 to 2013 Environmental Investigations

A release of 180 gallons of unleaded gasoline occurred on June 2, 2010 from a pipe connection that is attached to the AST 15A fill valve. This release occurred outside the tank farm containments area. Contaminated soil was excavated to a depth of 2 feet. Subsequent investigations (Farallon 2014) resulting in the installation of five monitoring wells in 2010 (MW-1 through MW-5). Groundwater sampling between 2010 and 2013 resulted in detections of gasoline-range hydrocarbons (GRPH) and/or benzene above MTCA Method A Industrial cleanup levels (CULs) at MW-1 and MW-2 on at least one occasion, with no detections of GRPH or benzene, toluene, ethylbenzene, and xylenes (BTEX) in wells MW-3 through MW-5 above CULs.

On May 30, 2013, a 200-gallon gasoline spill occurred at the Site while the UST on the southeastern portion of the Site that supplied fuel to the retail sales card lock fuel island was being filled (Farallon 2017). A total of 90.08 tons of petroleum-impacted soil was removed from around the UST. Confirmation soil samples collected from the final limits of the excavation confirmed removal of petroleum-impacted soil to less than CULs. Ecology (2015) issued a No Further Action determination for the Property in a letter dated March 13, 2015 that included an Environmental Covenant.

4.2 2017 Environmental Investigations

A sheen on the Columbia River was reported north of the Property on March 17, 2017. Line tightness testing on March 24 revealed that the R99 fuel line and the B75 biodiesel fuel line did not hold pressure. These lines were subsequently decommissioned. Inventory records indicated the release was most likely entirely from the R99 fuel line. Coleman Oil's review of inventory records indicated a total loss of 4,543 gallons in 2016 and 2017 (HydroCon 20187b). The initial spill response activities included decommissioning the fuel lines and deployment of booms and sorbent pads in the area of the observed sheen on the Columbia River.

Site investigation and remedial activities conducted in 2017 by EPA, Farallon, and Coleman Oil Company included the installation of wells (BH-1 through BH-3, MW-1 through MW-11, and RW-1), exploratory test pits and trenches, installation of groundwater recovery sumps, and a 741.43-ton remedial excavation [Figure 2]) and soil removal. These activities confirmed that the release of R99

and other fuel products had resulted in soil and groundwater contamination at the Property and properties to the north and east and that the R99 release had impacted the Columbia River.

2017 interim actions included pumping water from some or all of the sumps (product recovery and maintaining a reduced head near the point of release), water/product level monitoring at wells MW-8 thru MW-10 (and presumably product recovery), and management of the boom area with product recovery utilizing hydrophobic pads and booms.

4.3 **2018 Supplemental Remedial Investigation**

HydroCon developed the Supplemental Remedial Investigation (SRI) Work plan, Sampling and Analysis Plan, and a Quality Assurance Project Plan for environmental investigations to be conducted at the Site in February 2018 (HydroCon 2018a). These documents were used to guide the field investigation and coordinate laboratory analysis.

The SRI (HydroCon 2018b) included the installation of fifteen borings at the Site including two temporary borings (HC01 and HC02), fourteen new 4-inch diameter monitoring wells (MW12 through MW23), and two shallow wells (MW1S and MW3S). MW1S and MW3S were installed to replace MW-1 and MW-3 due to improper screen placement in the original wells. A round of groundwater sampling was conducted on all wells.

The SRI also included sampling of shoreline soil near the hydrocarbon-impacted seeps on the riverbank (SL01 through SL04), the soil immediately under the discharge of the stormwater drain pipe emanating from Chehalis Street catch basin (SL05), and sediments in the Columbia River (sample locations SS01 through SS05).

The soil borings and wells greatly increased the understanding of the subsurface conditions by demonstrating that the Chumstick formation largely controlled groundwater flow and the distribution of contaminants (see Sections 2.3 and 2.4). The results of slug and aquifer testing showed that some wells at the Site have a higher yield than others. In general, wells with higher flow also have had higher product recovery rates. This information shows that there are preferential pathways in the top of the formation in which groundwater and product flow. However, the pathways appear to be complex and are likely composed of localized fractures and channels.

Analytical testing of 55 soil samples resulted in detections and CUL exceedances of GRPH, DRPH, oil-range petroleum hydrocarbons (ORPH) and BTEX in both onsite and offsite samples. Five samples were analyzed for volatile organic compounds (VOCs, 66 compounds, not including BTEX) and no concentrations exceeded CULs.

Analytical testing of twenty-five groundwater samples from new and existing wells resulted in detections and CUL exceedances of GRPH, DRPH, BTEX and naphthalene. Total lead was analyzed in five samples and there were no exceedances of the CUL. Table 830-1 VOCs were sampled for in six samples. MTBE, EDB, and EDC were not detected above their respective MRL in any of the samples. Low concentrations of naphthalene were detected in samples collected from MW14 and MW17. The concentration of naphthalene in MW13 (167 ug/L) slightly exceeded the CUL of 160 ug/L. It should be noted that the source of this contamination was removed during the remedial excavation near the former Tank Farm B and Control Valve Building in 2019. Since PAHs are not considered to be COCs of the site, testing for total naphthalenes has not been done on a routine basis. With the exception of the sample results at MW13, naphthalene has only been detected at low concentrations. Since the source of the elevated naphthalene at MW13 has been removed, HydroCon has not included naphthalene in the semi-annual analytical protocols.

Polynuclear aromatic hydrocarbons (PAHs) were analyzed in groundwater samples from MW21, MW22 and MW32. The concentration of naphthalenes was exceeded in the groundwater samples collected from MW-22. It's been demonstrated that this well is not within the Coleman Oil plume and is associated with a different release (PUD substation). PAH Toxic Equivalent Concentrations (TEQ) did not exceed the benzo(a)pyrene reference cleanup level.

Shoreline samples were analyzed for GRPH, DRPH, ORPH and BTEX. GRPH and DRPH exceeded CULs in all of the samples collected from the seeps (SL01 through SL04). It's unknown whether ORPH concentrations exceed the CUL in the SL01 through SL04 samples as the laboratory method reporting limit (MRL) had to be elevated above the CUL due to the high concentration of other petroleum products. DRPH was the only analyte detected above the respect MRLs in the SL05 sample at a concentration below the CUL.

Sediment samples were analyzed for GRPH, DRPH, ORPH, and BTEX. DRPH exceeded Ecology's sediment cleanup objectives (SCO) at samples collected from SS01 and SS02.

The SRI included a Simplified Terrestrial Ecological Evaluation (TEE). Based on the MTCA scoring system the TEE was ended with no additional evaluation required.

A Conceptual Site Model (CSM) was developed for the Site in the SRI. The CSM described contaminant sources, the extent of impacted soil, groundwater and sediment, identified contaminant migration processes, identified the chemicals of concern, and conducted a preliminary exposure assessment. The CSM for the Site is further developed in Section 6.

Finally, the SRI identified data gaps for further investigation.

4.4 2018 Additional Interim Action #1 – Aquifer Testing and Groundwater/Product Recovery

Immediately following the SRI, step-drawdown aquifer testing was conducted to assess whether or not pumping in the existing monitoring wells could result in immediate cessation of the continued seepage to the river, and to assess if the water levels in target wells could be maintained at summertime levels to minimize seepage flow to the river.

The step-drawdown testing indicated that the average hydraulic conductivity of the formation in the screened intervals of BH-1, MW-9, and MW-10 is on the order of 2 ft/day. The testing also demonstrated that at a pumping rate of approximately 1.75 gallon per minute (gpm) that the water level in the wells could be sustained at the summertime levels.

Based on the testing described above, pumps were installed at monitoring wells MW-9, MW-10, and BH-1. Results of the pumping indicated that the goal of maintaining water levels at target depths and thereby reducing migration to the river was achieved. In addition, a remediation system was installed to recover groundwater and product from these three wells, treat the product/water to separate the recovered product, treat the groundwater and discharge it to the Wenatchee city sewer.

4.5 2018 Additional Interim Action #2 – Soil Boring and Groundwater Well Installation

In August 2018, nine new monitoring wells (MW24 through MW32) were installed. Two existing wells (MW-9 and MW-10) were deepened and completed as 4-inch diameter monitoring/recovery wells. These wells were renamed MW09R and MW10R, respectively. All boreholes were advanced to a depth equal to the average elevation of the Columbia River.

Aquifer testing was performed to select wells for inclusion in the expansion of the Site remediation system and to develop a better understanding of the aquifer characteristics. Aquifer testing included slug testing and step draw down testing in selected wells.

Results of the aquifer testing, boring logs, and the soil analytical data were used to design an expansion of the remediation system. A primary design objective for upgrading the interim remediation system was to expand the product recovery capability of the system. The original system was capable of oil/groundwater extraction from three wells. The new design package included the expansion of the system to a total of nine wells.

The remediation system was expanded in late October 2018 and consists of three zones:

- The MW09R zone is located along the north Right of Way (ROW) of Chehalis Street and includes three wells (MW09R, MW17 and MW32). All of these wells are operational, using dedicated AP-3 top loading pneumatic total fluids pumps. The pump intake on MW09R and MW32 is set at 28 feet bgs and the pump intake on MW17 is set at 25 feet bgs.
- The MW10R zone includes MW10R, MW24, and MW28. This zone is located north of BH-1 along the east ROW of Worthen Street. All of these wells are operational, using dedicated AP-3 top loading pneumatic total fluids pumps. Product has been measured in MW10R and MW24. The pumps in MW10R and MW24 are set with the intake set at 27 feet bgs. The pump intake in MW28 is set at 33 feet bgs.
- The BH-1 zone includes monitoring wells MW29, MW30, and BH-1 and is located in the eastern ROW of Worthen Street beginning at BH-1 south to MW30. Product has been observed in BH-1 and recently at MW29. All three of these wells are operational using dedicated AP-3 top loading pneumatic pumps. The pumps in MW29 and MW30 are set with the intake set at 34 feet bgs and the pump intake in BH-1 is set at 27 feet bgs.

4.6 2019 SRI Addendum – Upland Soils Characterization

Data collected with the SRI identified an apparent GRPH source in the vicinity of MW13 (Figure 2). This contamination is a separate issue from the R99 release and required further characterization to identify the source and the extent of subsurface impact.

Activities for this investigation (HydroCon 2019x) were conducted in January 2019 and included:

- Demolition of the Control Valve Building (CVB) which was believed to be one of the primary sources of the GRPH.
- Excavation of 6 exploratory test pits (TP01 through TP06) to assess shallow soil quality near the former CVB and former Tank Farm B.
- Installing 10 temporary soil borings (HC03 through HC12) to the depth of bedrock in the vicinity of the CVB, former Tank Farm B and downgradient (to the north), and
- Deepening and constructing well BH-1 as a larger 4-inch diameter monitoring well to enhance the ability to extract petroleum contaminated groundwater and LNAPL (if present) in this area of the Site. This well was renamed BH01R.

Elevated concentrations of GRPH, DRPH, ORPH, and BTEX were been detected in the soil samples collected in the Uplands area near monitoring well MW13. The investigation identified shallow soil contamination (less than 2 feet bgs) under the CVB and former Tank Farm B. The lateral extent of this contamination was delineated except to the west (BNSF property line) and south (Tank Farm A). The contamination extended from the vadose zone down to the bedrock (approximately 12 to 13 feet bgs).

4.7 2019 SRI Addendum – Sediment Characterization

Five sediment samples were collected on April 23, 2018 as part of the SRI in the observed Sheen Discharge Area. The analytical results of the sediment samples were compared to the Sediment Cleanup Objectives (SCO, WAC 173-204) for TPH-diesel (DRPH, 340 mg/Kg) and TPH-residual (ORPH, 3,600 mg/kg). Two samples, (SS01 and SS02) had DRPH concentrations that exceed the DRPH SCO of 340 mg/kg. Additional sediment characterization was conducted to define the lateral and vertical extent of the DRPH near these sampling locations.

Five sediment samples were collected in March 2019 (HydroCon 2019x). Samples were collected at previous locations SS01 and SS02 and at new locations SS06, SS07, and SS08. Results of the sampling indicated that none of the samples had concentrations above the SCO. As a result, concentrations of DRPH in sediment are no longer at concentrations that exceed the SCO.

4.8 2019 Additional Interim Action #3 – Remedial Excavation

In May 2019, a remedial excavation was conducted in the MW13/CVB area to remove the majority of the source of soil contamination in the unsaturated (vadose) zone affecting groundwater in this area and areas downgradient of the Property. MW13 was abandoned for the excavation and reinstalled as MW13R.

The excavation was advanced to a total depth of approximately 12 to 13 feet bgs (at or near the bedrock interface). The excavation was advanced laterally until field screening results indicated the majority of petroleum contaminated soil (PCS) had been removed or that no further excavation could be done due to access issues (i.e., the property line with BNSF railroad to the west and Tank Farm A to the south). A total of 875 tons of soil was excavated and disposed of at the Greater Wenatchee Regional Landfill. Following excavation, two sets of 4-inch diameter slotted Schedule 40 PVC piping were placed inside the excavation at a depth of approximately 5 feet bgs for potential use in the future for soil vapor extraction (SVE) or application of an in-situ remediation process.

Soil field screening and analytical results indicate that residual contamination remains in the sidewalls and bottom of the excavation in the saturated zone, particularly in the west side wall (adjacent to the railway property) and excavation bottom, which was expected.

Two test pits were installed near the former loading rack and under a former pipe run where the first remedial excavation was performed in 2017 shortly after discovery of the R99 release. The purpose of the test pitting is to assess the quality of backfill soil used. Field observation and soil sampling results confirmed that the soil used to backfill the excavation was clean.

4.9 Remedial Actions

Extensive remedial actions have been conducted since the discovery of the R99 release to the Columbia River in March 2017. This section briefly summarizes these efforts. Additional details are found in the Operations and Maintenance Report – 2018 (HydroCon 2019x).

Decommissioned Fuel Lines. On March 26, 2017, Coleman Oil decommissioned the fuel lines that would not hold pressure. All fuel associated with the ASTs in Tank Farm A was subsequently removed from the Property and transported to other Coleman Oil facilities.

Removal of Truck Loading Rack and Associated Piping. On April 6 and 7, 2017 the truck fuel loading rack and subsurface piping leading to the rack were removed.

2017 Remedial Excavation. Between April 12, 2017 and June 19, 2017, a total of 741.43 tons of contaminated soil was excavated and removed from the Site. Coleman Oil also removed the former Storage Building (Sump #5 area) and former Maintenance and Warehouse Building as they performed the trenching and remedial excavations.

Columbia River Product Recovery. Documentation of product recovery from the Columbia River has been recorded since product recovery efforts began on March 27, 2017. The total volume of product collected from the river through August 28, 2018 is 214.1 gallons. No product has been observed with daily observations or recovered from the river since August 29, 2018.

Initial Product Recovery – Uplands. Recovery sumps #1 through #3 were installed along the eastern side of the warehouse and office building, recovery sump #4 was installed in the excavation south of the warehouse and office building, and recovery sump #6 was installed north of the warehouse and office building. Recovery sump #5 was installed in the northeastern corner of the Property, where the former storage building was located (Figure 2). Product was also recovered from MW-06, MW-08, MW-09, MW-10, MW-11, BH-1 and BH-2. Total product recovery from these wells through mid-2018 was 102 gallons.

Current Product Recovery – Uplands. An additional nine 4-inch diameter monitoring wells (MW24 through MW32) were installed and two of the pumping wells (MW-9 and MW-10) were deepened and completed as 4-inch diameter wells and renamed MW09R and MW10R in August 2018. BH-1 was deepened and constructed as a 4-inch diameter well in January 2019 and renamed BH01R. Nine wells were incorporated into current groundwater remediation system. A total of 205,092 gallons of water had been recovered, treated and discharged to the city system at the Site between July 10 and December 31, 2018. An additional 290,880 gallons of groundwater has been treated and discharged to the City sewer in 2019 through October 14, 2019.

2018 Barrel Spill. A spill from a 55-gallon drum near the northwest corner of Tank Farm A occurred in September 2018. Remedial excavations were conducted in stages in September and October, resulting in the removal of 16.83 tons of PCS. The excavation was complicated by the presence of a large boulder and Tank Farm A. All PCS from the spill may not have been removed.

2019 Remedial Excavation. A total of 875 tons of petroleum-contaminated soil was excavated and transported offsite in May 2019. Soil contamination was left in place along the western sidewall due to the property line with BNSF and the floor of the excavation due to the uneven surface of the bedrock. HydroCon placed 2 sets of 4-inch diameter slotted PVC piping for potential futures use for alternative remedial action (SVE and/or application piping for an in-situ remediation product).

2020 Upgrade of Groundwater Treatment System. The Site's groundwater treatment system was upgraded in 2020. The new system was activated in August 2020 and recirculates treated water into sumps located in the Uplands area of the Site instead of discharging it into the City of Wenatchee's sanitary sewer system.

The groundwater pump and treat system has been installed at the site to control water levels below the seeps along the river bank and to capture contaminated groundwater before it discharges into the Columbia River. Nine pumping wells (MW09R, MW10R, BH01R, MW17, MW24, MW28, MW29, MW30, and MW32) are included in the system. The wells were strategically placed to intercept groundwater including three wells (MW32, MW17 and MW09R) located in a west-east alignment along Chehalis Street and six wells (MW30, MW29, BH01R, MW28, MW10R and MW24) located in a north-south alignment on the east side of S. Worthen Street near the edge of the river bank. The system consists of groundwater being pumped from three zones using top loading pneumatic pumps to maintain groundwater elevations below seep elevations. Effluent from the wells is pumped through three oil/water separators prior to placement into vertical holding tanks. The untreated water is then passed through granular activated carbon (GAC) and then enriched with oxygen using hydrogen peroxide prior to discharge into selected sumps located in the Uplands area. This creates a closed loop system designed to enhance the biologic degradation of residual hydrocarbons at the Site.

This engineered recirculation system includes a series of trenches that contains 2-inch diameter piping leading to 11 sumps that were installed during the 2017 and 2019 remedial excavations (Figures 6 and 7). These include the following:

- 6 sumps installed in the 2017 Remedial Excavation (Sump 1 through Sump 6)
- 3 sumps installed in the West Trench (WT-N, WT-M, and WT-S)
- 2 sumps installed in the 2019 Remedial Excavation (RE-West and RE-East)

4.10 **Groundwater Monitoring**

Groundwater sampling has been conducted in the Site monitoring wells since 2010 with the installation of MW-1 through MW-5. Groundwater samples were collected on an approximately quarterly basis until 2013. Following the R99 spill, MW-6 though MW-11 were installed in March and April 2017.

In 2018 HydroCon was retained by Coleman Oil to take over the environmental investigation at the Site. HydroCon utilizes a well and boring identification convention that differentiates wells and boring installed by HydroCon verses installations by others. Wells and borings installed by others include a hyphen in the identification (e.g., MW-11, BH-2) whereas those installed or modified by HydroCon do not include a hyphen (e.g., MW12, HC01).

Monitoring wells MW01S, MW03S and MW12 through MW23 were installed in April 2018, and wells MW09R, MW10R, and MW24 through MW32 we installed in August 2018. MW13 was abandoned and MW13R was installed July 2019.

In general, quarterly groundwater sampling of all Site wells began in August 2018 and there have been eight quarterly sampling events completed (August 2018, November 2018, March 2019, August 2019, December 2019, March 2020, September 2020, November 2020).

Beginning in 2021, groundwater monitoring was transitioned to a semi-annual basis (spring and fall in 2021 followed by winter and summer the next year, etc.) at selected monitoring wells (agreed upon by Ecology) until all contaminants of concern are reduced below their respective CULs. Once that occurs, the groundwater monitoring schedule will revert back to a quarterly basis until the concentration of all contaminants of concern remain below their respective CUL at all wells being monitored for 4 consecutive quarters. At Ecology's request, at least one monitoring event during the final quarterly sampling process will include sampling of all site monitoring wells to verify that the "clean wells" have remained below the cleanup level.

There have been four semi-annual groundwater sampling events (April 2021, October 2021, March 2022, September 2022 and March 2023). This FS was initially authored prior to the March 2023 sampling event. For continuity's sake, a summary of the September 2022 groundwater monitoring is provided in Section 5.3.

5.0 NATURE AND EXTENT OF CONTAMINATION

During the SRI, HydroCon primarily used the sonic drilling method to advance borings at the Site. This method produced excellent sample recovery that allowed the field geologist to examine the geologic composition of the subsurface as well as field screen the soils for the presence of petroleum hydrocarbon contamination using visual, olfactory, sheen testing, and PID monitoring. Typically, a minimum of three soil samples were collected from each boring to assess the lateral extent of contamination. The sample cores produced by the sonic drilling method allowed high resolution examination of the geologic composition of the subsurface which revealed that alluvial soils are underlain by bedrock which has been identified as the Chumstick formation. This was key to Site characterization as previous work performed at the Site in 2017 and earlier utilized drilling and sampling methodology that had poor sample recovery, particularly as the depth increased. This resulted in an improperly characterized Site where the controlling geologic feature (Chumstick formation) was not identified.

The results of the SRI (HydroCon 2018b) provided significant clarification to the understanding of contaminant distribution at the Site. With the exception of some localized areas at the Site, the majority of soil contamination was found in a relatively narrow depth range beginning near the groundwater interface and extending downward and terminating in the underlying bedrock (Chumstick formation). Groundwater levels fluctuate seasonally with late winter and spring having the highest water levels and late summer and fall having the lowest. The Columbia River does not appear to be connected to the aquifer perched on top of the bedrock until the spring thaw occurs, raising water levels in the river high enough to come into contact with the seeps located along the shoreline. These seeps have been identified as discharge locations where R99 and contaminated groundwater have left the Site and entered the Columbia River. A series of booms have been deployed to mitigate the discharge of product into the river. Due to recovery efforts including the installation of a groundwater and product capture system at the Site, daily observations of river conditions indicate that there has been no product discharge to the river since August 2018. Through daily monitoring it has been observed that the only time sheens appear on the Columbia River in the sheen discharge area is when the river level rises to a level at or above the elevation of the seeps.

Results of the SRI indicated that DRPH and GRPH exceeding their respective CUL are present in subsurface soil, groundwater, shoreline soil, and shoreline sediments. Shoreline soil and shoreline sediments are impacted by groundwater discharging to the Columbia River approximately 400 feet north of the release area. A discussion of each matrix is provided below.

5.1 Soil Characteristics and Quality

The soils beneath the Site are consistent with ice-age alluvial flood deposits underlain by the Chumstick formation bedrock. The alluvium consists primarily of silt and silty sand, with layers of clay, sand, gravel, cobbles and boulders. The thickness of the alluvium ranges from 6 to 31.5 feet. Boring logs and drilling observations indicate that a more massive, well cemented sandstone layer is beneath thin layers of mudstone, shale and sandstone and the sandstone appears to be acting as an aquitard in this area. The groundwater level is within a few feet of the top of the Chumstick formation and always above the sandstone layer. Downgradient of the onsite source areas, soil is impacted by diesel and gasoline transported by groundwater.

An exception is at MW22, where the groundwater is approximately 15 feet above the top of the Chumstick formation. This area has been disturbed by previous excavation and has been backfilled with construction and other debris; it is not considered part of the Site.

Shoreline soil and shoreline sediments are impacted by groundwater discharging to the Columbia River approximately 400 feet north of the release area. Four seeps (identified as SL01, SL02, SL03, and SL04) have been identified at the Site. Soil in these seeps has been sampled and is impacted with high concentrations of DRPH and GRPH. It should be noted that the composition of soil at the seeps is predominantly gravels, cobbles and rip rap. The finer grained sediments collected for laboratory analysis were taken between the coarse grain material at each location. Considering that the fine-grained soil is approximately 20% of the total composition, the results are considered to be biased high. The elevation of the seeps has been measured and compared with the level of the Columbia River (measured by a surveyed staff gauge) as part of the daily monitoring program.

The primary sources of soil contamination at the Site included the fuel that used to be stored in the ASTs located in Tank Farm A and former Tank Farm B; the USTs that supply fuel to the cardlock facility; the loading rack and associated piping (location of the R99 release); the CVB and associated pumps and piping (primary source of the Uplands contamination along with former Tank Farm B); and fuel handling and storage at multiple locations at the Site (including the recent drum spill). Considering that the Site has been operated as a bulk fuel facility for approximately 100 years, there may be other sources of contamination no longer visible at the Site.

Nearby historical adjacent operations, the PUD Wenatchee Substation and the BNSF Wenatchee Rail Yard, may have contributed to soil contamination within the area investigated by the SRI. Operations at BNSF resulted in a confirmed diesel release. As noted above, soil contamination at MW22 does not appear to be related to releases from Coleman Oil, but is directly downgradient of the PUD Substation which has a history of petroleum handling based on review of Sanborn Maps.

As discussed above, two remedial excavations occurred at the Site (in 2017 near the release of R99 and the 2019 Uplands remedial excavation). Both excavations removed contaminated soil including some from sampling locations (shown with shading in Table 1). In addition, results of the SRI concluded that contamination at monitoring well MW22 is not part of the Site. Therefore, the discussion below of each contaminant only includes soil that still remains at the Site and is located within the defined area of the Coleman Oil plume.

5.1.1 Diesel Range Petroleum Hydrocarbons

A total of 15 soil samples has DRPH concentrations that exceed the CUL cleanup level of 2,000 mg/kg (Table 1). Six of the samples have concentrations greater than 5,000 mg/kg. The highest concentration of DRPH (10,100 mg/kg) was collected at 13 feet bgs in a floor sample of the 2019 Uplands remedial excavation (sample B03-13).

5.1.2 Gasoline Range Petroleum Hydrocarbons

A total of 69 soil samples has GRPH concentrations that exceed the CUL of 30 mg/kg (Table 1). Sixteen of the samples have concentrations equal to or greater than 2,000 mg/kg. The highest concentration of GRPH (15,000 mg/kg) was collected at approximately 16 feet bgs at monitoring well MW-9 (sample MW-9-15.6).

5.1.3 Oil Range Petroleum Hydrocarbons

One soil sample collected in 2019 from the Uplands remedial excavation had ORPH above the CUL of 2,000 mg/kg. Sample SW Corner 01-08 was collected at 8 feet bgs and had a concentration of 12,900 mg/kg.

5.1.4 Total Diesel plus Oil Range Petroleum Hydrocarbons

Per Ecology's *Guidance on Remediation of Petroleum Contaminated Sites* (Publication No. 10-09-057), summation of DRPH and ORPH should be done when totaling the heavier end hydrocarbons. The CUL remains 2,000 mg/kg for the total concentration. Going forward, all DRPH results are considered to be the sum total of DRPH + ORPH concentrations. A total of 35 soil samples has concentrations greater than the CUL. Twelve of these sample locations have been removed by remedial excavation.

5.1.5 Benzene

A total of 12 soil samples has benzene concentrations that exceed the CUL of 0.03 mg/kg. The highest concentration (3.16 mg/kg) was collected at 13 feet bgs in the Uplands remedial excavation (sample

B03-13). Two soil samples collected from MW-22 had benzene above the CUL. This well is not located within the Coleman Oil plume. Therefore, the sample results aren't applicable to the discussion.

5.1.6 **Toluene**

None of the samples collected at the Site have toluene above the CUL of 7 mg/kg.

5.1.7 **Ethylbenzene**

A total of 2 soil samples has ethylbenzene concentrations that exceed the CUL of 6 mg/kg. The highest concentration (9.8 mg/kg) was collected at 8 feet bgs from the Uplands remedial excavation (sample WSW01-08).

5.1.8 **Total Xylenes**

A total of 7 soil samples has total xylenes concentrations above the CUL of 9 mg/kg. The highest concentration (93.1 mg/kg) was collected in the Upland remedial excavation (sample WSW01-08).

5.2 **Extent of Soil Contamination**

Prior to the SRI, two spills occurred at the Site near the USTs in 2010 and 2013. Remedial actions were taken and the majority of soil contamination was removed. Further site investigation was prompted by the release of R99 in 2017. Multiple borings were drilled and a minimum of three soil samples were collected from each to assess the lateral extent of contamination in the subsurface. Results of those investigations indicated that the majority of soil contamination at the Site was found in a relatively narrow depth range beginning near the groundwater surface. The depth of the saturated zone at the site fluctuates seasonally and is highest during the late winter and spring and lowest during the late summer and fall. The depth to water during the seasonal low water period is near the contact with the bedrock (Chumstick formation). The depth of the Chumstick formation at each sample location is recorded on the soil analytical results summary table (Table 1). As shown on the table, the majority of the soil samples with COCs above their respective CUL is near or at the contact with the Chumstick formation.

This supports the conceptual model that groundwater is the primary mechanism for contaminant transport at the Site.

The two primary COCs at the Site are GRPH and DRPH. A discussion of the extent of DRPH and GRPH at the Site is provided below. Since ORPH was only detected above the CUL in one sample, HydroCon will discuss DRPH (which includes total DRPH + ORPH) as being one product classification.

The locations of soil samples exceeding CULs for DRPH and GRPH are shown on Figures 3 and 4. It should be noted that the analytical methods used to quantify GRPH and DRPH both quantifies chemicals within the carbon range of C10 to C12 as being within the quantifiable range of each hydrocarbon. This overlap biases the GRPH and DRPH results higher than they actually are.

5.2.1 Diesel Range Petroleum Hydrocarbons

The extent of DRPH in soil above the CUL is primarily found in the Uplands area near the former CVB and former Tank Farm B, near the release point of R99, the former dry well, and the drum spill area (Figure 2). Only two soil samples collected downgradient of the Coleman Oil facility (from monitoring wells MW19 and MW32) have DRPH above the CUL. The four seeps also have DRPH above the CUL.

Based on the distribution of DRPH in soil at the Site, it appears that R99 travelled quickly through the subsurface without leaving a high concentration residue in soil. The remaining soil concentrations are relatively low and are expected to naturally attenuate with the reduction of DRPH concentrations in groundwater.

5.2.2 Gasoline Range Petroleum Hydrocarbons

The extent of GRPH in soil above the CUL appears to be relatively wide spread laterally but limited in the vertical direction as discussed above. Two known releases of gasoline occurred near the USTs that provide fuel to the cardlock and were cleaned up prior to the release of R99. One other notable area of GRPH at the Site was found near the CVB and former Tank Farm B. This area of contamination is mixed with other fuel products, primarily DRPH. A remedial excavation was performed in this area in June 2019. Much of the extent of contamination was removed but some was left in place due to the property boundary with the BNSF railroad to the west and Tank Farm A to the south. Some of the highest concentrations of GRPH and DRPH in soil were found in the sidewalls and floor of the excavation cavity. Some additional remedial action in this area of the Site would accelerate the cleanup process.

It's unlikely that all the GRPH in soil at the Site is solely attributable to these areas of known GRPH contamination. Considering the fact that a large release of R99 occurred it's possible that DRPH affected the GRPH results. It should be noted that laboratory flagged many of the GRPH results as being overlap from DRPH.

5.3 Groundwater Characteristics and Quality

Groundwater flow is generally parallel with the top of the Chumstick formation. The groundwater flow direction and the dip of the sandstone surface are both to the north, northeast except in the region between the Site and the Columbia River where both are more to the east. The groundwater elevation

contour plot for the March 2022 groundwater monitoring event is shown on Figure 5. The location of the observed seeps 300 feet north of the Property is consistent with the observed groundwater flow direction and gradient.

DRPH and GRPH in groundwater extend from Tank Farm A to the north-northeast to the area between MW21 and MW22, a distance of approximately 650 feet.

The most recent groundwater monitoring event occurred in September 2022 and the report[2] has been submitted to Ecology. The previous semi-annual groundwater monitoring event occurred in March 2022 and included an assessment of DRPH analytical results of selected samples using silica gel cleanup procedures. This was done to gain an understanding of the current chemistry of the R99 after biologic and physical degradation has taken place since the release occurred. Laboratory analytical results are reported as micrograms per liter (µg/L) or parts per billion. The results of the March 2022 sampling event are provided on Table 2. A summary of the results for each constituent sampled for that sampling event is provided below.

5.3.1 Gasoline Range Petroleum Hydrocarbons

GRPH was detected above the laboratory's method reporting limit (MRL) in 11 wells including MW-6, MW-8, MW09R, MW10R, MW11, MW14, MW17, MW20, MW21, MW29, and BH01R. The GRPH concentration ranged up to 4,020 µg/L at MW14. The CUL for GRPH is 800 µg/L and was exceeded in the MW09R and MW14 samples. A significant reduction in the GRPH concentration is seen in the sample collected from MW-13R compared to the groundwater monitoring event before the remedial action was performed (March 2019). This is attributed to the remedial excavation performed in June 2019 near the former CVB and former Tank Farm B.

5.3.2 Diesel Range Petroleum Hydrocarbons

DRPH was detected in all 17 wells sampled with concentrations ranging up to 4,290 µg/L at MW09R. The CUL for DRPH is 500 µg/L and was exceeded in all wells sampled except MW28 and MW32.

5.3.2.1 Diesel Range Petroleum Hydrocarbons with Silica Gel Cleanup

In March 2022, four selected samples were analyzed for DRPH using the NWTPH-Dx analysis with and without using the silica gel cleanup procedure. This was done in order to determine what portion of the

[2] HydroCon, *Groundwater Monitoring Report – September 2022*. October 13, 2022.

DRPH is due to polar or semi-polar petroleum degradation products. The results are shown in the table below.

Estimated DRPH Attributable to Non-Hydrocarbons (Polar Compounds)

Sample Identification	With Silica Gel Cleanup (µg/L)	Without Silica Gel Cleanup (µg/L)	Percent of sample due to Polar Compounds
MW06-W	150	904	83.4%
MW32-W	<81.6	338	At least 75.8%
BH01-W	217	2,180	90%
BH02-W	706	1,760	59.8%

As shown on the table, the majority of DRPH in groundwater at these locations is due to petroleum degradation byproducts. This is important information as it shows that the majority of TPH has degraded into polar metabolites which are generally less toxic.

5.3.3 Oil Range Petroleum Hydrocarbons

ORPH was detected not detected above the MRL in any well sampled.

5.3.4 Benzene

Benzene was detected above the MRL in two wells including MW14 and MW17 at concentrations ranging up to 4.03 µg/L. The highest concentration was seen in MW14. The CUL for benzene (5 µg/L) was not exceeded in any sample.

5.3.5 Toluene

Toluene was not detected in the groundwater above the MRL in any of the samples.

5.3.6 Ethylbenzene

Ethylbenzene was detected above the MRL in MW14 at a concentration of 6.47 µg/L. The CUL for ethylbenzene is 700 µg/L and was not exceeded in the sample.

5.3.7 Total Xylenes

Total xylenes were not detected above the MRL in any of the samples.

5.3.8 Naphthalenes

Naphthalenes weren't analyzed for during this sampling event. Historical results indicate that two wells (MW-22 and MW-13) had concentrations that exceeded the CUL. Monitoring well MW-22 is located outside the Coleman Oil plume and is considered to be representative of the plume emanating from the PUD facility. The source of VOCs including naphthalene at monitoring well MW-13 was removed during the 2019 remedial excavation at former Tank Farm B and Control Valve Building. With remedial action, naphthalene is no longer considered to be a COC at the site. Further analysis of naphthalene may be performed during future semi-annual groundwater sampling events to assess if there's been any changes in groundwater chemistry related to this constituent.

5.3.9 Polynuclear Aromatic Hydrocarbons

Polynuclear Aromatic Hydrocarbons (PAHs) were not analyzed in the groundwater samples from any of the wells during this sampling event. Historical results are provided in Table 3. When establishing and determining compliance with cleanup levels and remediation levels for mixtures of carcinogenic PAHs (cPAHs) under MTCA Cleanup Regulation (WAC 173-340-708(8)(e)), the mixture is considered a single hazardous substance. The Toxic Equivalent Concentration (TEQ) was calculated for the groundwater PAH samples per Ecology's Focus Sheet[3]. One-half the detection limit used for non-detected concentrations. The TEQs are shown on Table 3. The samples do not exceed the benzo(a)pyrene reference cleanup level of 0.1 µg/L.

5.4 Monitored Natural Attenuation Parameters

The August 2019 groundwater sampling event included analysis of geochemical parameters used to monitor natural attenuation (MNA) at petroleum contaminated sites (Table 4). This sampling event was done to establish a baseline from which to assess if natural attenuation is occurring at the Site. The use of MNA will be considered as a method to use to monitor post-remediation groundwater quality at the Site.

In general, a plume of petroleum hydrocarbons that is undergoing natural attenuation should have decreasing amounts of dissolved oxygen, nitrate, sulfate, and redox potential and an increase in ferrous iron, methane, manganese, and alkalinity (Ecology 2005a).

[3] https://fortress.wa.gov/ecy/clarc/FocusSheets/tef.pdf

Dissolved Oxygen – The dissolved oxygen content in the samples collected from the Site ranged from 0.18 to 2.77 mg/L. These values indicate that groundwater at the Site has a low oxygen content (Ecology 2005b).

Redox Potential – Redox potential is a measure of the tendency of a chemical species to acquire or lose electrons. It is measured in millivolts (mV). The more positive the redox potential, the more readily a molecule can acquire electrons and be reduced. The redox potential in the samples collected from the Site ranged from -196 mV to 128.4 mV. A total of 19 samples had a negative reading, 6 had a positive reading, and 1 had a reading of 0 mV.

pH – pH is a measure of the acidity or alkalinity of a solution. The pH scale ranges from 0 to 14. A pH less than 7 is considered to be acidic. A pH greater than 7 is considered to be basic or alkaline. The pH in the samples collected at the Site ranged from 5.97 to 7.43.

Nitrate – Nitrate was detected above the MRL in only three wells (MW01S, MW16, and MW32) ranging from 0.35 to 2.0 mg/L. Nitrate concentrations below background in areas with dissolved contamination is evidence for biodegradation (Ecology 2005b).

Sulfate – Sulfate was detected above the MRL in each well except MW-8, MW-11, and MW-4 at concentrations ranging from 0.18 to 78.4 mg/L. Sulfate concentrations less than background in areas with dissolved contamination provide evidence for biodegradation (Ecology 2005b).

Manganese – Manganese was detected in each well ranging from 52.8 to an estimated 10,700 mg/L.

Alkalinity – Alkalinity ranged from 148 to 619 mg/L in the samples collected from the Site.

Methane – Methane was detected in the samples collected from every well except MW-16. Detections ranged from 3.1 µg/L to 8,100 µg/L.

Ferrous Iron – Ferrous iron ranged from 0.0 to 6.5 mg/L in the samples collected from the Site.

While future testing of these parameters is needed to adequately evaluate the presence and progress of natural attenuation, there are preliminary indications that biodegradation is active at the Site.

5.5 Extent of Groundwater Contamination

Iso-concentration contours of DRPH and GRPH concentrations were prepared to illustrate the magnitude and extent of each contaminant at the Site (Figure 5 and 6). Red colored shading was used to graphically display the plume boundary. Areas of higher concentration are shaded in darker red.

The seep area (shoreline soil samples SL01 through SL04) is included on the figures since the seep water is in contact with impacted soil and shows the location of this area relative to areas of impacted groundwater.

A comparison of the extent of groundwater contamination in March 2019 and March 2022 is shown on Figures 5 and 5A (DRPH) and Figures 6 and 6A (GRPH).

5.5.1 **Diesel Range Petroleum Hydrocarbons**

The extent of DRPH contamination in groundwater is illustrated on Figures 6 and 6A. A plume of DRPH impacted groundwater with DRPH levels greater than the 500 µg/L CUL is present at the site from the former CVB and extends northeast slightly beyond monitoring well MW21.

As discussed above, HydroCon modified the plume configuration in this report to reflect known preferential pathways and presumed groundwater quality where no data have been obtained in between the point of the release and Chehalis Street. The extent of DRPH greater than 1,000 µg/L has been expanded based on the known direction of groundwater flow and the two areas of elevated DRPH concentrations within the plume including:

- The area encompassing the area north of MW-14 and extending to monitoring well MW20. This area generally begins downgradient of the remedial excavation north of the point of release of R99 and includes many of the pumping wells located downgradient. The concentration of DRPH in this plume area ranges from 1,000 to 4,290 µg/L.
- The downgradient tip of the plume shows an elevated concentration of DRPH in the area of pumping wells MW10R and MW24 to MW21.

Areas with DRPH concentrations less than 500 µg/L (Method A cleanup level) include areas of the Property south of Tank Farm A, much of the eastern and southern tip of the Property and adjacent Worthen Street, the northwest portion of Chehalis Street, and the line of wells east of Worthen Street including and between MW25 and BH-3 and RW-1.

A comparison of the extent of DRPH in groundwater in March 2022 (Figure 6A) to March 2019 (Figure 6B) indicates that the size of the plume above the CUL (shaded in pink) remains relatively the same. The distribution of DRPH in the 1,000 to 2,000 µg/L (shaded in orange) and greater than 2,000 µg/L (shaded in red) has been removed from the CVB and former Tank Farm B area and is currently concentrated primarily near the groundwater pumping wells.

5.5.2 Gasoline Range Petroleum Hydrocarbons

The extent of GRPH contamination in groundwater is illustrated on Figures 7A and 7B. There is currently a localized area within the plume that have elevated GRPH concentrations above the CUL of 800 µg/L:

- The area around MW14 and downgradient towards MW09R. The highest concentration of GRPH (4,020 µg/L) is present in MW14 which is located immediately downgradient of the footprint of former Tank Farm B.

A comparison of the extent of GRPH in groundwater in March 2022 (Figure 7A) to March 2019 (Figure 7B) shows a significant improvement in water quality after the remedial excavation was performed in 2019. The March 2022 data shows only two small areas (MW-14 and MW09R) with GRPH concentrations above the CUL.

5.6 Sediment Characteristics and Quality

HydroCon performed sediment sampling on two different dates during the investigation to assess the nature and extent of contamination in the shallow sediment in the Columbia River in the observed sheen discharge area where the spill containment booms are deployed (Figure 2). The sediment consisted of Silty Sand (SM) which was composed predominantly with fine sand with some low plastic fines and trace to 10% black colored organic material. Local gravels and cobbles were observed within the sediment.

Five sediment samples were collected on April 23, 2018 as part of the SRI in the area of observed sheens. The analytical results of the sediment samples were compared to the Sediment Cleanup Objectives (WAC 173-204) for TPH-diesel (DRPH, 340 mg/Kg) and TPH-residual (ORPH, 3,600 mg/kg) Two samples, (SS01 and SS02) had DRPH concentrations that exceed the DRPH Sediment Cleanup Objective (SCO) of 340 mg/kg (Table 5).

After the 2018 sediment sampling was completed, an exploratory exercise was conducted to assess if a hydrocarbon sheen could be produced in the surface sediment along the river by agitating it with a steel rod. The rod was approximately 6 feet in length. This exercise began downstream of the boat launch at Wenatchee Riverfront Park and ended at the at the Senator George Sellar bridge. The field technician agitated the sediment as the boat slowly floated downstream (controlled by motor) and watched for a sheen to be produced. No sheen was observed in any of the estimated 300 near-shore (in water less than 6 feet deep) probe locations.

In March 2019 HydroCon performed a follow up investigation to define the lateral and vertical extent of contamination. Deeper samples were collected at locations SS01 and SS02. Shallow and deeper

samples were collected from three additional sample locations (SS06 through SS08) north and east of SS01 and SS02 to define the lateral extent of DRPH contamination as shown on Figure 3. It should be noted that multiple attempts were made to collect sediment sample SS06. The first location (western-most) encountered bedrock with no sediment present. The sampler was moved into deeper water (east) and another attempt was made. Large concrete fragments were encountered at this location with no apparent sediment present. The sampler was again moved into deeper water (east) and another attempt was made. Large cobbles were present in this location preventing the collection of sediment samples. The boat was moved into deeper water, approximately 20 feet from the initial location and the fourth attempt at collecting a sediment sample was successful. Figure 3 shows the location of all sampling locations including the unsuccessful ones. The analytical testing of the sediment samples in March 2019 indicated that none of the samples exceeded the SCO, including samples collected at SS01 and SS02 which had previously exceeded the SCO.

5.7 **Extent of Sediment Contamination**

Based on the results of the sediment investigation, the 2018 extent of sediment contamination exceeding the SCO as determined by sample analytical results is limited to the shallow samples at and near locations SS01 and SS02. Subsequent sampling in 2019 indicated that none of the samples having concentrations above the SCO. As a result, concentrations of DRPH in sediment are no longer at concentrations that exceed the SCO.

6.0 CONCEPTUAL SITE MODEL

This section presents a conceptual understanding of the Site and identifies potential or suspected sources of hazardous substances, types and concentrations of hazardous substances, potentially contaminated media, and actual and potential exposure pathways and receptors.

6.1 Areal and Vertical Extent of Soil, Groundwater and Sediment Impacts

This section reviews the areal contaminant distribution and subsurface migration pathways.

6.1.1 Areal Contaminant Distribution

The CSM focuses on contamination of soil and groundwater as the impacted media arising from the release of petroleum fuels. The presence of impacted media at the interface between groundwater and soil is the driving force behind this FFA.

DRPH and GRPH exceeding CULs are present in subsurface soil, groundwater, and shoreline soils. R99 in groundwater extends from the release area to the north-northeast to approximately MW21, a distance of 550 feet. Most soil within the groundwater interface (commonly referred to as the smear zone) is impacted primarily by DRPH and GRPH transported by groundwater.

GRPH in groundwater above the CUL is currently localized to two monitoring wells (MW-14 and MW09R). Prior to the 2019 remedial excavation, the extent of GRPH above the CUL ranged from the former CVB and former Tank Farm B area (MW13R) to at least MW21. Gasoline releases were due to historic releases not associated with the R99 release. The area with the highest historic concentrations of GRPH was near monitoring well MW13R which is located within the footprint of former Tank Farm B and next to (north of) the former CVB. Both of these site areas had historic handling of gasoline and other petroleum products. The majority of the source of GRPH and related VOCs were removed during the 2019 remedial excavation.

Shoreline soil is impacted by DRPH and GRPH impacted groundwater discharging to the Columbia River approximately 400 feet north of the release area.

The extent of petroleum in river sediments has been defined and it appears that the sediments no longer have exceedances of sediment management standards based on the 2019 sediment sampling results.

Gasoline and diesel impacts to soil and groundwater at MW22, the northernmost monitoring well, are interpreted to be due to a source not associated with the operations at Coleman Oil Company.

6.1.2 Contamination Sources

The primary source addressed with this FFS is the R99 release discovered as a sheen in the Columbia River on March 17, 2017. This source is likely entirely attributable to a failed underground pipeline.

Localized areas of the Site had relatively shallow soil contamination (above the water table). HydroCon interpreted this to be source areas. This is based on the fact that other than the USTs, all other sources of contamination at the Site are from above ground equipment such as ASTs, drums, product stored in former warehouses, above ground pumps and piping, as well as fuel handling. Shallow underground piping was the source of the R99 release.

Shallower areas of impacted soil above the saturated zone were discovered during exploration including the former fuel line excavation (R99 release), the former dry well, the Uplands area near the former CVB and former Tank Farm B, and the drum spill area. Most of this soil was removed by remedial excavation by Coleman Oil in 2017 and HydroCon in 2019.

The other major source of soil and groundwater contamination is historical operations involving handling and distribution of gasoline and other petroleum fuel products, with a primary source in the central eastern portion of the Property with the highest GRPH concentrations observed at MW13.

Sources of contamination at the Site can be placed into 4 separate categories (known releases, suspected releases, historic releases, offsite sources). Most of these releases or sources are shown on Figure 2. Details of known contamination and potential offsite sources have been discussed in previous sections. A discussion of each category is provided below.

Recent Known Releases

- In June 2010, 180 gallons of unleaded gasoline were released from a leaking valve control box on the southern portion of Tank Farm A.
- In May 2013, 200 gallons of gasoline were released while the UST on the southeastern portion of the Site that supplied fuel to the retail sales card lock fuel island was being filled. Ecology issued an NFA determination in March 13, 2015 for the Site. It should be noted that improper monitoring well construction in two of the wells installed to monitor the gasoline releases (MW-1 and MW-3) may have provided groundwater data that wasn't representative of actual groundwater conditions. This instigated the installation of monitoring wells MW1-S and MW3-S in 2018. It is possible that gasoline impacted soil remains at the Site near the 2010 and 2013 releases and may require further remediation.

- On March 17, 2017, the Wenatchee Fire Department reported the presence of a sheen and petroleum odor on the Columbia River near the Site. Results of investigation and line tightness testing indicated that an estimated 4,543 gallons of R99 biodiesel was released from a broken fuel line. Ongoing characterization and product recovery measures are being implemented at the Site for this release.
- A spill from a 55-gallon drum near the northeast corner of Tank Farm A occurred in September 2018. This drum held fluids recovered from onsite monitoring wells. Remedial excavations were conducted in stages in September and October, resulting in the removal of 16.83 tons of PCS. The excavation was complicated by the presence of a large boulder and Tank Farm A. All PCS from the spill may not have been removed.

Historic Releases

The Property has operated as a bulk fuel facility since 1921. Little is known about historic operations. However, it is likely that handling, storage, and distribution of fuel resulted in spills, leaks, and accidents over the operational history of this bulk fuel facility and potentially at operations at adjacent industrial facilities (BNSF railroad to the west and the Chelan County PUD operation to the north). This is supported by forensic review of chromatograms that identified several petroleum fuels types in the subsurface other than R99 including degraded diesel, gasoline, bunker C, and oil.

A high concentration of GRPH and benzene has been observed in soil and groundwater samples collected at monitoring well MW13. This well is located within the footprint of former Tank Farm B and adjacent to (north) and downgradient of the CVB that housed pumps used to load fuel into the storage tanks. A 2019 remedial excavation removed 875 tons of PCS in this area. While it appears that the majority of vadose zone PCS was removed, residual contamination remains in the sidewalls and bottom of the excavation in the saturated zone.

A dry well, located in the east-central portion of the Site, was sampled on April 3, 2017. Five samples were collected at depths of 3 to 5 feet bgs. The deepest sample collected at the bottom of the excavation had a concentration of 2,400 mg/Kg DRPH and 2,000 mg/kg ORPH. HydroCon installed monitoring well MW23 at the presumed location of the dry well based on Farallon figures. Soil samples collected at 8 and 12 feet bgs in the boring had GRPH concentrations above the CUL.

Potential Offsite Sources

Two adjacent properties that have had known releases and/or handled petroleum products near the subject Site include the PUD property to the north and the BNSF railroad to the west.

BNSF (FSID #28673212, CSID #5820) - Two underground storage tanks (USTs) for diesel fuel were located on the property with capacities of 25,690 gallons and 34,120 gallons. In November 1991, a site assessment was conducted prior to decommissioning of the tanks. Soil and groundwater samples were collected in the vicinity of the tanks at various depths. Sample results showed diesel contamination above MTCA Method A CUL in soil and groundwater. Based on review of available documents, there's no indication that remedial action has taken place.

Chelan County PUD (FSID #44830, CSID #14795) - This site currently operates as an electrical substation facility, and has used petroleum products including coal tar in the past, as shown on historical Sanborn maps. Assessment of the contamination discovered at monitoring well MW22 indicated a different composition of petroleum products than seen at the wells monitoring the Coleman Oil R99 release including elevated concentrations of benzene and PAHs, which are commonly associated with coal tar. A remedial investigation is currently in progress at the site.

6.1.3 Contaminant Migration within the Subsurface

Alluvial deposits are underlain by the Chumstick formation bedrock. The thickness of the alluvium ranges from 6 to 31.5 feet. Boring logs and drilling observations indicate that a more massive, well cemented sandstone layer is beneath thin layers of mudstone, shale and sandstone and the sandstone appears to be acting as an aquitard in this area. Cross sections are included as Figures 8 through 11 and show the contact between the alluvium and the underlying Chumstick formation, groundwater levels in April 2018, and the distribution of contamination based on field observations (PID, odor, sheen). These figures demonstrate that the groundwater level is within a few feet of the top of the Chumstick formation and always above the sandstone layer. An exception is at MW22 where the groundwater is approximately 15 feet above the top of the Chumstick formation. This area has been disturbed by previous excavation and has been backfilled with construction and other debris. The MW22 area is not considered to be part of the Site.

Groundwater flow is generally parallel with the Chumstick formation. The groundwater flow direction and the dip of the Chumstick sandstone surface are both to the north, northeast except in the region between the Property and the Columbia River where both are more to the east. Groundwater levels are approximately 10 feet above the Sandstone. The depth of the top of the sandstone estimated in the easternmost wells (MW15 and MW18) as the boreholes did come in contact with the top of the formation, but not the underlying the sandstone.

Six recovery sumps were installed prior to backfilling the remedial excavations during April to June 2017. The remedial excavation was reportedly advanced to bedrock and then backfilled. The total depth of the sumps ranges from 13 to 20 feet bgs. Pumps were installed in the sumps to recover R99 and maintain a cone of depression in groundwater near the point of release. Initially, the highest

recovery of product was at Sump #1 and Sump #2 which are both downgradient and nearest the point of release. Both of these sumps are 13 feet deep. As the water level dropped by pumping (and seasonally) product recovery became more prevalent in the deeper sumps (Sump #2, Sump #5 and Sump #6). The sumps with the most consistent recovery of product were Sump #5 and Sump #6, both of which are located the furthest downgradient from the point of release and are the deepest (20 and 18 feet, respectively). The observation and recovery of product in the sumps follows a similar pattern as what is seen in the downgradient wells with product following the top of the bedrock (Chumstick formation).

Using the survey information of the wells, a plot of the top of the Chumstick formation, the total amount of product recovered from the wells, and the relative flow rates of the wells obtained from the hydraulic testing at the Site. A correlation can be made between the contours of the bedrock and the presence of LNAPL in individual wells downgradient (north) of the loading rack (point of the release). Wells with higher flow rates have generally had the most product recovered.

Contaminant transport and groundwater flow appears to follow the surface of the Chumstick formation and field observations paired with analytical data suggest that the petroleum contamination penetrates a few feet into the formation and travels laterally within the shaley sandstone and shale/siltstone/mudstone of the Chumstick formation. Beginning at the point of release, product migrated downward via gravity until it reached groundwater. Downgradient migration appears to be controlled by geology (bedrock) along preferential pathways within the subsurface that are likely fractured and/or channelized areas within the Chumstick formation and areas of different porosity in the overlying alluvium. These pathways appear to be complex and localized based on the intermittent presence of LNAPL in monitoring wells installed near the Columbia River near the area of observed sheens and where the four seeps are located. Groundwater flow velocities (and contaminant transport) are relatively high, with the average hydraulic conductivity of the formation screened by BH-1, MW-9, and MW-10 being on the order of 2 feet/day. This is reinforced by the aquifer testing performed in February 2018 that demonstrated that none of the wells tested are hydraulically connected. However, over 200 gallons of R99 (based on product recovery totals) has made its way into the Columbia River with the apparent discharge points being west of monitoring wells BH-2 (south) to MW-10 (north).

Cross Section B-B' (Figure 10) shows the spatial relationship of the seep samples (SL01), the sediment samples (SS03, SS04, and SS08), and groundwater and river elevations.

Based on the elevation data presented in Cross Section B-B', it appears evident that the sediment impacts are the result of shoreline seepage that has settled beneath the water column as opposed to upward migration of contaminated groundwater. The data supporting this conclusion include:

- Elevations of groundwater in monitoring wells and elevations of the seeps and the river would not suggest any groundwater coming into the river from below, only laterally. Although some seepage discharge below river level evidently occurs when some shoreline seeps are submerged (typically during the spring thaw), such seepage appears to be only in close proximity to the shoreline bank.

- Concentrations of DRPH in sediment samples generally decrease with depth, and higher concentrations were only exhibited in the shallowest samples collected at SS01 and SS02.

Natural attenuation of DRPH in sediments would be expected to include mechanisms such as biodegradation, sediment bioturbation and sediment transport (and hence dilution), and dissolution (transfer of DRPH to the aqueous phase).

Any transfer of DRPH from sediments to the aqueous phase would not be expected to be of significant concern due to:

- The relatively small amount of sediment that was impacted by DRPH (approximately 7 cubic yards) in 2018.

- The tremendous dilution that takes place from the volume of water flowing within the Columbia River.

- The lack of persistence of DRPH in the aqueous environment (mechanisms such as photolysis would be expected to result in destruction of dissolved phase DRPH).

- The lack of DRPH concentrations above SCOs in 2019.

The extent of petroleum in river sediments has been defined and it appears that the sediments no longer have exceedances of sediment management standards based on the 2019 sampling results.

6.2 **Chemicals and Media of Concern and Cleanup Levels**

The COCs for the Site are those compounds that were detected at concentrations exceeding their respective CULs. The COCs and the media where the COCs were detected above the respective CULs are listed below:

- GRPH, DRPH, and BTEX in soil

- GRPH, DRPH, ORPH, benzene, toluene, and xylenes in groundwater

- Petroleum constituents in surface water.

The selected cleanup alternative must comply with the MTCA cleanup regulations specified in WAC §173-340 and with applicable state and federal laws. The CULs selected for the Site are equivalent and consistent with the remedial action objectives (RAOs), which require that the ultimate RAO is to reduce risks to human health and the environment to levels suitable for Ecology to make a determination of NFA for the Site. Achieving the interim RAO will enable Ecology to issue a Property-Specific NFA. The associated media-specific CULs for the identified COCs are summarized in the following sections.

The proposed CULs for soil and groundwater beneath the Site are generally the MTCA Method A CULs for Industrial Land Use (see Section 2.1) for COCs that have a Method A CUL. Ecology stipulates that compliance for soil and groundwater media will be based on a summation of DRPH and ORPH, consistent with Ecology's guidance documents[4]. Therefore, the DRPH and ORPH concentrations will be added together and compared to their respective combined CUL (2,000 mg/kg soil and 500 µg/L water). If there is no promulgated Method A CUL for a given chemical or medium, the proposed cleanup level is the MTCA Method B Standard Formula Value for carcinogenic or non-carcinogenic compounds, depending on the carcinogenic properties of the compound.

The CULs for the media and COCs include those that have been detected in soil (Table 1) and groundwater (Tables 2 and 3) above the CULs. The soil and groundwater CULs are summarized in the tables below, including the source of the cleanup level.

Proposed CULs for Soil

Chemicals of Concern	Cleanup Level (mg/kg)	Source
GRPH[1]	30	MTCA Method A, Industrial; WAC §173-340-745(3)(b)(i)
Total TPH (DRPH+ORPH)	2,000	
Benzene	0.03	
Toluene	7	
Ethylbenzene	6	
Xylenes[2]	9	

[1]For all gasoline mixtures with benzene included
[2]For total xylenes: ortho-, meta-, and para-isomers

Proposed CULs for Groundwater

[4] Ecology, *Guidance for Remediation of Petroleum Contaminated Sites, Publication Number 10-09-57*, Revised June 2016.

Chemicals of Concern	Cleanup Level (µg/L)	Source
GRPH[1]	800	MTCA Method A; §173-340-720(3)(b)(i)
Total TPH (DRPH+ORPH)	500	
Benzene	5	
Toluene	1,000	
Ethylbenzene	700	
Xylenes[2]	1,000	
Naphthalenes[3]	160	

[1]When benzene is present in groundwater
[2]For total xylenes: ortho-, meta-, and para-isomers
[3]Value is for total of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene

6.3 Site Definition

Based on the findings from the investigations conducted by HydroCon and others, the Site is defined as PCS and groundwater exceeding the CULs and as shown in Figure 12.

6.4 Preliminary Exposure Assessment

The following is a review of exposure pathways and receptors identified for the Site based on currently available data.

6.4.1 Soil-to-Groundwater Pathway

Analytical testing of groundwater samples indicates that contamination of groundwater via the soil leaching pathway and is considered to be complete.

6.4.2 Direct Contact Pathway

Direct contact with soil and groundwater exhibiting concentrations of petroleum hydrocarbons in excess of the CULs is limited to human receptors who come into close contact with the media via direct exposure, including dermal contact or ingestion of excavated soil or groundwater. The standard point of compliance for soil contamination beneath a Site is approximately 15 feet bgs, which represents a reasonable estimate of the depth that could be accessed during normal Site redevelopment activities (WAC §173-340-740[6][d]).

Areas where laboratory analytical results exceeded the Method A Industrial CUL(s) at depths of less than 15 feet include (the areas with potential exposure to direct contact) include most of the Property

north of Tank Farm A. Areas where contamination exceeds 15 feet include all of Worthen Street (with the exception of shoreline samples and FB-9 and MW20). This distribution of areas with potential direct contact exposure is consistent with the northward dip of the top of Chumstick formation where contamination is generally encountered, which is encountered at greater depths to the north. The distribution suggests that direct contact exposure is also not present beneath most of the adjacent PUD facility, however this area contains no data.

Until such time as the contaminated soil and groundwater are removed or remediated, or an institutional control limiting direct contact is implemented, the direct contact pathway is a potentially viable exposure pathway.

6.4.3 **Vapor Pathway**

Volatile COCs have been identified in soil, however no soil gas samples have been collected. There are no current structures on the Coleman Oil property, except two small sheds, but structures could be built in the future. The vapor intrusion exposure pathway is considered to be potentially complete at the Site.

A telephone conversation with the PUD on September 3, 2018 revealed that a portion of one of the buildings has a basement used for equipment storage. With product observed in MW-9 at a depth of 21.5 feet bgs, the bottom of the basement is likely less than 15 feet (EPA screening guidance adopted by Ecology) above the product level. As such, this building may be subject to vapor intrusion.

6.4.4 **Surface Water/Sediment Pathway**

Migration of contaminants to the Columbia River via groundwater discharge has been demonstrated at the Site. Concentrations in two sediment samples collected in 2018 exceeded the Freshwater Sediment Cleanup Objectives and Cleanup Screening Levels for protection of the benthic community for Diesel. In March 2019 sediment samples were collected at the same locations with 2018 exceedances at roughly the same depth. As noted in Section 6.1.3, the extent of petroleum in river sediments has been defined and it appears that the sediments no longer had exceedances of sediment management standards in 2019.

Protection of surface water is paramount on this project as the Columbia River is considered to be one of the most valuable surface water bodies in the country. Surface water in the Columbia River has been impacted by Site releases, with 214.1 gallons of product recovered through August 29, 2018. Due to the diligent remedial actions taken at the site, no product has been detected in the oil/water separator since August 28, 2018.

The only measurable free product detected at the site since then has been during semi-annual groundwater monitoring events during the seasonal low water period of the year. Free product (0.01 feet) was detected in MW29 on November 19, 2020 and in three wells (MW09R, MW10R and MW-11) on October 6, 2021. Both measurements occurred during the seasonal low water period (Fall) after the pumps had been turned off for several days allowing groundwater conditions to stabilize prior to commencement of sampling activities.

Based on site investigation results, there does not appear to be hydraulic continuity between the Uplands alluvial soil where the mass of PCS is located and the Columbia River until the river level rises above the elevation of the four seeps. The majority of reported sheen observations in the river concurred during the time period (spring thaw) when the river levels are above the seeps. The last reported sheen observed in the river (from daily monitoring reports) was on May 22, 2020. There does not appear to be an upwelling seep in the river based on the sediment sampling results.

6.4.5 **Groundwater/Drinking Water Pathway**

Groundwater in the vicinity of the Site is not developed as a drinking water resource and is not likely to be developed in the future due to a well-established municipal water supply system. HydroCon reviewed registered water wells on the Ecology website, which revealed that there are no water supply wells in the vicinity of the Site. While adverse impacts to shallow groundwater in the immediate vicinity of the Site have been confirmed, there is no potential for adverse impacts to the municipal water supply or private wells from contaminants migrating from the Property. Based on definition under MTCA, there is a potential for future nearby potable water supply development since it cannot be fully eliminated by criteria of salinity. The other provisional criterion is yield. Based on aquifer testing at the site, most of the monitoring wells tested to assess aquifer characteristics had low yields. The aquifer generally has a relatively small amount of water in it with water level fluctuates in response to seasonal precipitation. The recirculation system is comprised of 9 pumping wells. In 2022 the daily total volume of water produced from these wells ranged from approximately 378 gallons per day (GPD) in October to approximately 2,190 GPD in June. This yield is insufficient to support a municipal water supply system.

On another basis, the proximity to historic source of contamination including the BNSF railway, PUD facility and the subject Site being used as a bulk fuel handling facility for almost 100 years precludes the logical use of water from this aquifer as a potable water supply.

6.5 Points of Compliance

6.5.1 Soil Points of Compliance

Soil points of compliance for the soil exposure pathways must be considered, which include direct contact, soil leaching to groundwater, soil protection of vapor migration and protection of terrestrial species. The standard point of compliance for soil is defined as throughout the Site from the surface to 15 feet below ground surface. As discussed in Section 6.4.2, most of the Property north of Tank Farm A has contamination in soil at a depth of less than 15 feet.

6.5.2 Groundwater Points of Compliance

Points of compliance will be set for groundwater. The standard point of compliance for groundwater consists of the groundwater throughout the Site from the uppermost level to the lowest depth that could have been affected by contaminants. As such, existing monitoring wells represent on Property compliance points.

A conditional point of compliance is also needed for offsite groundwater near the Columbia River. Existing wells have been located as close the river as is technically possible, so some or all of these wells to the east of Worthen Street should be considered groundwater points of compliance. These wells were installed as part of the emergency spill response to monitor groundwater, locate potential preferential pathways for product migration and the means to remove the product via installation of product recovery pumps, if warranted. A ROW permit and performance bond were obtained from the City of Wenatchee to install these wells.

7.0 REMEDIAL ALTERNATIVES EVALUATION PROCESS

This section describes the remedial alternative evaluation and selection for contaminated groundwater and soils at the Site. The purpose, in support of the FFA, is to develop and evaluate cleanup action alternatives to enable a cleanup action to be selected for the Site. Further, the purpose is to protect human health and the environment by implementing an effective alternative. The technologies and process options identified for each general response action will be subjected to an initial evaluation (screening) to reduce the number of potential remedies.

Initially, soil vapor extraction (SVE) was considered a potentially viable and useful alternative, particularly for use in the subsurface piping installed in the cavity of the 2019 remedial excavation near the CVB and former Tank Farm B. However, due to the significant improvement in groundwater quality near and in MW13R after that interim remedial action, there would be no benefit using this remedial technology to improve groundwater quality in this area of the site. All other soil contamination, with the possible exception near MW-14, appears to be at depths below the water table. Therefore, SVE was removed as a viable Alternative for the site.

Below is a list of remedial alternatives for consideration at the site.

7.1.1 Alternative 1: No Action

A “No Action” alternative is evaluated as a remedial action alternative. Alternative 1 would involve no further remedial action activities and no institutional controls. Under this alternative, current conditions at the Site would remain without any change, without restrictions being placed on future operations or redevelopment and with no further remedial costs incurred.

7.1.2 Alternative 2: Excavation and Disposal

It should be noted that evaluation of this Alternative has two elements. The first being the excavation of shallow soil in the unsaturated zone and in the Uplands area where bedrock (Chumstick formation) is less than 10 feet bgs. This alternative has been implemented at the Site resulting in the excavation and disposal of a total of approximately 1,723 tons of PCS and includes a 2013 excavation responding to a gasoline spill at the UST (90 tons), the 2017 excavation in the area of the R99 release (741 tons), the 2019 excavation in the area of the former CVB and Tank Farm B areas (875 tons), and the 2019 drum spill excavation (17 tons). The locations of the remedial excavations are shown on Figure 2. Confirmation sampling of the 2013 excavations confirmed the soil exceeding CULs was removed. The 2017 excavation was not sampled, but sampling that occurred during the 2019 excavation confirmed that the soil used to backfill the excavation did not have detections of hydrocarbons. Sampling of the 2019 excavation indicated that residual contamination remains in the western sidewalls and bottom of

the excavation in the saturated zone. Removal of the contaminated vadose zone soils would be expected to enhance and accelerate natural attenuation in downgradient areas where excavation is not cost effective and/or accessible (e.g., the PUD facility located north of the property).

The second element of this Alternative that is being evaluated as a potential remedial option is the removal of the impacted area within the smear zone (top of Chumstick to approximately 2 to 3 into the weathered siltstone, mudstone and/or sandstone) where the PCS is located. Soil contamination downgradient of the R99 release and CVB and Tank Farm B areas has been demonstrated with soil borings to be limited to the soils within the saturated zone at depths beginning where the contact of bedrock is (10 to 30 feet or greater). Removal of this soil is impractical due to the large volume of clean overburden including cobbles and large boulders that would be required to remove to access the PCS.

Localized remedial excavation in the northern portion of the former Tank Farm B area (near MW14) is a consideration. Based on recent groundwater monitoring, it's evident that the remedial excavation performed near MW13 was successful at removing the source of GRPH and related VOCs in soil and groundwater. It appears that a source of GRPH and related VOCs remains near MW14 and is impacting groundwater quality downgradient of its location. Removal of the remaining source of GRPH and related VOCs would likely reduce the concentrations of these chemicals below their respective CULs and possibly eliminate the vapor intrusion pathway as a concern at the Site.

7.1.3 **Alternative 3: Groundwater Pump and Treat**

This alternative has been implemented at the Site and is being used to remove contaminated groundwater and to control groundwater elevations and thereby reduce the potential for contaminated groundwater to discharge to the Columbia River. The current remediation system is described in Sections 4.4 and 4.5 and consists of groundwater being pumped from three zones using top loading pumps to maintain groundwater elevations below seep elevations. The treatment system was upgraded in 2020. The new system was activated in August 2020 and recirculates treated water into sumps located in the Uplands area of the Site instead of discharging it into the City of Wenatchee's sanitary sewer system. Petroleum contaminated water is collected from 9 pumping wells (MW09R, MW10R, BH01R, MW17, MW24, MW28, MW29, MW30, and MW32) and treated using granular activated carbon (GAC), the same as the previous system. The treated water is temporarily placed into the storage tanks located in Tank Farm A. The treated water is enriched with oxygen using hydrogen peroxide (H202) and then discharged into one or more of the sumps that were placed in the Uplands area during remedial excavations in 2017 and 2019. This creates a closed loop system designed to enhance the biologic degradation of residual hydrocarbons and promote flushing to liberate contaminants bound onto soil particles into solution so it can be captured by one of the pumping wells.

7.1.4 Alternative 4: Biodegradable Solvent

Site investigations of soil and groundwater conditions indicate that soils in the saturated zone at the top of the Chumstick formation are highly transmissive and groundwater flow occurs along preferential pathways. A biodegradable solvent, such as isopropyl alcohol could act as a surfactant and potentially be used to dissolve and reduce the viscosity of the fuel product. It is expected that this remedial method could work in groundwater and reduce the hydrophobic bond to soil, allowing the fuel to mobilize (with water) and be pumped from the groundwater system.

7.1.5 Alternative 5: In Situ Chemical Oxidation

Hydrogen peroxide (H_2O_2) is currently being used in the pump and treat groundwater recirculation system as a means to elevate the dissolved oxygen content in the treated water that is being reapplied to the Site in the Uplands area. The intent is to enhance the biodegradation of the contaminants via aerobic bacteria. In situ chemical oxidation has been tested at other sites for the remedial action of fuels. Favorable results have been achieved in degradation of petroleum concentration and thickness. This method is similar to Alternative 4 above, except that no surfactants are used and as such, less contaminant byproduct groundwater transport is expected.

Chemicals such as sodium persulfate ($NA_2S_2O_8$), activated and catalyzed by hydrogen peroxide (H_2O_2), are examples of oxidizers that could provide for the oxidation of the contaminants. Fenton's reagent and an induced hydroxyl radical (iron as Fe^{+3}) can also be used to increase the oxidizing power toward accomplishment of this alternative.

The current pump, treat and recirculation system currently utilizes hydrogen peroxide as a means to enhance the oxygen content to stimulate biodegradation of the petroleum contaminants. Even though hydrogen peroxide is considered to be an oxidant, the concentration that is being used in the recirculation system is less than 1%. Using hydrogen peroxide for In Situ Chemical Oxidation involves using much higher concentrations (greater than 5%) to achieve the desired effect.

It is expected that the existing well network and the PVC piping that was placed inside the 2019 remedial excavation would be effective in introducing chemicals into the subsurface for Alternatives 4 and 5.

7.1.6 Alternative 6: Monitored Natural Attenuation

Natural attenuation occurs at most contaminated sites. Monitoring the natural processes to decrease or "attenuate" concentrations of contaminants in soil and groundwater can be performed as way to track remediation progress. Monitoring typically involves collecting soil and groundwater samples to analyze

them for the presence of contaminants and other site characteristics. The entire process is called "monitored natural attenuation" or "MNA." This alternative would monitor specific MNA parameters in groundwater to make sure natural attenuation is occurring. However, the right conditions must exist in the subsurface to allow for the natural attenuation process to occur. MNA can be used in conjunction with more active remedial alternatives, such as groundwater pump and treat and in-situ chemical oxidation.

MNA also includes continued monitoring of the Columbia River surface for petroleum sheen or product. Monitoring of the river for sheens has been conducted daily since March 2107. The lack of observed sheen on the river for approximately two years indicates that river monitoring could be conducted on a less frequent basis, and/or only conducted at times of high river levels.

7.1.7 **Alternative 7: Barrier Wall**

A barrier wall, either at the north edge of the Property and/or to the east of Worthen Street near the seeps, may be effective in containing contaminants and reducing or eliminating releases to the Columbia River. A wall may also be effective in aiding pump and treat efforts. As described in later sections, this alternative would be very difficult to implement due to the nature of the subsurface flood deposits with large rocks, back filled material, and the presence of subsurface utilities.

7.1.8 **Alternative 8: Institutional Controls (Environmental Covenant)**

Institutional controls involve implementation of legal and/or physical restrictions on land use to limit potential exposures to contaminated media. Such restrictions may be implemented as a component of a remedial alternative. The application of institutional controls as a formal component of an accepted remedial alternative would include the use of an Environmental Covenant (EC), approved by Ecology, and filed with Chelan County as a recorded covenant affecting title to the Subject Property. Institutional controls, as an independent and standalone approach, can under certain situations adequately address the remedial alternatives.

7.2 **Comparison of Remedial Action Alternatives**

This section includes a comparison of the alternatives in terms of the remedy selection factors, as required by WAC 173-340-350. The alternative review process will provide evaluation in terms of protectiveness, permanence, long-term effectiveness, implementability, implementation risk and cost. A final screening parameter incorporating "the degree to which community concerns are addressed" will be addressed after comments concerning the Site are received. The findings of the comparative evaluation are summarized below for each of the remedy selection factors.

7.2.1 Protectiveness

The overall protectiveness of each alternative is evaluated as follows:

7.2.1.1 Alternative 1: No Action

This alternative does not address future potential exposure pathways or reduce Site contaminant concentrations. This alternative would not provide for future protection through institutional controls or provide an avenue for future monitoring to check for contaminant movement with groundwater. This alternative has the least protectiveness compared to other alternatives.

7.2.1.2 Alternative 2: Excavation and Disposal

Most of the identified contaminated vadose soil has been excavated and disposed of. Excavation of contaminated soil is the most protective alternative in that this action removes the most contamination. Further excavation of contaminated soil from within the soil/groundwater smear zone would require access to offsite areas. In addition, a large volume of clean overburden would need to be removed to access the thin zone of contaminated soil. Dewatering and treatment of petroleum impacted groundwater would likely be required as well.

7.2.1.3 Alternative 3: Groundwater Pump and Treat

Groundwater pump and treat is being implemented at the Site and effectively removes subsurface contaminants. It is a protective alternative and effectively removes subsurface contaminants.

7.2.1.4 Alternative 4: Biodegradable Solvent

Existing wells at the Site could be utilized to provide access for completing biodegradable solvent/oxidant remediation. Applying a solvent to the hydrocarbons would support mobilization, making the product more pump-able for remediation above ground. This technology could potentially be protective by reducing the total volume of contaminants, but could also make the contaminants more soluble with water and exacerbate downgradient movement, reducing protectiveness.

7.2.1.5 Alternative 5: In Situ Chemical Oxidation

This technology could be protective by reducing the total volume of contaminant. This method would also form water soluble breakdown components of the contaminant and oxidizers, which, could affect downgradient groundwater chemical characteristics. The breakdown of DRPH by oxidizers typically creates polar organic compounds which are quantified in the DRPH analysis. High concentrations of

polar organics (whether naturally occurring or from the breakdown of TPH by oxidation) can be impediments towards achieving regulatory closure. Unless Ecology is willing to allow the use of silica gel cleanup in the NWTPH-Dx analysis, this method would likely frustrate the cleanup process.

7.2.1.6 Alternative 6: Monitored Natural Attenuation

The protectiveness of MNA is similar to that of the No Action and Groundwater Monitoring alternatives in that it does not achieve a reduction of toxicity, mobility, and volume through treatment.

7.2.1.7 Alternative 7: Barrier Wall

Although a barrier wall would provide for no further permanent destruction of contamination, this alternative provides a regimen for monitoring and isolation. It would only be as permanent as the commitment to monitoring.

7.2.1.8 Alternative 8: Institutional Controls (Environmental Covenant)

The EC is designed to document the presence and location of contamination above CULs at a site, the necessary personal protective equipment (PPE) to be worn while working in an area of known contamination, and proper waste handling and disposal for soil excavated during the construction process. The EC would protect against potential future exposures to construction workers as identified in the CSM. Construction worker exposures are only likely to occur if the property is redeveloped or there are improvements that involve utility excavation inside the area of soil impacts. Redevelopment is not likely for the foreseeable future, but may be possible at some point. Recommendations of installing a vapor barrier during construction of the foundation of a building within the known area of contamination may also be a component of the EC language.

7.2.2 Permanence

The permanence of the contaminant destruction is evaluated for each alternative is as follows:

7.2.2.1 Alternative 1: No Action

This alternative provides no contaminant destruction beyond natural biodegradation.

7.2.2.2 Alternative 2: Excavation and Disposal

This alternative provides the greatest amount of permanence for final destruction of onsite contamination. A significant amount of contaminant removal and source control has already completed through interim remedial actions

7.2.2.3 Alternative 3: Groundwater Pump and Treat

Groundwater pump and treat provides permanence for the destruction of onsite and offsite contamination. Contaminant removal with this alternative is currently in operation.

7.2.2.4 Alternative 4: Biodegradable Solvent

This alternative would undoubtedly provide some permanent destruction of contamination, but may result in some secondary product contamination or accelerated product migration.

7.2.2.5 Alternative 5: In Situ Chemical Oxidation

This technology would permanently reduce the total volume of contaminant. Any amount of contaminant oxidized would not be available for further contamination, but some secondary product contamination is expected. Also, the resulting polar compounds created by the oxidation of DRPH will be quantifiable by the NWTPH-Dx method, possibly preventing regulatory closure.

7.2.2.6 Alternative 6: Monitored Natural Attenuation

As with the No Action alternative, the MNA alternative by its self provides no contaminant destruction beyond natural biodegradation.

7.2.2.7 Alternative 7: Barrier Wall

This alternative would provide for no further permanent destruction of contamination, but may provide a regimen for enhancing contaminant removal with groundwater pump and treat.

7.2.2.8 Alternative 8: Institutional Controls (Environmental Covenant)

The health and safety and land use provisions documented in the EC would be permanently institutionalized at the Site until the property owner petitions Ecology to remove it once an NFA for unrestricted land use is obtained.

7.2.3 Long-term Effectiveness

The long-term effectiveness of each alternative is as follows:

7.2.3.1 Alternative 1: No Action

The no-action alternative does not eliminate or reduce the potential for exposure.

7.2.3.2 Alternative 2: Excavation and Disposal

Excavation of contaminated soil from within the saturated zone and soil/groundwater smear zone has had a significant positive effect. It is not cost effective in removing all of the remaining soil and groundwater contamination but provides the most long-term effectiveness of all the alternatives.

7.2.3.3 Alternative 3: Groundwater Pump and Treat

This alternative is effective in permanently removing contaminants from groundwater and is currently operating at the Site.

7.2.3.4 Alternative 4: Biodegradable Solvent

This technology is not expected to remediate all of the contamination and therefore would be limited in long-term reliability.

7.2.3.5 Alternative 5: In Situ Chemical Oxidation

Any amount of hydrocarbon removed by this technology would be permanently removed and would assist in long-term reliability. It typically does not remove all of the contaminants and does create polar compounds during the oxidation of DRPH.

7.2.3.6 Alternative 6: Monitored Natural Attenuation

MNA does not actively remove contaminants, but does monitor the volume and rate of contaminant destruction by natural processes.

7.2.3.7 Alternative 7: Barrier Wall

If installed, a barrier wall can serve as a permanent alternative for containment and to aid in the collection and removal of subsurface contaminants.

7.2.3.8 Alternative 8: Institutional Controls (Environmental Covenant)

The EC will have no effect on the reduction of contamination at the site. However, it will stay on the title of the property until it is removed by obtaining a No Further Action determination. Therefor, it will effectively govern land use restrictions and provide the necessary health and safety protection to construction workers during its lifespan.

7.2.4 Implementability

Technical and administrative implementability would increase as the complexity of the action increases. The relative implementability of each alternative is described below.

7.2.4.1 Alternative 1: No Action

This alternative can be readily implemented, as it involves no action; Site conditions would not be modified from their current state.

7.2.4.2 Alternative 2: Excavation and Disposal

A significant amount of excavation of vadose zone soil has been completed at the Site. Most of the remaining contaminated soil is in the saturated zone, is present at depths of 8 feet or more, and present at offsite locations. Implementation of this alternative in the saturated zone would involve excavations up to 20 feet in depth and access to offsite areas. There may be a shallow source of contamination near MW14 based on persistent GRPH and benzene concentrations in groundwater samples collected during semi-annual sampling. If warranted, this remedial excavation would be at similar depths as the 2019 since bedrock is documented to be relatively shallow near this well. A probe investigation designed to delineate the extent of this contamination would assist in the planning and implementation of the this source removal activity.

7.2.4.3 Alternative 3: Groundwater Pump and Treat

This technology is currently being implemented at the Site and has been proven to be effective in contaminant removal and containment.

7.2.4.4 Alternative 4: Biodegradable Solvent

Existing wells at the Site could provide access for completing biodegradable solvent remediation within the contaminated zone. Implementing this technology would be an involved process. Significant testing would be required to determine the best surfactant to mobilize the contaminant. Not all of the contamination could be removed by this alternative.

7.2.4.5 Alternative 5: In Situ Chemical Oxidation

This technology is dependent on different chemicals working together to oxidize and reduce contamination. The theory is simple; oxidation reduces contaminant volume and produces water and carbon dioxide as byproducts. There are many potential complications with chemical oxidation, with other elements and molecules present within the contaminants and the oxidants used in the process.

This could certainly be completed at the Site using the existing well network to introduce the oxidants. The introduced oxidants should migrate through the subsurface in a manner similar to the contaminants. However, since offsite areas such as the PUD facility do not have wells, it may have limited implementability.

7.2.4.6 Alternative 6: Monitored Natural Attenuation

MNA is easily implemented since an adequate monitoring well system is installed at the Site.

7.2.4.7 Alternative 7: Barrier Wall

A barrier wall at either the downgradient northern Site boundary or below Worthen Street near the river seeps would be very difficult to implement. The large alluvial boulders that have been encountered in Site excavations will likely preclude the installation of a sheet pile wall or a narrow trench that would be filled with sheet piling or a material such as low-density concrete. Underground utilities and backfilled materials are also present in these areas. This alternative would also require considerable monitoring down gradient and of the lateral wall endpoints to assure that contaminates were not migrating beneath or around the wall. Also, given that contaminants flow along preferential pathways at or near the surface of the underlying bedrock, getting a good bottom seal may not be obtainable or verifiable without subsequent monitoring.

7.2.4.8 Alternative 8: Institutional Controls (Environmental Covenant)

Implementation of an EC requires completing paperwork and documentation and obtaining the necessary signatures.

7.2.5 Implementation Risk

The relative short term implementation risk of each alternative is provided as follows:

7.2.5.1 Alternative 1: No Action

There is no implementation risk associated with this alternative.

7.2.5.2 Alternative 2: Excavation and Disposal

Further excavation of contaminated soil from within the soil/groundwater smear zone would clean up contamination. Short term worker risk would increase due to opening up the excavation and potential worker exposure to the contaminants. Some implementation risk is expected in that if excavation to

below the smear zone occurs, some contaminant could be released to areas downgradient of the excavation. Higher horizontal hydraulic conductivity is possible at the greater depth causing the remaining contaminant to travel with groundwater.

7.2.5.3 Alternative 3: Groundwater Pump and Treat

No further implementation risk is expected from pumping and treating, because the monitoring wells have already been installed at the Site.

7.2.5.4 Alternative 4: Biodegradable Solvent

No short-term implementation risk is expected from introducing solvent if the existing wells are used. However, introducing solvent could lead to accelerated contaminant migration which may not be containable by the existing well system, potentially leading to releases to the Columbia River.

7.2.5.5 Alternative 5: In Situ Chemical Oxidation

No short-term implementation risk is expected from introducing oxidants if the existing wells are used.

7.2.5.6 Alternative 6: Monitored Natural Attenuation

There is no implementation risk associated with this alternative.

7.2.5.7 Alternative 7: Barrier Wall

Short term worker risk would be increased due to potential worker exposure to contamination. Since the barrier wall would produce little or no contaminated media, less worker risk would be present than in Excavation and Disposal.

7.2.5.8 Alternative 8: Institutional Controls (Environmental Covenant)

There is no implementation risk associated with this alternative.

7.2.6 Cost Comparison

7.2.6.1 Alternative 1: No Action

There are no costs associated with implementing this alternative.

7.2.6.2 Alternative 2: Excavation and Disposal

Excavation of contaminated soil from within the saturated zone and soil/groundwater smear zone in the Uplands area has had a significant positive effect. Unfortunately, due to the dip of the bedrock, this smear zone north of Chehalis Street is at depths that are too deep to remove cost effectively.

Further excavation of contaminated soil from within the soil/groundwater smear zone would clean up a contamination, but costs would be prohibitive. Contaminants in the saturated zone at the north, downgradient edge of the property extend to depths of 25 feet (MW17) and 30 feet beneath South Worthen Street near the seeps (BH-3). Previous excavations have encountered large unmovable alluvial boulders that are likely to further complicate excavation at both onsite and offsite areas. Excavation beneath the PUD facilities would require demolition and likely reconstructing the facility. The cost of implementing this alternative onsite would exceed $1,000,000. Implementation beyond the Property would likely be in the tens of millions of dollars.

Localized remedial excavation in the Uplands area near MW14 where persistent elevated GRPH and benzene concentrations are seen in groundwater samples is recommended. This area of the Site appears to be the remaining source of GRPH and benzene at the site. Removal of this source material would mitigate the primary remaining vapor intrusion issue at the Site. The cost for performing a probe investigation to delineate the extent of soil that needs to be excavated and the costs for the remedial excavation, disposal and backfill (and possibly replacement of MW14) would cost less than $100,000.

7.2.6.3 Alternative 3: Groundwater Pump and Treat

The Site's groundwater treatment system was upgraded in 2020. The new system was activated in August 2020 and recirculates treated water into sumps located in the Uplands area of the Site instead of discharging it into the City of Wenatchee's sanitary sewer system. The treated water is enriched with oxygen using hydrogen peroxide (H202) and then discharged into one or more of the sumps that were placed in the Uplands area during remedial excavations in 2017 and 2019. This creates a closed loop system designed to enhance the biologic degradation of residual hydrocarbons at the Site.

This remediation system has already been constructed and has been proven to be effective at containing the spread of contamination and protecting the Columbia River. Associated costs for this system are O&M monitoring, replacement of GAC and bag filters, hydrogen peroxide, and maintenance. Annual operation, maintenance, monitoring and reporting costs are approximately $100,000 a year.

7.2.6.4 Alternative 4: Biodegradable Solvent

If the existing well network and remediation system is used to introduce solvents, costs are somewhat ameliorated, however a considerable amount of testing would be necessary to choose the best and safest solvent to mobilize contamination. Additional wells for monitoring and capture of the mobilized contaminates may also be needed, as well as an agreement with the City of Wenatchee to continue to dispose of treated groundwater impacted by the surfactants. Additional permitting (i.e., underground injection) would be required. Although these variables have not been thoroughly assessed, the costs of implementing the alternative could easily be in the 100's of thousands of dollars. These costs are very high for a cleanup method that could cause uncontrolled mobilization of the contaminants.

7.2.6.5 Alternative 5: In Situ Chemical Oxidation

As with Alternative 4, use of the existing well network to introduce oxidants reduces costs for implementation. Testing and monitoring will be required to identify the optimum oxidation compounds and multiple applications may be necessary. Additional permitting will likely be required. Unlike Alternative 4, oxidation is not likely to mobilize contaminants. Implementation of this technology is expected to be in the $100,000 to $300,000 range.

7.2.6.6 Alternative 6: Monitored Natural Attenuation

MNA costs are based on the cost of groundwater monitoring and reporting. The current quarterly groundwater monitoring program has been in place for a year and costs should be considered reasonable. Using the currently established or somewhat reduced monitoring network, monitoring MNA will be approximately $30,000 per year for semi-annual monitoring.

7.2.6.7 Alternative 7: Barrier Wall

Due to the same subsurface complications as described for the Excavation and Disposal alternative, installing a barrier wall at the northern Site boundary or under South Worthen Street the costs of implementing this option are likely to be prohibitive and it is likely to be unsuccessful. Permitting and bonding will also be required. Costs of implementation of this alternative could exceed $1,000,000.

7.2.6.8 Alternative 8: Institutional Controls (Environmental Covenant)

The costs to prepare and implement the EC would not exceed $10,000. The EC will likely require routine monitoring to ensure that contaminant concentrations don't increase or affect surface water quality in the Columbia River. The costs for the long-term monitoring depends on the frequency of the

monitoring and the number of samples required. This monitoring would likely not exceed $10,000 per year.

7.3 Comparative Analysis of Remedial Action Alternatives

This section includes a more focused comparison of the alternatives to support selection of a preliminary alternative. A review of each of the seven alternatives, including No Action, Excavation and Disposal, Groundwater Pump and Treat, Biodegradable Solvent, In Situ Chemical Oxidation, Monitored Natural Attenuation, and Barrier Wall is provided. Taking into consideration protectiveness, permanence, long-term effectiveness, implementability, implementation risk, and cost, each of the alternatives will be considered in this section.

In support of the comparison, Table 6 was prepared to screen the alternatives including a beneficial cost analysis. Benefits were evaluated on a scale of 1 to 5 with 1 having the least benefit and 5 having the most. Costs were evaluated on a scale of 1 to 5 with 1 being the cheapest and 5 being the most expensive.

In an effort to make the best choice, the comparison may take elements out of several of the alternatives to form a best fit for the preliminary chosen remedial alternative. In accordance with WAC 173-340-360 the preferred order of alternative choices incorporates contaminant recycling, destruction/detoxification, immobilization/solidification, on-site/off-site disposal (in a lined facility), on-site isolation/containment (with engineering controls) and institutional controls, with monitoring.

Table 6 sums each of the alternatives on the basis of protectiveness, permanence, long-term effectiveness, implementability, implementation risk and reasonableness of cost. The sums are provided for the total of all of the components. For each alternative, the above criteria are assigned a value of 1 to 5. The values are weighted in that where there is a large difference between the criteria for each alternative, there is a corresponding large difference in the value assigned (e.g., the difference in cost for MNA verses excavation and disposal is reflected in a large difference in the value assigned). The results provided are based on the best judgment of HydroCon.

Based on the results of the evaluation, groundwater pump and treat and MNA have the highest number of points. These alternatives appeared to be attractive, in part, because one year of monitoring indicates that contaminate volume is decreasing and is not migrating. Additionally, the more aggressive remedial actions have aspects that could chemically or physically change the state of the contaminant to be amenable to movement with water (Alternative 4 and 5) or are cost prohibitive due to physical and logistical aspects (Alternatives 2 and 7).

8.0 SELECTED REMEDY AND IMPLEMENTATION

In accordance with the requirements of Exhibit B – Scope of Work and Schedule of Agreed Order No. DE 15389, this study has evaluated the feasibility of the alternatives listed above.

Several interim remedial actions have been performed at the site including extensive remedial excavation at two key source areas (point of the R99 release at the loading rack and around the CVB and Tank Farm B) and the installation of the groundwater pump, treat and recirculation system. These actions have been effective at removing source material and free product, managing groundwater levels below the elevation of the Columbia River and capturing and treating contaminated groundwater before it discharges into the Columbia River, and reducing the dissolved phase concentrations of GRPH, DRPH and BTEX in groundwater at the site. These actions have resulted in the removal of as much of the free product as practical and the elimination of observed hydrocarbon sheen in the river. Two exposure pathways documented in the CSM need to be addressed including the direct contact pathway in the uplands area and the vapor intrusion pathway.

Although the State of Washington views all groundwater as potential potable water supply sources, it's unrealistic to consider the shallow aquifer underlying the Site as ever being one considering the very low yield rates measured during aquifer testing as well as proximity to known historic sources of contamination such as the railroad, the PUD facility, and the subject site's long history as a bulk fuel handling facility. Since there's no beneficial use of groundwater (potable water supply wells) the primary focus is to protect the surface water receptor (Columbia River) from the discharge of petroleum impacted groundwater. The active pump, treat and recirculation system has proven to be effective at containment, control and remediation of petroleum impacted groundwater at the site.

In addition, the potential future use of the Site may include construction of a building along with associated utility lines. The area where construction is possible is in the uplands area where contaminated soil remains above the CUL at depths within the direct contact pathway. This contamination is generally located within a narrow depth range between the top of the saturated zone and Chumstick formation (i.e., smear zone). It's not practical to remove this soil by excavation. The soil contamination is expected to degrade with time as groundwater concentrations are reduced below their respective CULs. The use of an EC appears to be the most logical solution until groundwater cleanup is achieved.

8.1 **Preliminary Recommended Remedial Action Alternative**

Based on the comparative evaluation of the remedial action alternatives Alternative 3 (Groundwater Pump and Treat) and Alternative 6 (MNA) rate the highest next to Alternative 2, based on points

received for weighted benefits. However, Alternative 2 should only be considered as a remedial action in the Uplands area due to the depth of contamination. The depth of PCS in the northern portion of the site is too deep to warrant this remedial method.

These recommended alternatives discussed below were chosen, in part, based on their demonstrated effectiveness over the last two years as well as their weighted benefits and costs.

Alternative 2 (Excavation and Disposal), a localized remedial excavation near MW14, is recommended to remove the remaining source of GRPH and associated VOCs. It was initially believed that the concentration of these constituents was due to the well location being downgradient of MW13 and that the removal of the source at the CVB and former Tank Farm B would reduce these concentrations. The concentration of GRPH in the well has not shown much improvement. Therefore, removal of this source of GRPH and related VOCs is expected to reduce these COCs below their respective CULs in groundwater. If successful, it would likely eliminate vapor intrusion concerns at the Site.

Alternative 3 (Groundwater Pump and Treat) has demonstrated that contaminant concentrations are decreasing and migration to the river is being controlled. This alternative provides long term control and successful attenuation of the contaminants. The application of low concentrations of hydrogen peroxide as a means to increase the dissolved oxygen content appears to have a localized effect near the point of application. Based on the results of groundwater monitoring, the wells near the sumps where the treated water is being applied shows elevated dissolved oxygen content. However, the application of a relatively small amount of treated water to the Uplands is unable to overcome the low oxygen (reduced) background conditions throughout the site.

Alternative 6 (MNA), includes quarterly groundwater monitoring of existing onsite and offsite wells and adds analysis of attenuation parameters to the testing for contaminant. The cost of adding Alternative 6 to Alternative 3 is minimal and provides important information to help assess the rate of attenuation. HydroCon's preliminary recommendation for site remediation is to continue Groundwater Pump and Treat and perform additional testing for MNA. Approximately one year after completion of the remedial excavation near MW14 has been completed, HydroCon recommends turning of the recirculation system to assess if rebound in contaminant concentrations in groundwater occurs. If so, the system will be restarted. If not, MNA will replace the recirculation system.

While relative costs of all the alternatives have been developed in this FFA, the details of implementing the preliminary recommend alternatives will be developed once the alternatives have been approved. These details may include, at least in part, the frequency and numbers of wells used for pump and treat, the frequency and number of wells used for monitoring, and the frequency and methods used for river monitoring. As noted in the following section, the restoration time frame is

expected to be lengthy and reducing costs while being protective will play an important role in developing the implementation of these recommended alternatives.

9.0 QUALIFICATIONS

HydroCon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. HydroCon makes no warranties, either expressed or implied, regarding the findings, conclusions or recommendations. Please note that HydroCon does not warrant the work of laboratories, regulatory agencies, or other third parties supplying information used in the preparation of the report.

Findings and conclusions resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, non-detectable or not present during these services, and we cannot represent that the Site contains no hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during monitoring. Subsurface conditions may vary from those encountered at specific sampling locations or during other surveys, tests, assessments, investigations, or exploratory services; the data, interpretations and findings are based solely upon data obtained at the time and within the scope of these services.

This report is intended for the sole use of **Coleman Oil Company** to meet the requirements of Exhibit B – Scope of Work and Schedule of the Agreed Order. This report may not be used or relied upon by any other party without the written consent of HydroCon or as mandated by the Agreed Order. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings, conclusions, or recommendations is at the risk of said user.

The conclusions presented in this report are, in part, based upon subsurface sampling performed at selected locations and depths. There may be conditions between borings or samples that differ significantly from those presented in this report and which cannot be predicted by this study.

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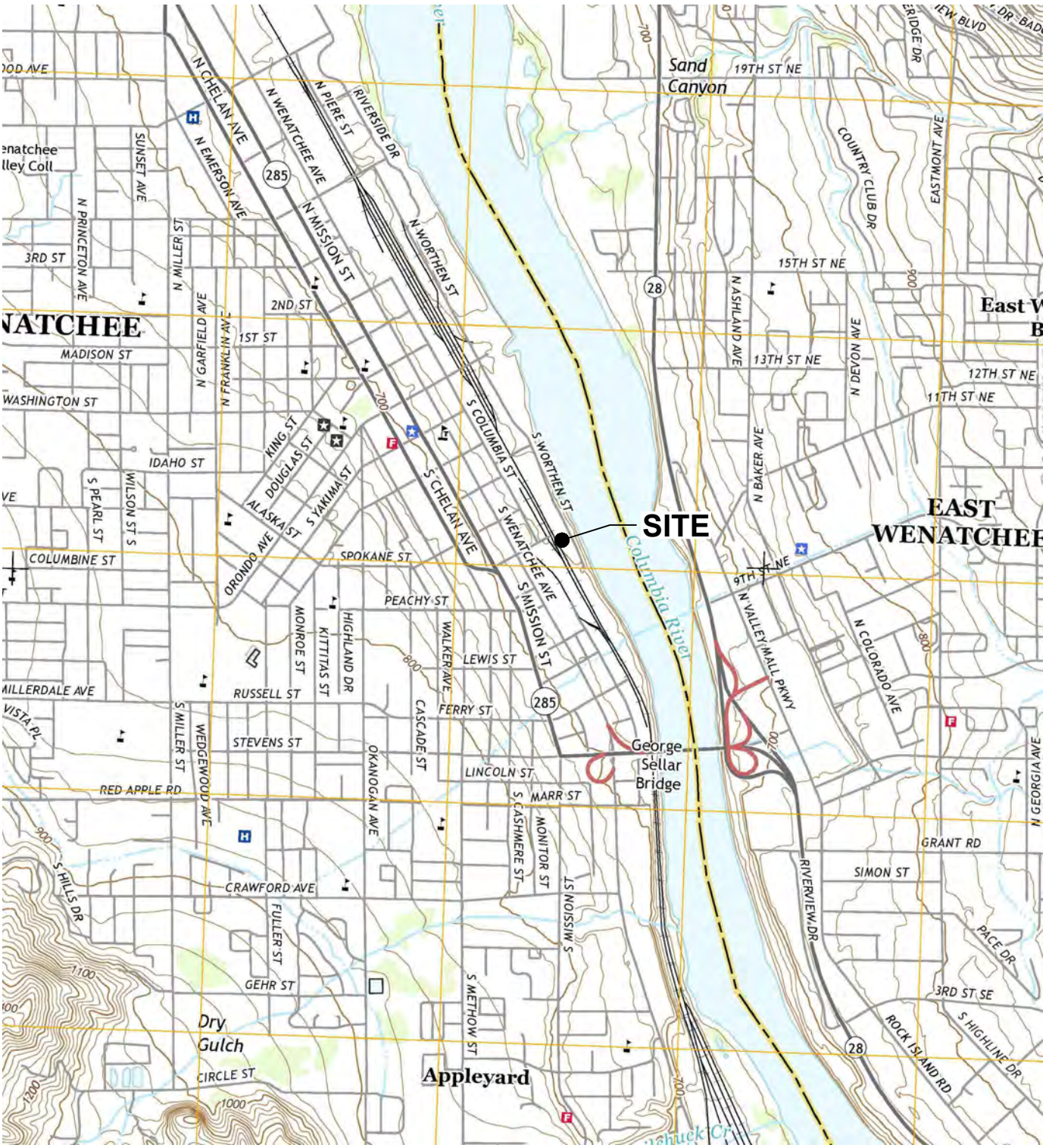
FIGURES



NOTE(S):
USGS, WENATCHEE QUADRANGLE
WASHINGTON
7.5 MINUTE SERIES (TOPOGRAPHIC)

0 2000 4000
SCALE IN FEET
1" = 2000'

N
W E
S

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 10-18-18
DWN: JJT
CHK: RH
APPROVED: RH
PRJ. MGR: CH
PROJECT NO: 2017-074

FIGURE 1
SITE LOCATION MAP

COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

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LEGEND

- Road
- Railroad
- Former Dry Well
- MW-1 — Monitoring Well (FARALLON)
- MW12 — Monitoring Well (HydroCon)
- BH-1 — Monitoring Well (EPI, 2017)
- RW-1 — Recovery Well (FARALLON)
- FB-3 — Boring Locations
- SUMP#6 — Sump
- Containment Booms
- TP01 — Test Pit Locations
- Sediment Sample Locations
- Attempted Sediment Sample Location

MW22
MW21
MW24
MW10R
MW25
MW26
BH-3
MW27
RW-1
FB-9
MW20
MW28
BH01R
MW29
MW19
MW30
BH-2
SL05
FB-8
MW31
MW09R
FB-7
FB-3
MW17
MW32
CHEHALIS ST.
MW16
MW18
MW-8
Excavated Areas
SUMP#5
HC02
FB-11
FB-4
MW-11
SUMP#6
FB-10
Former Storage Building
FB-5
SUMP#3
East-West Trench
North-South Trench
MW15
Former Main Office and Warehouse Building
HC12
MW14
SUMP#2
MW-6
MW-7
MW23
Former Truck Loading Rack
East-West Trench 2
HC01
FB-6
MW-5
TP08
MW-4
West Trench
SUMP#1
TP07
HC10
EPT2
SUMP#4
MW-2 /FB-2
Former Product Lines
HC08
2019 Remedial Excavation
HC11
Former Tank Farm B Fuel and Oil ASTs
HC09
MW13R
Drum Spill Excavation
HC07
HC06
UST Access
TP03
TP06
TP02
TP05
HC05
2013 Remedial Excavation
Former Pipe Load/Unload
TP01
TP04
HC04
MW01S
MW-1/FB-1
Control Valve Building
HC03
Former Above Ground Pumps
MW03S
Tank Farm A Fuel ASTs
MW-3
Former Dispenser Island
Cardlock Dispenser Island
MW12
Upriver Primary Containment Boom
Downriver Primary Containment Boom
River Level Gage
SL04
SL03
SL02
SL01
SS01
SS02
SS03
SS04
SS05
SS06
SS07
SS08
COLUMBIA RIVER
River Bank
S WORTHEN ST.

FIGURE 2
SITE FEATURES

COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

DATE: 10-10-19
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2017-074

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

SCALE IN FEET
1" = 50'
0 50 100

N W E S

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MW22
MW21
MW24
MW10R
MW25
MW26
BH-3
MW27
RW-1
FB-9
MW20
MW28
BH01R
MW29
MW19
MW30
BH-2
SL05
FB-8
MW31
MW09R
FB-7
FB-3
MW17
MW32
MW16
CHEHALIS ST.
MW-8
2017 Remdial Excavation
SUMP#5
HC02
FB-11
FB-4
MW-11
SUMP#6
FB-10
SUMP#3
Former Main Office and Warehouse Building
HC12
MW14
SUMP#2
MW-6
East-West Trench 2
West Trench
SUMP#1
HC10
HC08
2019 Remedial Excavation
SUMP#4
HC11
Former Tank Farm B Fuel and Oil ASTs
HC09
MW13R
HC07
HC06
TP03
TP02
TP06
Former Pipe Load/Unload
TP05
TP01
HC05
TP04
HC04
HC03
Former Control Valve Building
Former Above Ground Pumps
Tank Farm A Fuel ASTs
MW03S
MW-3
Former Storage Building
East-West Trench
North-South Trench
MW-7
MW23
HC01
TP08
TP07
MW-4
MW-2 /FB-2
Former Underground Product Lines
2018 Drum Spill Excavation
UST Access
2013 Remedial Excavation
MW01S
MW-1/FB-1
Former Dispenser Island
Cardlock Dispenser Island
MW12
Truck Parking
Upriver Primary Containment Boom
Downriver Primary Containment Boom
River Level Gage
SL04
SL03
SL02
SL01
SS06
SS01
SS07
SS04
SS08
SS05
SS02
SS03
MW18
MW15
FB-5
FB-6
MW-5
COLUMBIA RIVER
River Bank
S WORTHEN ST.

LEGEND

- Road
- Railroad
- Former Dry Well
- MW-1 — Monitoring Well (FARALLON)
- MW12 — Monitoring Well (HydroCon)
- BH-1 — Monitoring Well (EPI, 2017)
- RW-1 — Recovery Well (FARALLON)
- FB-3 — Boring Locations
- SUMP#6 — Sump
- Containment Booms
- TP01 — Test Pit Locations
- Sediment Sample Locations
- Attempted Sediment Sample Location
- Locations of DRPH in Soil Above CUL

FIGURE 3
DIESEL DRPH IN SOIL ABOVE CUL

COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

DATE: 10-23-19
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2017-074

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

SCALE IN FEET
1" = 50'
0 50 100

N W E S

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MW22
MW21
MW24
MW10R
MW25
MW26
BH-3
MW27
RW-1
FB-9
MW20
MW28
BH01R
MW29
MW19
MW30
BH-2
SL05
FB-8
MW31
MW09R
FB-7
FB-3
MW17
MW32
CHEHALIS ST.
MW16
MW-8
Excavated Areas
SUMP#5
HC02
FB-11
FB-4
MW-11
SUMP#6
FB-10
Former Storage Building
FB-5
SUMP#3
East-West Trench
North-South Trench
MW15
Former Main Office and Warehouse Building
HC12
MW14
SUMP#2
MW-6
MW-7
MW23
Former Truck Loading Rack
East-West Trench 2
HC01
FB-6
MW-5
TP08
MW-4
West Trench
SUMP#1
TP07
EPT2
HC10
HC08
SUMP#4
MW-2 /FB-2
Former Product Lines
2019 Remedial Excavation
HC11
Former Tank Farm B Fuel and Oil ASTs
HC09
MW13R
Drum Spill Excavation
HC07
HC06
UST Access
TP03
TP06
Former Pipe Load/Unload
TP02
TP05
HC05
2013 Remedial Excavation
TP01
TP04
HC04
MW01S
Control Valve Building
HC03
MW-1/FB-1
Former Above Ground Pumps
MW03S
Tank Farm A Fuel ASTs
MW-3
Former Dispenser Island
Cardlock Dispenser Island
MW12
S WORTHEN ST.
River Bank
COLUMBIA RIVER
Upriver Primary Containment Boom
River Level Gage
Downriver Primary Containment Boom
SS04
SS06
SS01
SS07
SS08
SS05
SS02
SS03
SL04
SL03
SL02
SL01
MW18

LEGEND

- Road
- Railroad
- Former Dry Well
- MW-1 — Monitoring Well (FARALLON)
- MW12 — Monitoring Well (HydroCon)
- BH-1 — Monitoring Well (EPI, 2017)
- RW-1 — Recovery Well (FARALLON)
- FB-3 — Boring Locations
- SUMP#6 — Sump
- Containment Booms
- TP01 — Test Pit Locations
- Sediment Sample Locations
- Attempted Sediment Sample Location
- Locations of GRPH in Soil Above CUL

FIGURE 4
GRPH IN SOIL ABOVE CUL

COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

DATE: 10-9-19
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2017-074

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

SCALE IN FEET
1" = 50'
0 50 100

N W E S

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LEGEND

- Road
- Railroad
- MW-1 — Monitoring Well (FARALLON)
- MW12 — Monitoring Well (HydroCon)
- BH-1 — Monitoring Well (EPI, 2017)
- RW-1 — Recovery Well (FARALLON)
- MW-4 — Decommissioned Wells
- SL04 — Shoreline Sample Locations
- Containment Booms
- 626.36 — Groundwater Surface Elevation
- 630 — Groundwater Elevation Contour
- Approximate Groundwater Flow Direction

MW22 617.20
620
MW21 624.32
Upriver Primary Containment Boom
625
MW24 621.07
MW10R 626.36
630
MW25 633.14
SL04
SL03
SL02
SL01
635
MW26 634.62
BH-3 631.95
MW27 629.14
RW-1 628.70
MW20 638.74
MW28 629.75
640
BH01R 630.74
Downriver Primary Containment Boom
MW29 632.01
MW19
MW30 619.34
BH-2 627.09
MW31 623.03
COLUMBIA RIVER
MW09R 641.55
644.58 MW32
MW17 642.54
MW18
MW16
645
CHEHALIS ST
MW-8 643.80
2017 Remdial Excavation
SUMP#5
Former Storage Building
SUMP#6
MW-11 644.86
SUMP#3
East-West Trench
North-South Trench
MW15
Former Main Office and Warehouse Building
MW14 649.46
SUMP#2
MW-6 648.59
MW-7 648.48
MW23 648.30
Former Truck Loading Rack
East-West Trench 2
MW-5 619.13
TP08
SUMP#1
West Trench
MW-4 642.69
TP07
SUMP#4
MW-2 648.90
Former Underground Product Lines
Former Tank Farm B Fuel and Oil ASTs
2019 Remedial Excavation
MW13R 649.78
650
2018 Drum Spill Excavation
UST Access
Former Pipe Load/Unload
RE-EAST
RE-WEST
2013 Remedial Excavation
648.47 MW01S
Former Control Valve Building
MW-1 648.90
Former Above Ground Pumps
651.26 MW03S
Tank Farm A Fuel ASTs
MW-3 651.67
Cardlock Dispenser Island
Former Dispenser Island
S WORTHEN ST.
651.44 MW12
Truck Parking
River Bank

FIGURE 5
GROUNDWATER ELEVATION CONTOURS
FOR (MARCH 2, 2022)
COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

DATE: 2-27-22
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2017-074

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

0 50 100
SCALE IN FEET
1" = 50'

N W E S

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MW22
MW21
1,650
MW24
883
MW10R
1,940
MW25
MW26
BH-3
MW27
RW-1
MW20
2,130
MW28
381
BH01R
2,180
MW29
3,120
MW30
1,650
MW19
SL05
H-2
1,760
MW31
MW09R
4,290
MW17
3,000
338
MW32
CHEHALIS ST
MW16
MW-8
3,390
2017 Remdial Excavation
SUMP#5
SUMP#6
MW-11
2,480
SUMP#3
MW14
1,000
SUMP#2
MW-6
904
East-West
Trench 2
SUMP#1
TP08
TP07
SUMP#4
West
Trench
Former Tank Farm B
Fuel and Oil ASTs
2019 Remedial Excavation
MW13R
703
Former Pipe Load/Unload
RE-EAST
RE-WEST
Former Control Valve Building
Former Above Ground Pumps
Tank Farm A Fuel ASTs
MW03S
MW-3
MW12
Truck
Parking
Former
Storage
Building
Former Main Office
and Warehouse
Building
East-West
Trench
North-South
Trench
MW-7
MW23
MW-4
MW-2
COMPRESSOR/CONTROL
ROOM
Former Underground Product Lines
2018 Drum Spill Excavation
UST Access
2013 Remedial Excavation
MW01S
MW-1
Former
Dispenser
Island
Cardlock
Dispenser
Island
S WORTHEN ST.
MW18
MW15
MW-5
COLUMBIA RIVER
River Bank
Upriver Primary
Containment Boom
Downriver Primary
Containment Boom
?

LEGEND

- Road
- Railroad
- MW-1 — Monitoring Well (FARALLON)
- MW12 — Monitoring Well (HydroCon)
- BH-1 — Monitoring Well (EPI, 2017)
- RW-1 — Recovery Well (FARALLON)
- MW-4 — Decommissioned Wells
- SL04 — Shoreline Sample Locations
- Containment Booms
- 1,750 — DRPH Concentration ug/L
- FP = — Free Product
- >2,000 ug/L
- 1,000-2,000 ug/L
- 500-1,000 ug/L
- Area of seeps in contact with impacted soil
- MTCA Method A Cleanup Level for DRPH = 500 ug/L

FIGURE 6A
DRPH IN GROUNDWATER
FOR (MARCH 2022)
COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

DATE: 3-20-23
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO:
2017-074

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

SCALE IN FEET
0 50 100
1" = 50'

N W E S

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LEGEND

- Road
- Railroad
- MW-1 — Monitoring Well (FARALLON)
- MW12 — Monitoring Well (HydroCon)
- BH-1 — Monitoring Well (EPI, 2017)
- RW-1 — Recovery Well (FARALLON)
- MW-4 — Decommissioned Wells
- SL04 — Shoreline Sample Locations
- Containment Booms
- 7,040 — DRPH Concentration ug/L
- >2,000 ug/L
- 1,000-2,000 ug/L
- 500-1,000 ug/L
- Area of seeps in contact with impacted soil
- MTCA Method A Cleanup Level for DRPH = 500 ug/L

MW22
MW21 1,400
MW24 696
MW10R 2,960
?
MW25 302
MW26 591
BH-3 1,850
MW27 185
RW-1 <74.8
FB-9
MW20 2,190
MW28 1,370
BH01R 13,600
MW29 2,930
MW19 4,300
MW30 612
SL05
BH-2 5,310
FB-8
MW31 <74.8
MW09R 5,690
FB-7
FB-3
MW17 2,520
296
MW32
CHEHALIS ST.
MW16 183
MW18
MW-8 2,220
Excavated Areas
SUMP#5
HC02
FB-11
SUMP#6
FB-4
MW-11 1,230
FB-10
FB-5
Former Storage Building
SUMP#3
East-West Trench
North-South Trench
MW15
Former Main Office and Warehouse Building
HC12
MW14 1,070
SUMP#2
MW-6 1,010
MW-7
MW23 339
Former Truck Loading Rack
East-West Trench 2
HC01
EPT1
FB-6
MW-5
West Trench
SUMP#1
EPT3
MW-4
HC10
EPT2
SUMP#4
2019 Remedial Excavation
HC11
MW-2
Former Product Lines
Former Tank Farm B Fuel and Oil ASTs
MW13 4,650
UST Access
Former Pipe Load/Unload
2013 Remedial Excavation
116
MW01S
MW-1/FB-1 126
Control Valve Building
Former Above Ground Pumps
MW03S <76.2
Tank Farm A Fuel ASTs
MW-3
Former Dispenser Island
Cardlock Dispenser Island
<76.2
MW12
Upriver Primary Containment Boom
Downriver Primary Containment Boom
COLUMBIA RIVER
River Bank
S WORTHEN ST.

FIGURE 6B
DRPH IN GROUNDWATER
FOR (MARCH 2019)
COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

DATE: 6-24-20
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2017-074

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

SCALE IN FEET
1" = 50'
0 50 100

N W E S

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MW22
MW21
613
Upriver Primary
Containment Boom
MW24
<100
MW10R
687
?
MW25
SL04
MW26
SL03
SL02
BH-3
MW27
SL01
RW-1
MW20
751
MW28
<100
?
BH01R
366
Downriver Primary
Containment Boom
MW29
221
MW19
MW30
<100
SL05
H-2
<100
MW31
?
MW09R
868
<100
MW32
MW17
544
CHEHALIS ST
MW16
MW18
COLUMBIA RIVER
MW-8
559
2017 Remdial Excavation
SUMP#5
Former
Storage
Building
SUMP#6
MW-11
580
East-West
Trench
North-South
Trench
MW15
SUMP#3
Former Main Office
and Warehouse
Building
MW-7
MW14
4,020
SUMP#2
MW-6
156
MW23
Former Truck
Loading Rack
East-West
Trench 2
MW-5
TP08
MW-4
West
Trench
SUMP#1
TP07
COMPRESSOR/CONTROL
ROOM
SUMP#4
MW-2
Former Underground Product Lines
Former Tank Farm B
Fuel and Oil ASTs
2018 Drum Spill Excavation
2019 Remedial Excavation
MW13R
<100
UST Access
Former Pipe Load/Unload
RE-EAST
RE-WEST
2013 Remedial Excavation
MW01S
MW-1
Former Control Valve Building
Former Above Ground Pumps
MW03S
Tank Farm A Fuel ASTs
MW-3
Former
Dispenser
Island
Cardlock
Dispenser
Island
S WORTHEN ST.
MW12
Truck
Parking
River Bank

LEGEND

- Road
- Railroad
- MW-1 — Monitoring Well (FARALLON)
- MW12 — Monitoring Well (HydroCon)
- BH-1 — Monitoring Well (EPI, 2017)
- RW-1 — Recovery Well (FARALLON)
- MW-4 — Decommissioned Wells
- SL04 — Shoreline Sample Locations
- Containment Booms
- 632 — GRPH Concentration
- 1,500-5,000 ug/L
- 800-1,500 ug/L
- 101-799 ug/L
- Area of seeps in contact with impacted soil
- MTCA Method A Cleanup Level for GRPH = 800 ug/L

FIGURE 7A
GRPH IN GROUNDWATER
FOR MARCH 2022
COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

DATE: 4-27-22
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO:
2017-074

Hydro Con
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

SCALE IN FEET
1" = 50'
0
50
100

N
W
E
S

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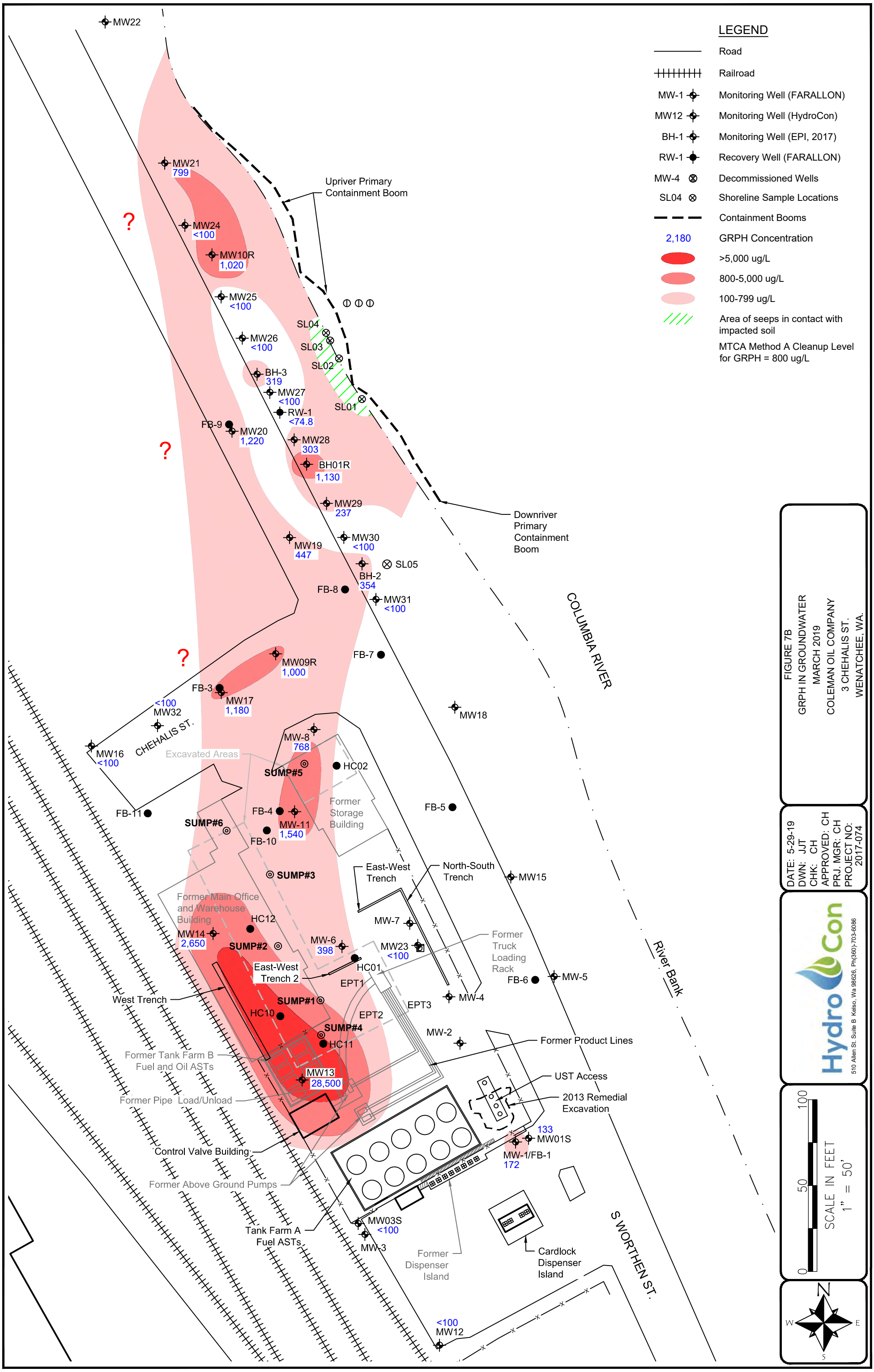

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LEGEND

- Road
- Railroad
- MW-1 — Monitoring Well (FARALLON)
- MW12 — Monitoring Well (HydroCon)
- BH-1 — Monitoring Well (EPI, 2017)
- RW-1 — Recovery Well (FARALLON)
- FB-3 — Boring Locations
- SUMP#6 — Sump
- Containment Booms
- SS01 — Sediment Sample Locations
- Documented Historic Gasoline Release Locations
- TP01 — Test Pit Locations

A'
B'
C
B
A
C'

MW22
MW21
MW24
MW10R
MW25
MW26
BH-3
MW27
RW-1
FB-9
MW20
MW28
BH01R
MW29
MW19
MW30
SL05
BH-2
FB-8
MW31
MW09R
FB-7
FB-3
MW17
MW32
CHEHALIS ST.
MW16
MW18
MW-8
Excavated Areas
SUMP#5
HC02
FB-11
SUMP#6
FB-4
MW-11
FB-10
FB-5
SUMP#3
Former Main Office and Warehouse Building
HC12
MW14
SUMP#2
MW-6
East-West Trench 2
HC01
West Trench
SUMP#1
HC10
HC08
SUMP#4
HC11
2019 Remedial Excavation
Former Tank Farm B Fuel and Oil ASTs
HC09
MW13R
HC07
HC06
TP03
TP06
Former Pipe Load/Unload
TP02
TP05
HC05
TP01
TP04
HC04
Control Valve Building
HC03
Former Above Ground Pumps
Tank Farm A Fuel ASTs
MW03S
MW-3
Former Dispenser Island
Cardlock Dispenser Island
MW12
MW-7
MW23
MW-4
TP08
TP07
EPT2
MW-2 /FB-2
MW-1/FB-1
MW01S
MW15
FB-6
MW-5
SS01
SS02
SS03
SS04
SS05
SS06
SS07
SS08
SL01
SL02
SL03
SL04
Upriver Primary Containment Boom
Downriver Primary Containment Boom
Sediment and Shoreline Investigation Area
East-West Trench
North-South Trench
Former Dry Well
Former Truck Loading Rack
KNOWN POINT OF R99 RELEASE
Former Product Lines
Drum Spill Excavation
UST Access
2013 Remedial Excavation
200 Gallons Gasoline Release (2013)
180 Gallons Gasoline Relaese (2010)
Former Storage Building
COLUMBIA RIVER
River Bank
S WORTHEN ST.

FIGURE 8
CROSS SECTION LOCATIONS

COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

DATE: 7-3-19
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2017-074

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

SCALE IN FEET
1" = 50'
0 50 100

N W E S

C:\Users\Josh\Desktop\Autocad Files\Hydrocon-Autocad\2017-074 Coleman Oil\2019\Sept 2019\2017-074_BM-090419.dwg

A'
NORTH

A
SOUTH

Chehalis St.

Former Storage Building

Elevation Feet Above Mean Sea Level (MSL)

660'
650'
640'
630'
620'
610'
600'

MW22 MW21 MW24 MW10R MW25 MW26 MW20 MW19 MW-8 Sump #5 HC02 MW-7 MW23

River Elevation (4/27/18)

River Elevation (8/31/18)

Transmissive Zone

TWD=40'
TWD=35'
TWD=30'
TWD=25'

Legend

- Water Level at time of Drilling
- Well Screen Interval
- Water Level (4/27/18)
- Water Level (8/31/18)
- Top of Chumstick Formation
- 172 PID Reading
- Sample Location
- Area of Contamination as Defined by Analytical Results and PID Readings

0 40 80
SCALE IN FEET
1" = 40'

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 11-27-18
DWN: JJT
CHK: RH
APPROVED: RH
PRJ. MGR: CH
PROJECT NO: 2017-074

FIGURE 9
CROSS SECTION A-A'

COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

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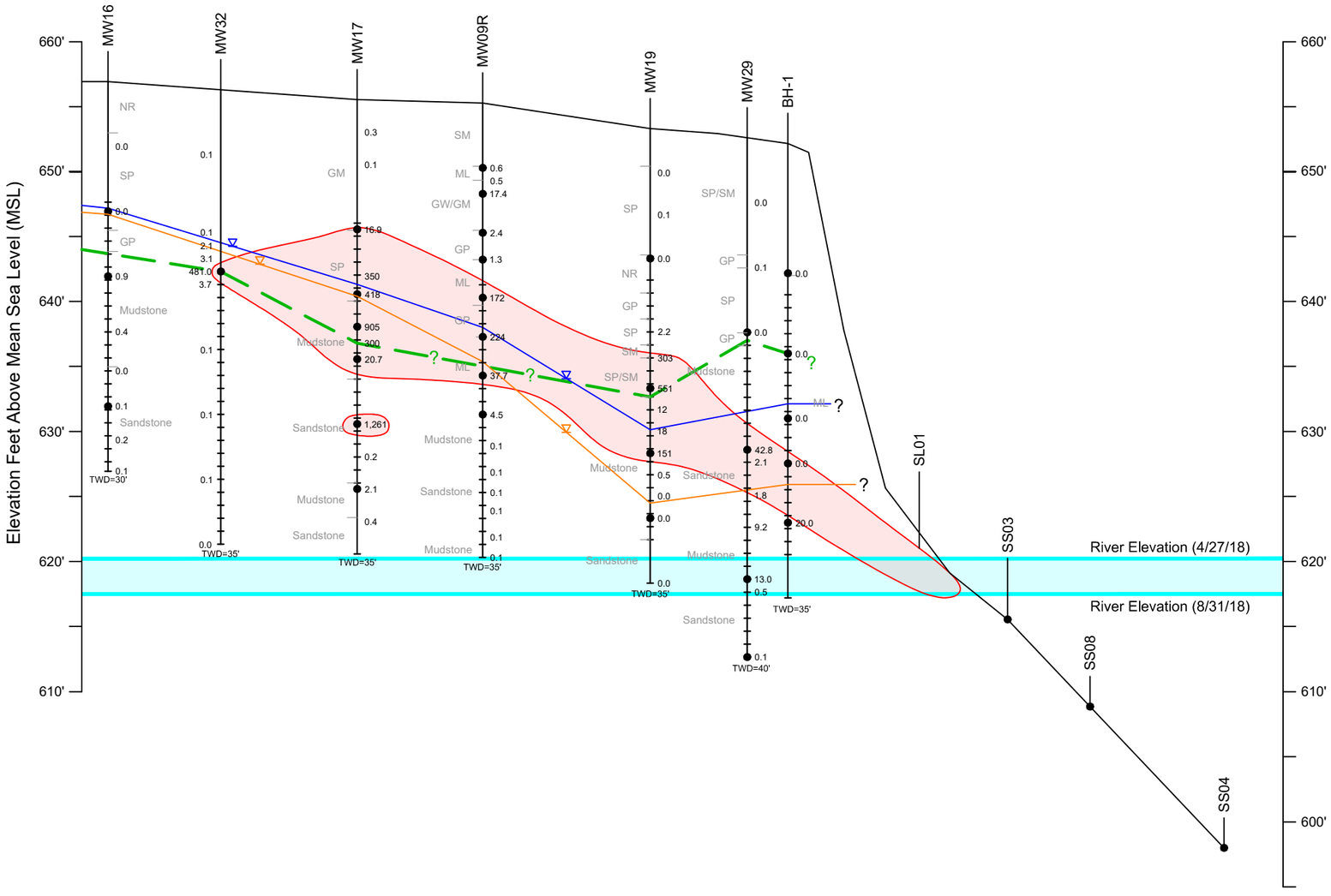
B
WEST

B'
EAST



Legend

- Water Level at time of Drilling
- Well Screen Interval
- Water Level (4/27/18)
- Water Level (8/31/18)
- Top of Chumstick Formation
- 300 PID Reading
- Sample Location
- Area of Contamination as Defined by Analytical Results and PID Readings

0 40 80

SCALE IN FEET
1" = 40'

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 7-17-19
DWN: JJT
CHK: NV
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2017-074

FIGURE 10
CROSS SECTION B-B'

COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

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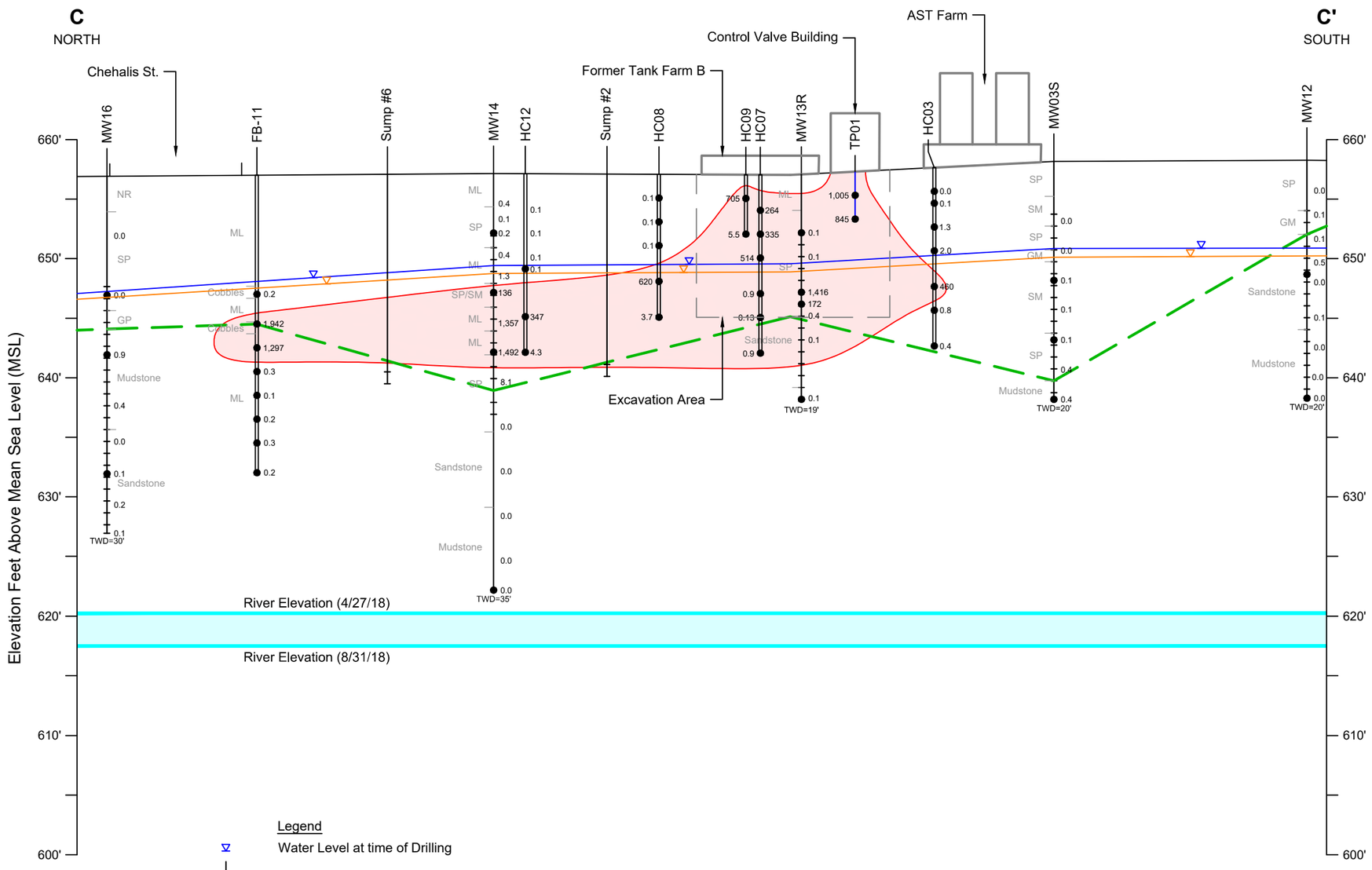

Legend

- Water Level at time of Drilling
- Well Screen Interval
- Water Level (4/27/18)
- Water Level (8/31/18)
- Top of Chumstick Formation
- 172 PID Reading
- Sample Location
- Area of Contamination as Defined by Analytical Results and PID Readings

0 40 80

SCALE IN FEET
1" = 40'

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 9-4-19
DWN: JJT
CHK: RH
APPROVED: RH
PRJ. MGR: CH
PROJECT NO: 2017-074

FIGURE 11
CROSS SECTION C-C'

COLEMAN OIL COMPANY
3 CHEHALIS ST.
WENATCHEE, WA.

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I:\Autocad Files\Hydrocon-Autocad\2017-074 Coleman Oil\2022\April 2022\2017-074_BM-042722.dwg

TABLES

Table 1

Soil Analytical Results - Fuels and BTEX
Coleman Oil
Wenatchee, Washington

			Fuels				BTEX			
			GRPH	DRPH	ORPH	DRPH + ORPH	Benzene	Toluene	Ethylbenzene	Total Xylenes
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WA MTCA Method A Cleanup Level for Soil			**30/100**	**2,000**	**2,000**	**2,000**	**0.03**	**7**	**6**	**9**
Benzene (Non Detect)			**100**							
Benzene (Detect)			**30**							
Field ID	**Sample Depth (feet)**	**Date**								
Dry Well and Conrete Box Excavation										
CMTB-3.0	3	4/3/2017	**370**	**150**	< 7.5	**150**	< 0.020	< 0.075	< 0.075	< 0.150
DRY WELL-B-5.0	5	4/3/2017	**2,400**	**2,000**	--	**2,000**	--	--	--	--
DRY WELL-E-4.0	4	4/3/2017	**2,000**	**540**	--	**540**	--	--	--	--
DRY WELL-N-4.0	4	4/3/2017	**4,400**	**1,800**	--	**1,800**	--	--	--	--
DRY WELL-S-4.0	4	4/3/2017	**580**	< 55	--	< 55	--	--	--	--
DRY WELL-W-4.0	4	4/3/2017	**1,800**	**300**	--	**300**	--	--	--	--
Fuel Line Excavation										
FUEL LINE-EX-B-6.0	6	4/3/2017	**14,000**	**< 3,300**	--	**< 3,300**	--	--	--	--
FUEL LINE-EX-E-2.0	2	4/3/2017	**58,000**	**< 6,000**	--	**< 6,000**	--	--	--	--
FUEL LINE-EX-E-3.0	3	4/3/2017	**3,400**	< 230	--	< 230	--	--	--	--
FUEL LINE-EX-N-3.0	3	4/3/2017	**3,400**	< 280	--	< 280	--	--	--	--
North-South Trench Excavation										
NS-TRENCH-1-5.0	5	4/4/2017	< 28	< 56	--	<56	--	--	--	--
NS-TRENCH-2-10.0	10	4/4/2017	**49**	< 55	--	< 55	--	--	--	--
NS-TRENCH-3-10.0	10	4/4/2017	< 28	< 55	--	<55	--	--	--	--
NS-TRENCH-4-5.0	5	4/4/2017	< 28	**61**	--	**61**	--	--	--	--
NS-TRENCH-5-10.0	10	4/4/2017	< 28	< 56	--	<56	--	--	--	--
NS-TRENCH-6-10.0	10	4/4/2017	< 28	< 55	--	<55	--	--	--	--
NS-TRENCH-7-10.0	10	4/4/2017	**6,400**	< 550	--	< 550	--	--	--	--
NS-TRENCH-8-5.0	5	4/4/2017	**94** N	**600**	--	**600**	--	--	--	--
NS-TRENCH-9-10.0	10	4/4/2017	**5,600**	< 600	--	< 600	--	--	--	--
NS-TRENCH-9-10.0-1	10	4/4/2017	**6,400**	< 570	--	< 570	--	--	--	--
East-West Trench Excavation										
EW-TRENCH-1-5.0	5	4/4/2017	< 27	< 54	--	<54	--	--	--	--
EW-TRENCH-10.0	10	4/4/2017	< 28	< 56	--	<56	--	--	--	--
EW-TRENCH-3-5.0	5	4/5/2017	< 28	< 57	--	<57	--	--	--	--
EW-TRENCH-4-10.0	10	4/5/2017	**7,700**	< 550	--	< 550	--	--	--	--
EW-TRENCH2-5-5.0	5	4/5/2017	< 28	< 55	--	<55	--	--	--	--
EW-TRENCH2-6-9.0	9	4/5/2017	< 28	< 55	--	<55	--	--	--	--
EW-TRENCH2-7-5.0	5	4/5/2017	< 27	< 54	--	<54	--	--	--	--
EW-TRENCH2-8-6.0	6	4/5/2017	< 27	< 55	--	<55	--	--	--	--
Filling Station Excavation										
FS-EX-1-6.0	6	4/6/2017	**8,700**	< 550	**540** F	**540**	**0.089**	**0.74**	**2.4**	**7.1**
FS-EX-2-4.0	4	4/6/2017	**42,000**	**2,200** N1	--	**2,200**	--	--	--	--
FS-EX-2-4.0-1	4	4/6/2017	**45,000**	**2,500** N1	--	**2,500**	--	--	--	--
FS-EX-3-2.0	2	4/6/2017	**69,000**	**5,600** N1	--	**5,600**	--	--	--	--
FS-EX-4-8.0	8	4/6/2017	**12,000**	< 660	**1,300** F	**1,300**	**0.050**	**0.071**	**3.9**	**12.7**
FS-EX-5-11.0	11	4/6/2017	**24,000**	< 730	--	< 730	--	--	--	--

Table 1

Soil Analytical Results - Fuels and BTEX
Coleman Oil
Wenatchee, Washington

			Fuels				BTEX			
			GRPH	DRPH	ORPH	DRPH + ORPH	Benzene	Toluene	Ethylbenzene	Total Xylenes
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WA MTCA Method A Cleanup Level for Soil			**30/100**	**2,000**	**2,000**	**2,000**	**0.03**	**7**	**6**	**9**
Benzene (Non Detect)			**100**							
Benzene (Detect)			**30**							
Field ID	**Sample Depth (feet)**	**Date**								
Temporary Soil Borings - Uplands Area										
HC03-07	7	1/8/2019	<5.02	<25	<50	<75	<0.0100	<0.0502	<0.0251	<0.0754
HC03-10	10	1/8/2019	**3,550**	**3,240**	<216	**3,240**	<0.179	<0.895	<0.447	<1.34
HC03-15	15	1/8/2019	<5.08	<25	<50	<75	<0.0102	<0.0508	<0.0254	<0.0762
HC04-07	7	1/8/2019	**152**	**631**	**4,640**	**5,271**	<0.0105	<0.0527	<0.0264	**1.40**
HCO4-09	9	1/8/2019	**1,070**	**6,400**	<869	**6,400**	<0.203	<1.01	<0.507	**10.2**
HC04-12	12	1/8/2019	<4.98	<25	<50	<75	<0.00996	<0.0498	<0.0249	<0.0747
HC05-10	10	1/8/2019	<5.63	**130**	**62.9**	**192.9**	<0.0113	<0.0563	<0.0281	<0.0844
HC05-12	12	1/8/2019	**101**	**2,210**	**316**	**2,526**	<0.0107	<0.0537	<0.0269	<0.0806
HC05-15	15	1/8/2019	**55.4**	<25	<50	<75	<0.0109	<0.0547	<0.0274	<0.0821
HC06-09	9	1/8/2019	**17.6**	**1,750**	<50.0	**1,750**	<0.00987	<0.0494	<0.0247	<0.0740
HC06-12	12	1/8/2019	**1,900**	**5,560**	<416	**5,560**	<0.0414	<0.207	**0.968**	**53.6**
HC06-15	15	1/8/2019	<5.28	<25	<50	<75	<0.0106	<0.0528	<0.0264	<0.0792
HC07-03	3	1/9/2018	**712**	**1,780**	<50.0	**1,780**	**0.0913**	<0.207	**0.373**	**2.17**
HC07-05	5	1/9/2018	**1,270**	**2,740**	<50.0	**2,740**	**0.159**	<0.185	**0.367**	**3.53**
HC07-15	15	1/9/2018	<4.92	<25	<50	<75	<0.00983	<0.0492	<0.0246	<0.0737
HC08-04	4	1/9/2019	<4.43	<25	<50	<75	<0.00887	<0.0443	<0.0222	<0.0665
HC08-09	9	1/9/2019	**1,260**	**9,150**	<230	**9,150**	<0.112	<0.562	<0.281	<0.843
HC08-12	12	1/9/2019	<5.35	<25	<50	<75	<0.0107	<0.0535	<0.0267	<0.0802
HC09-02	2	1/9/2019	**12,200**	**3,320**	**515**	**3,835**	**2.35**	**9.46**	**41.4**	**307**
HC10-05	5	1/9/2019	<4.92	<25	<50	<75	<0.00984	<0.0492	<0.0246	<0.0738
HC10-12	12	1/9/2019	**17.6**	**84.5**	<50.0	**84.5**	<0.0117	<0.0584	<0.0292	<0.0876
HC10-15	15	1/9/2019	<6.88	<25.0	**51.7**	**51.7**	<0.0138	<0.0688	<0.0344	<0.103
HC11-06	6	1/9/2019	<4.94	**45.0**	**1,110**	**1,156**	<0.00987	<0.0494	<0.0247	<0.0741
HC11-11	11	1/9/2019	**1,520**	**6,760**	**1,740**	**8,500**	**1.12**	<0.214	**0.567**	**34.2**
HC11-15	15	1/9/2019	<4.95	<25	<50	<75	<0.00990	<0.0495	<0.0248	<0.0743
HC12-08	8	1/9/2019	**627**	<25	<50	<75	<0.0231	<0.115	<0.0577	<0.173
HC12-12	12	1/9/2019	**1,190**	**3,790**	<439	**3,790**	<0.0113	<0.0567	0.0458	2.80
HC12-15	15	1/9/2019	<5.16	<25	<50	<75	<0.0103	<0.0516	<0.0258	<0.0774
Uplands Test Pits										
TP01-02	2	1/7/2019	**4,970**	**3,510**	**1,850**	**5,360**	**0.328**	**0.408**	**40.5**	**343**
TP02-02	2	1/7/2019	<6.06	<99.8	**1,250**	**1,250**	<0.0121	<0.0606	<0.0303	<0.0910
TP03-04	4	1/7/2019	<6.23	**119**	<50.0	**119**	<0.0125	<0.0636	<0.0311	<0.0934
TP04-02	2	1/7/2019	**47.6**	<560	**4,270**	**4,270**	<0.0138	<0.0690	**0.263**	**1.66**
TP05-02	2	1/7/2019	<5.93	**270**	<50.0	**270**	<0.0119	<0.0596	<0.0297	<0.0890
TP06-02	2	1/7/2019	<6.43	**580**	**61.1**	**641.1**	<0.0129	**0.0643**	<0.0321	<0.0964
TP07-6	6	6/20/2019	<4.95	<25	<50	<75	<0.00989	<0.0495	<0.0247	<0.0742
TP08-6	6	6/20/2019	<4.46	<25	<50	<75	<0.00892	<0.0446	<0.0223	<0.0669
Uplands Remedial Excavation										
NE-CORNER01-08	8	5/23/2019	**12.0**	**120**	**346**	**466**	<0.00985	<0.0493	<0.0246	<0.0739
NSW01-08	8	5/23/2019	<5.44	<25	<50	<75	<0.0109	<0.0544	<0.0272	<0.0816
NW CORNER01-08	8	5/23/2019	**127**	**282** F-19	**197** F-16	**479**	<0.00998	**0.102**	**0.177**	**2.44**
SE CORNER01-08	8	5/22/2019	<5.65	<25	<50	<75	<0.0113	<0.0567	<0.0283	<0.0850
SSW01-08	8	5/22/2019	<5.40	<25.0	**803**	**803**	<0.0108	<0.0540	<0.0270	<0.0810
SW CORNER01-08	8	5/22/2019	**29.0**	<1,720	**12,900**	**12,900**	<0.0111	<0.0557	**0.0455**	**0.587**
ESW01-08	8	5/22/2019	<5.77	<25	<50	<75	<0.0115	<0.0577	<0.0289	<0.0866
ESW02-08	8	5/23/2019	<5.26	<25	<50	<75	<0.015	<0.0526	<0.0263	<0.0789
ESW03-08	8	5/23/2019	**5.96**	**171**	**693**	**864**	<0.0108	<0.0541	<0.0271	<0.0812
WSW01-08	8	5/22/2019	**3,010**	**1,330** F-19	**443** F-16	**1,773**	0.0390	**0.123**	**9.80**	**93.1**
WSW02-08	8	5/23/2019	**1,450**	**2,850** F-15	**466** F-16	**3,316**	**0.0704**	**0.955**	**8.30**	**52.3**
WSW03-08	8	5/23/2019	**769**	**3,210**	<210	**3,210**	<0.0792	<0.396	<0.198	**1.14**
B01-12	12	5/22/2019	**1,730**	**8,220**	<869	**8,220**	**0.236**	**0.0782**	**0.118**	**12.1**
B02-12	12	5/23/2019	**848**	**5,650**	<436	**5,650**	**1.01**	**0.179**	**1.04**	**11.6**
B03-13	13	5/23/2019	**2,780**	**10,100**	<837	**10,100**	**3.16**	<0.945	**1.46**	**34.6**
Drum Spill Excavation										
EX01-WSW-06	6	10/26/2018	<5.38	<25	<50	<75	<0.0108	<0.0538	<0.0269	<0.0807
EX-01-SSW-06	6	10/26/2018	<5.57	**27**	<50	**27**	<0.0110	<0.0551	<0.0275	<0.0826
EX01-ESW-06	6	10/26/2018	<4.92	<25	<50	<75	<0.00985	<0.0492	<0.0246	<0.0739
EX01-B-08	8	10/26/2018	**789** F-09	**8,570** S-05	<399	**8,570**	<0.110	<0.551	<0.276	<0.827

Table 1

Soil Analytical Results - Fuels and BTEX
Coleman Oil
Wenatchee, Washington

			Fuels				BTEX			
			GRPH	DRPH	ORPH	DRPH + ORPH	Benzene	Toluene	Ethylbenzene	Total Xylenes
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WA MTCA Method A Cleanup Level for Soil			**30/100**	**2,000**	**2,000**	**2,000**	**0.03**	**7**	**6**	**9**
Benzene (Non Detect)			**100**							
Benzene (Detect)			**30**							
Field ID	**Sample Depth (feet)**	**Date**								
Temporary Soil Borings - Site Investigation										
FB-3-9.0-040617	9	4/6/2017	< 27	< 55	< 5.4	< 60.4	< 0.020	< 0.054	< 0.054	< 0.108
FB-3-12.5-040617	12.5	4/6/2017	**4,000**	< 110	**420** F	**420**	< 0.020	< 0.049	**0.68**	**0.59**
FB-3-13.5-040617	13.5	4/6/2017	**14,000**	< 610	**940** F	**940**	**0.046**	< 0.042	**2.5**	**4.03**
FB-3-15.0-040617	15	4/6/2017	**2,300**	**150** N1	**380** F	**530**	**0.028**	< 0.044	**1.2**	**0.98**
FB-5-13.5-040617	13.5	4/6/2017	< 26	< 51	< 4.2	< 55.2	< 0.020	< 0.042	< 0.042	< 0.084
FB-5-15.0-040617	15	4/6/2017	< 26	< 52	< 4.4	< 56.4	< 0.020	< 0.044	< 0.044	< 0.088
FB-5-17.0-040617	17	4/6/2017	< 27	< 53	< 4.8	< 57.8	< 0.020	< 0.048	< 0.048	< 0.096
FB-6-12.0-040617	12	4/6/2017	< 120	**1,100**	< 4.7	**1,100**	< 0.020	< 0.047	< 0.047	< 0.094
FB-7-13.0-040617	13	4/6/2017	< 27	< 53	< 4.9	< 57.9	< 0.020	< 0.049	< 0.049	< 0.098
FB-7-23.0-040617	23	4/6/2017	**40** N	**440**	< 4.7	**440**	< 0.020	< 0.047	< 0.047	< 0.094
FB-8-14.0-040717	14	4/7/2017	< 27	< 55	< 5.0	< 60.0	< 0.020	< 0.050	< 0.050	< 0.100
FB-9-6.9-040717	6.9	4/7/2017	**1,100**	**350**	< 4.7	**350**	< 0.020	< 0.047	< 0.047	< 0.094
FB-9-10.0-040717	10	4/7/2017	**60**	< 53	< 5.0	< 58.0	< 0.020	< 0.050	< 0.050	< 0.100
FB-9-14.0-040717	14	4/7/2017	**440**	**180**	**330** F	**510**	< 0.020	< 0.050	**0.63**	**0.48**
FB-10-12.8-040717	12.8	4/7/2017	**4,300**	< 610	**880** F	**880**	< 0.020	< 0.044	**0.59**	**0.99**
FB-10-14.0-040717	14	4/7/2017	**5,900**	**1,800** N1	**860** F	**2,660**	**0.080**	< 0.055	**0.52**	**2.1**
FB-10-17.1-040717	17.1	4/7/2017	**1,300**	**270**	**910** F	**1,180**	**0.086**	< 0.25	**0.58**	**3.0**
FB-10-17.3-040717	17.3	4/7/2017	**8,200**	< 580	**530** F	**530**	**0.13**	< 0.27	**1.3**	**2.2**
FB-11-12.6	12.6	4/13/2017	< 27	< 54	< 5.5	< 59.5	**0.020**	< 0.055	< 0.055	< 0.110
FB-11-23.4	23.4	4/13/2017	**140**	**390**	< 5.9	**390**	< 0.020	< 0.059	< 0.059	< 0.118
HC01-4.5	4.5	3/28/2018	<5.7	<25	<50	<75	<0.0114	<0.0570	<0.0285	<0.0855
HC01-10	10	3/28/2018	**671**	**4,680**	<433	**4,680**	<0.104	<0.518	<0.259	<0.0855
HC01-15	15	3/28/2018	<4.25	<25	<50	<75	<0.0114	<0.0570	<0.0285	<0.776
HC01-22	22	3/28/2018	**7.99**	**104**	**80.3**	**184.3**	<0.00850	<0.0425	<0.0212	<0.0637
HC01-34	34	3/28/2018	<5.53	**38.6**	<50	**38.6**	<0.0111	<0.0553	<0.0277	<0.0830
HC02-10	10	3/28/2018	<7.66	<25	<50	<75	<0.0153	<0.0766	<0.0383	<0.115
HC02-15	15	3/28/2018	**37.7**	<25	<50	<75	<0.0103	<0.0513	<0.0257	<0.0770
HC02-22	22	3/28/2018	**9.26**	**26.6**	<50	**26.6**	<0.00984	<0.0492	<0.0246	<0.0738
Monitoring Wells										
MW1S-10	10	4/3/2018	<5.26	<25	<50	<75	<0.0132	<0.0658	<0.0329	<0.0987
MW1S-20	20	4/3/2018	<4.88	<25	<50	<75	**0.318**	<0.0488	<0.0244	<0.0731
MW3S-15	15	4/3/2018	**83.8**	<25	<50	<75	<0.00910	<0.0455	<0.0227	<0.0682
MW3S-20	20	4/3/2018	<4.88	<25	<50	<75	<0.0132	<0.0658	<0.0329	<0.0987
MW-6-10.3	10	4/12/2017	**10,000**	< 570	**280** F	**280**	**0.068**	< 0.065	**2.2**	**0.96**
MW-6-12.8	13	4/12/2017	**3,900**	< 310	**1,400** F	**1,400**	**0.066**	< 0.29	**0.34**	**0.76**
MW-7-13.0	13	4/11/2017	**160**	< 56	< 5.8	< 61.8	< 0.020	< 0.058	< 0.058	< 0.116
MW-7-17.3	17	4/11/2017	< 29	< 58	< 6.1	< 64.1	< 0.020	< 0.061	< 0.061	< 0.122
MW-8-12.8	13	4/11/2017	**1,400**	< 55	< 6.0	< 61.0	< 0.020	< 0.060	< 0.060	< 0.120
MW-8-15.0	15	4/11/2017	**100**	< 51	< 4.3	< 55.3	< 0.020	< 0.043	< 0.043	< 0.086
MW-8-17.5	18	4/11/2017	**230**	< 56	< 5.5	< 61.5	< 0.020	< 0.055	< 0.055	< 0.110
MW-9-12.8	13	4/12/2017	< 28	< 55	< 6.2	< 61.2	< 0.020	< 0.062	< 0.062	< 0.124
MW-9-15.6	16	4/12/2017	**15,000**	< 580	**1,800** F	**1,800**	< 0.062	< 0.31	**0.64**	**2.7**
MW-9-24.5	25	4/13/2017	**280**	**330**	**31** F	**361**	< 0.020	< 0.076	< 0.076	**0.094**
MW09R-35	35	8/16/2018	**12.8**	**176**	**117**	**293**	< 0.0132	< 0.0661	**0.102**	**0.495**
MW-10-15.7	16	4/14/2017	< 30	< 59	< 6.1	< 65.1	< 0.020	< 0.061	< 0.061	< 0.122
MW-10-25.1	25	4/14/2017	**1,300**	< 55	**1,300** F	**1,300**	**0.13**	< 0.46	**4.5**	**5.14**
MW10R-35	35	8/16/2018	< 4.76	**50.6**	< 50.0	**50.6**	< 0.00953	< 0.0476	< 0.0238	< 0.0714
MW-11-5.8	6	4/14/2017	< 28	< 55	< 5.0	< 60.0	< 0.020	< 0.050	< 0.050	< 0.100
MW11-13.2	13	4/14/2017	**600**	< 59	**570** F	**570**	< 0.024	< 0.12	**1.0**	**0.97**
MW11-17.8	18	4/14/2017	**58**	< 56	**12**	**12**	< 0.020	< 0.060	< 0.060	< 0.120
MW12-10	10	4/2/2018	<5.10	<25	<50	<75	<0.0102	<0.0510	<0.0255	<0.0766
MW12-20	20	4/2/2018	<4.79	**42.5**	**66.7**	**109.2**	<0.00958	<0.0479	<0.0239	<0.0718
MW13-05	5	3/29/2018	**580**	**1,700**	**5,310**	**7,010**	**0.701**	**25.5**	**6.27**	**29.3**
MW13-10	10	3/29/2018	**3,360**	**2,290**	<50	**2,290**	**1.51**	<1.07	<0.533	**5.2**
MW13-12	12	3/29/2018	**12.1**	<25	<50	<75	<0.0102	<0.0512	<0.0256	0.0774
MW13-21	21	3/29/2018	**22.5**	**90.9**	**209**	**299.9**	<0.00998	<0.0499	<0.0250	<0.0749
MW13-35	35	3/29/2018	<5.16	<25	<50	<75	<0.0103	<0.0516	<0.0258	<0.0773
MW13-45	45	3/30/2018	<7.12	<25	<50	<75	<0.0142	<0.0712	<0.0356	<0.107
MW14-05	5	3/30/2018	<4.74	<25	<50	<75	<0.00948	<0.0474	<0.0237	<0.0711
MW14-10	10	3/30/2018	**171**	**50.2**	<50	**50.2**	<0.00971	<0.0486	<0.0243	<0.0729
MW14-15	15	3/30/2018	**465**	**447**	<50	**447**	<0.0142	<0.0712	<0.0356	<0.107
MW14-25	25	4/2/2018	<3.97	<25	<50	<75	<0.0794	<0.0397	<0.0198	<0.0595
MW15-10	10	4/12/2018	<5.17	<25	**75.8**	**75.8**	<0.0103	<0.0517	<0.0258	<0.0775
MW15-20	20	4/12/2018	<5.74	<25	<50	<75	<0.0115	<0.0574	<0.0287	<0.0862
MW15-30	30	4/12/2018	<5.73	<25	<50	<75	<0.0115	<0.0573	<0.0286	<0.0859
MW16-10	10	4/5/2018	<4.78	<25	<50	<75	<0.00955	<0.0478	<0.0239	<0.0717
MW16-14	14	4/5/2018	<5.09	<25	<50	<75	<0.0102	<0.0509	<0.0255	<0.0764
MW16-25	25	4/6/2018	<2.38	<25	<50	<75	<0.00476	<0.0238	<0.0119	<0.0357

Table 1

Soil Analytical Results - Fuels and BTEX
Coleman Oil
Wenatchee, Washington

			Fuels				BTEX			
			GRPH	DRPH	ORPH	DRPH + ORPH	Benzene	Toluene	Ethylbenzene	Total Xylenes
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WA MTCA Method A Cleanup Level for Soil			**30/100**	**2,000**	**2,000**	**2,000**	**0.03**	**7**	**6**	**9**
Benzene (Non Detect)			**100**							
Benzene (Detect)			**30**							
Field ID	**Sample Depth (feet)**	**Date**								
Monitoring Wells (continued)										
MW17-10	10	4/4/2018	<4.71	<25	<50	<75	<0.00943	<0.0471	<0.0236	<0.0707
MW17-17	17	4/4/2018	**1,900**	**1,650**	**740**	**2,390**	<0.0360	<0.180	<0.0900	<0.270
MW17-25	25	4/4/2018	**83.6**	<25	<50	<75	**0.0109**	<0.0508	**0.0631**	**0.0799**
MW17-30	30	4/4/2018	<4.86	<25	<50	<75	<0.00973	<0.0486	<0.0243	<0.0730
MW18-10	10	4/11/2018	<6.01	<25	**102**	**102**	<0.0120	<0.0601	<0.0301	<0.0902
MW18-15	15	4/11/2018	<5.45	<25	<50	<75	<0.0109	<0.0545	<0.0273	<0.0818
MW18-25	25	4/11/2018	<4.66	<25	<50	<75	<0.00932	<0.0466	<0.0233	<0.0699
MW19-10	10	4/5/2018	<5.34	<25	<50	<75	<0.0107	<0.0534	<0.0267	<0.0801
MW19-18	18	4/5/2018	**386**	**2,010**	<50	**2,010**	<0.0104	<0.0518	<0.0259	<0.0776
MW19-30	30	4/5/2018	<5.48	**167**	**284**	**451**	<0.0110	<0.0548	<0.0274	<0.0822
MW20-10	10	4/10/2018	<5.02	<25	<50	<75	<0.0100	<0.0502	<0.0251	<0.0753
MW20-15	15	4/10/2018	**60.3**	**72.9**	<50	**72.9**	<0.0102	<0.0508	<0.0254	<0.0762
MW20-23.5	33	4/10/2018	<6.84	<25	<50	<75	<0.0137	<0.0684	<0.0342	<0.103
MW20-26	26	4/10/2018	<5.05	<25	<50	<75	<0.0101	<0.0505	<0.0253	<0.0758
MW21-10	10	4/9/2018	<5.32	<25	<50	<75	<0.0106	<0.0532	<0.0266	<0.0797
MW21-25	25	4/9/2018	**9.65**	**47.2**	<50	**47.2**	<0.0114	<0.0570	<0.0285	<0.0854
MW21-32	32	4/9/2018	<5.69	<25	<50	<75	<0.0114	<0.0569	<0.0285	<0.0854
MW22-15	15	4/13/2018	<5.15	<25	<50	<75	<0.0103	<0.0515	<0.0258	<0.0773
MW22-25	25	4/13/2018	<13.4	<25.9	<51.8	<77.7	<0.0268	<0.134	<0.0670	<0.201
MW22-30	30	4/13/2018	**4,180**	**45,700**	<8,160 ec	**45,700**	**10.7**	<5.87	**23.1**	**43.8**
MW22-40	40	4/13/2018	**248**	**52.5**	<50	**52.5**	**0.0854**	**0.085**	**0.156**	**0.696**
MW23-05	5	3/29/2018	<4.63	**29.7**	**65.2**	**94.9**	<0.00926	<0.0463	<0.0231	<0.0694
MW23-08	8	3/29/2018	**116**	**586**	**112**	**698**	<0.0101	<0.0504	<0.0252	<0.0756
MW23-12	12	3/29/2018	**127**	**63.3**	<50	**63.3**	<0.0115	<0.0577	<0.0289	<0.0866
MW23-22	22	3/29/2018	<6.69	<25	<50	<75	<0.0134	<0.0669	<0.0335	<0.100
MW24-15	15	8/6/2018	<5.29	<25	<50	<75	<0.0106	<0.0529	<0.0265	<0.0794
MW24-22	22	8/6/2018	**109**	<25	<50	<75	<0.0112	<0.0559	<0.0279	**0.110**
MW24-28	28	8/6/2018	**179**	<25	<50	<75	<0.0131	<0.0653	<0.0326	<0.0979
MW24-35	35	8/6/2018	**19.5**	**73**	<50.0	**73**	<0.0114	<0.0572	<0.0286	**0.117**
MW25-19	19	8/7/2018	<6.67	<25	<50	<75	<0.0133	<0.0667	<0.0334	<0.100
MW25-22	22	8/7/2018	**6.7**	**92.7**	<50.0	**92.7**	<0.0112	<0.0562	<0.0281	<0.0843
MW25-35	35	8/7/2018	**7.98**	**239**	**323**	**562**	<0.0131	<0.0653	<0.0326	<0.0979
MW26-15	15	8/8/2018	<6.18	<25	<50	<75	<0.0124	<0.0618	<0.0309	<0.0928
MW26-19	19	8/8/2018	**7.69**	**34.1**	< 50.0	**34.1**	<0.0113	<0.0563	<0.0282	<0.0845
MW26-29	29	8/8/2018	**33.4**	**94.8**	< 50.0	**94.8**	<0.0125	<0.0627	<0.0314	<0.0941
MW26-33	33	8/8/2018	<7.39	**228**	**288**	**516**	<0.0148	<0.0739	<0.0369	<0.111
MW27-15	15	8/9/2018	<6.83	<25	<50	<75	<0.0137	<0.0683	<0.0341	**0.102**
MW27-19	19	8/9/2018	**126**	**263**	<50.0	**263**	<0.0123	<0.0616	0.0992	**0.631**
MW27-39	39	8/9/2018	<6.18	**69.4**	**65.9**	**135.3**	<0.0124	<0.0618	<0.0309	<0.0926
MW28-19	19	8/10/2018	<5.88	<25	<50	<75	<0.0118	<0.0588	<0.0294	0.169
MW28-25	25	8/10/2018	<7.04	<25	<50	<75	<0.0141	<0.0704	**0.0528**	**0.317**
MW28-39	39	8/10/2018	**28.2**	**27.8**	<50.0	**27.8**	<0.0105	<0.0523	**0.0638**	**0.233**
MW29-15	15	8/13/2018	< 5.66	<25	<50	<75	< 0.0113	< 0.0566	< 0.0283	< 0.0849
MW29-24	24	8/13/2018	**33.6**	**81.2**	< 50.0	**81.2**	< 0.0149	< 0.0745	< 0.0373	< 0.112
MW29-34	34	8/13/2018	<5.24	<25	<50	<75	< 0.0105	< 0.0524	< 0.0262	< 0.0786
MW29-40	40	8/13/2018	< 5.15	<25	<50	<75	< 0.0103	< 0.0515	< 0.0258	< 0.0773
MW30-15	15	8/14/2018	< 5.86	<25	<50	<75	< 0.0117	< 0.0586	< 0.0293	< 0.0879
MW30-20	20	8/14/2018	**132**	**424**	< 50.0	**424**	< 0.0123	< 0.0617	< 0.0308	< 0.0925
MW30-28	28	8/14/2018	**618**	**1,900**	< 50.0	**1,900**	< 0.0113	< 0.0563	**0.0473**	**0.123**
MW30-32	32	8/14/2018	**96.2**	**407**	< 50.0	**407**	< 0.0112	< 0.0558	< 0.0279	< 0.0837
MW30-40	40	8/14/2018	< 6.80	**266**	**250**	**516**	< 0.0136	< 0.0680	< 0.0340	**0.109**
MW31-19	19	8/15/2018	< 5.21	<25	<50	<75	< 0.0104	< 0.0521	< 0.0261	< 0.0782
MW31-28	28	8/15/2018	**125**	**564**	< 50.0	**564**	< 0.00904	< 0.0452	< 0.0226	< 0.0678
MW31-38	38	8/15/2018	< 5.23	<25	<50	<75	< 0.0105	< 0.0523	< 0.0262	< 0.0785
MW32-10	10	8/17/2018	< 5.09	<25	<50	<75	< 0.0102	< 0.0509	< 0.0255	< 0.0764
MW32-14	14	8/17/2018	**1,930**	**3,400**	< 438	**3,400**	< 0.00950	< 0.0475	< 0.0238	< 0.0713
MW32-28	28	8/17/2018	< 5.38	<25	<50	<75	< 0.0108	< 0.0538	< 0.0269	< 0.0808
RW-1-17.5	18	4/10/2017	< 32	< 63	< 6.9	< 69.9	< 0.020	< 0.069	< 0.069	< 0.138
BH-1R-32	32	1/10/2019	<5.77	**73.5**	**125**	**198.5**	<0.0115	<0.0577	<0.0288	<0.0865
BH-1R-37	37	1/10/2019	**108**	**400**	<50.0	**400**	<0.0101	<0.0507	<0.0253	<0.0760

Table 1

Soil Analytical Results - Fuels and BTEX
Coleman Oil
Wenatchee, Washington

			Fuels				BTEX			
			GRPH	DRPH	ORPH	DRPH + ORPH	Benzene	Toluene	Ethylbenzene	Total Xylenes
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WA MTCA Method A Cleanup Level for Soil			**30/100**	**2,000**	**2,000**	**2,000**	**0.03**	**7**	**6**	**9**
Benzene (Non Detect)			**100**							
Benzene (Detect)			**30**							
Field ID	**Sample Depth (feet)**	**Date**								
Shoreline Seep Samples										
SL01-0.5	1	4/12/2018	**1,140**	**39,400**	<2,350 ec	**39,400**	<0.246	<1.23	<0.614	<1.84
SL02-0.5	1	4/12/2018	**629**	**30,400**	<2,570 ec	**30,400**	<0.0528	<0.264	<0.132	<0.396
SL03-0.5	1	4/12/2018	**2,580**	**21,400**	<2,240 ec	**21,400**	<0.203	<1.02	<0.508	**1.6**
SL04-0.5	1	4/12/2018	**968**	**18,100**	<2,310 ec	**18,100**	<0.209	<1.05	<0.523	<1.57
SL05-0.5	1	4/12/2018	<5.15	**527**	<442	**527**	<0.0103	<0.0515	<0.0258	<0.0773

Notes

Red denotes concentration in excess of MTCA Method Cleanup Level for Soil.

Blue denotes concentration above the laboratory method reporting limit (MRL) but below the MTCA Method Cleanup Level for Soil.

Fill shading denotes soil has been removed by excavation

GRPH (gasoline range petroleum hydrocarbons) analyzed by Method NWTPH-Gx.

DRPH (diesel range petroleum hydrocarbons) analyzed by Method NWTPH-Dx.

ORPH (oil range petroleum hydrocarbons) analyzed by Method NWTPH-Dx.

Volatiles analyzed by EPA Method 8260C.

MTCA Method A Cleanup Levels, WAC 173-340-720 through 173-340-760, revised Nov., 2007

< = less than method reporting limit shown

--- = not analyzed

F-15 Results for diesel are due to overlap from the reported oil result.

F-16 Results for oil are due to overlap from the reported diesel result.

F-19 Results are estimated due to the presence of multiple fuel products.

F = hydrocarbons indicative of heavier fuels are present in sample and impacting the gasoline result

N = hydrocarbons in the oil-range are impacting the diesel result

N1 = hydrocarbons in the diesel-range are impacting the oil result

Table 2
Groundwater Analytical Results - Fuels and VOCs
Coleman Oil Site
Wenatchee, Washington

		Fuels			Volatiles by EPA Method 8260							
		GRPH	DRPH	ORPH	Benzene	Toluene	Ethylbenzene	Xylene, Total	Naphthalene[1]	MTBE	EDB	EDC
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WA MTCA Method A Cleanup for Groundwater		800/1000	500	500	5	1,000	700	1,000	160	20	0.01	5
Benzene (Non Detect)		1,000										
Benzene (Detect)		800										
Field ID	**Date**											
FB-9	4/7/2017	1,200 F	2,900	1,200	2.4	< 1.0	3.7	1.7	--	--	--	--
FB-10	4/7/2017	2,000 F	57,000	< 4,100 ec	71	13	7.1	64	--	--	--	--
BH-1	4/21/2017	820 F	1,900	970 N1	15	2.8	8.3	18.5	--	--	--	--
	4/26/2018	2,140	1,390	<377	0.671	<1.00	5.55	12.5	--	--	--	--
	8/30/2018	591	243	<148	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	12/1/2018	1,420	5,120 F13	<151	<0.200	<1.00	0.608	<1.50	--	--	--	--
BH01R	3/27/2019	1,130	13,600 F-13	<151	4.33	<1.00	1.15	1.78	--	--	--	--
	8/27/2019	518	1,910 F-13	<150	0.240	<1.00	<0.500	<1.50	--	--	--	--
BH-2	4/10/2017	1,900 F	100,000	10,000	< 4.0	< 4.0	13	39	--	--	--	--
	4/21/2017	1,500 F	2,600	630 N1	4.2	3.3	12	39	--	--	--	--
	4/24/2018	854	9,360	<377	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/28/2018	639	3,300	<148	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/30/2018	509	7,040	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/27/2019	354	5,310 F-13, F-15	475 F-03, F-16	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/27/2019	295	6,150 F-13	<150	<0.200	<1.00	<0.500	<1.50				
BH-3	4/21/2017	1,800 F	2,400	660	1.8	<1.0	5.4	8.2	--	--	--	--
	9/29/2017	150 O	1,200	550 N1	<1.0	<1.0	<1.0	<2.0	--	--	--	--
	4/26/2018	172	1,130	<377	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/30/2018	250	276	<148	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/29/2018	<100	502	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/28/2019	319	1,850 F-13	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/28/2019	121	816 F-13	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--

Table 2
Groundwater Analytical Results - Fuels and VOCs
Coleman Oil Site
Wenatchee, Washington

		Fuels			Volatiles by EPA Method 8260							
		GRPH	DRPH	ORPH	Benzene	Toluene	Ethylbenzene	Xylene, Total	Naphthalene[1]	MTBE	EDB	EDC
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WA MTCA Method A Cleanup for Groundwater		800/1000	500	500	5	1,000	700	1,000	160	20	0.01	5
Benzene (Non Detect)		1,000										
Benzene (Detect)		800										
Field ID	**Date**											
RW-1	4/21/2017	<100	840	540 N1	<1.0	<1.0	<1.0	<2.0	--	--	--	--
	9/29/2017	<100	360	440	<1.0	<1.0	<1.0	<2.0	--	--	--	--
	4/26/2018	<100	<189	<377	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/30/2018	<100	327	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/30/2018	<100	152	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/28/2019	<100	<74.8 F-13	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/28/2019	<100	116 F-11	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW-1	3/23/2017	---	520	480	---	---	---	---	--	--	--	--
	4/21/2017	210 F	730	510	<1.0	<1.0	<1.0	<2.0	--	--	--	--
	9/29/2017	200	410	<410	<1.0	<1.0	<1.0	<2.0	--	--	--	--
	8/28/2018	449	219	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/27/2018	152	159	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/25/2019	172	126 F-11,F-20	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW01S	4/24/2018	188	<187	<374	0.42	<1.00	5.8	9.48	--	--	--	--
	8/28/2018	268	294	<151	1.49	<1.00	1.26	<1.50	--	--	--	--
	11/27/2018	<100	<75.5	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/25/2019	133	116 F-11, F-20	<151	<0.200	<1.00	4.18	8.97	--	--	--	--
	8/26/2019	<100	269 F-11, F-20	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW-2	3/23/2017	---	<260	<410	---	---	---	---	--	--	--	--
	4/20/2017	<100	<260	<410	<1.0	<1.0	<1.0	<2.0	--	--	--	--
	4/25/2018	<100	<187	<374	<0.200	<1.00	<0.500	<1.50	--	--	--	--

Table 2
Groundwater Analytical Results - Fuels and VOCs
Coleman Oil Site
Wenatchee, Washington

		Fuels			Volatiles by EPA Method 8260							
		GRPH	DRPH	ORPH	Benzene	Toluene	Ethylbenzene	Xylene, Total	Naphthalene[1]	MTBE	EDB	EDC
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WA MTCA Method A Cleanup for Groundwater		800/1000	500	500	5	1,000	700	1,000	160	20	0.01	5
Benzene (Non Detect)		1,000										
Benzene (Detect)		800										
Field ID	Date											
MW-3	4/20/2017	<100	<260	<410	<1.0	<1.0	<1.0	<2.0	--	--	--	--
	9/28/2017	<100	<260	<410	<1.0	<1.0	<1.0	<2.0	--	--	--	--
MW03S	4/25/2018	<100	<187	<374	<0.200	<1.00	<0.500	<1.50	<2.00	<1.00	<0.500 ec	<0.400
	8/29/2018	<100	139	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/27/2018	<100	<75.5	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/25/2019	<100	<76.2	<152	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/26/2019	<100	114 F-11	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW-4	3/23/2017	---	<260	<410	---	---	---	---	--	--	--	--
	4/20/2017	<100	<260	<410	<1.0	<1.0	<1.0	<2.0	--	--	--	--
	9/28/2017	<100	<260	<410	<1.0	<1.0	<1.0	<2.0	--	--	--	--
	4/25/2018	<100	<187	<374	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW-5	3/23/2017	---	<260	<410	---	---	---	---	--	--	--	--
	4/20/2017	<100	<260	<410	<1.0	<1.0	<1.0	<2.0	--	--	--	--
	9/28/2017	<100	<260	<410	<1.0	<1.0	<1.0	<2.0	--	--	--	--
	4/25/2018	<100	<189	<377	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/28/2018	<100	<75.5	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW-6	4/20/2017	880 F	1,800	480 N1	5.0	<4.0	6.2	37	--	--	--	--
	9/28/2017	530 O	760	430 N1	<1.0	<1.0	<1.0	4.3	--	--	--	--
	4/25/2018	643	1,620	<374	0.56	<1.00	<0.500	2.19	--	--	--	--
	8/29/2018	376	668	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/27/2018	499	634	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/25/2019	398	1,010 F-13,F-20	<152	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/26/2019	356	1,200 F-13	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--

Table 2
Groundwater Analytical Results - Fuels and VOCs
Coleman Oil Site
Wenatchee, Washington

		Fuels			Volatiles by EPA Method 8260							
		GRPH	DRPH	ORPH	Benzene	Toluene	Ethylbenzene	Xylene, Total	Naphthalene[1]	MTBE	EDB	EDC
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WA MTCA Method A Cleanup for Groundwater		800/1000	500	500	5	1,000	700	1,000	160	20	0.01	5
Benzene (Non Detect)		1,000										
Benzene (Detect)		800										
Field ID	Date											
MW-7	4/20/2017	1,100 F	1,300	420 N1	3.2	< 1.0	15	11.4	--	--	--	--
	9/28/2017	<100	520	<470 U1	<1.0	<1.0	<1.0	<2.0	--	--	--	--
	4/25/2018	<100	435	<374	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/29/2018	<100	448	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/28/2018	<100	283	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW-8	9/29/2017	1,300 O	2,100	690 N1	<1.0	<1.0	4.1	27.2	--	--	--	--
	4/26/2018	720	1,300	<374	0.641	<1.00	<0.500	4.67	--	--	--	--
	8/29/2018	774	907	<151	<0.200	<1.00	<0.500	3.42	--	--	--	--
	11/28/2018	921	505	<151	0.214	<1.00	1.06	6.23	--	--	--	--
	3/26/2019	768	2,220 F-13,F-20	<152	22.2	<1.00	<0.500	2.70	--	--	--	--
	8/26/2019	899	1,320 F-13,F-20	<151	0.853	<1.00	0.504	2.17	--	--	--	--
MW-9	9/29/2017	500 O	1,200	670 N1	<1.0	<1.0	<1.0	1.5	--	--	--	--
	4/26/2018	2,810	2,620	<374	2.73	<1.00	9.95	20.4	--	--	--	--
MW-9R	8/29/2018	234	654	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/28/2018	1,300	1,850	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/26/2019	1,000	5,690 F-13,F-20	<151	5.64	<1.00	0.545	<1.50	--	--	--	--
	8/27/2019	1,080	5,880 F-13	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW-10	4/21/2017	1,900 F	3,800	730	3.4	< 1.0	11	12.5	--	--	--	--
	9/29/2017	1,900 O	16,000	1,300 N1	<1.0	<1.0	13	26.7	--	--	--	--
	4/26/2018	2,290	1,500	<377	0.219	<1.00	3.52	5.95	--	--	--	--
MW-10R	8/30/2018	1,080	838	< 150	< 0.200	< 1.00	1.22	2.42	--	--	--	--
	11/29/2018	2,160	1,370	<755 ec	<0.200	<1.00	3.90	5.98	--	--	--	--
	3/28/2019	1,020	2,960 F-13	<151	0.401	<1.00	0.837	<1.50	--	--	--	--
	8/27/2019	1,270	3,620 F-13	<1,510 ec	<0.200	<1.00	1.44	3.06	--	--	--	--

Table 2
Groundwater Analytical Results - Fuels and VOCs
Coleman Oil Site
Wenatchee, Washington

		Fuels			Volatiles by EPA Method 8260							
		GRPH	DRPH	ORPH	Benzene	Toluene	Ethylbenzene	Xylene, Total	Naphthalene[1]	MTBE	EDB	EDC
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WA MTCA Method A Cleanup for Groundwater		800/1000	500	500	5	1,000	700	1,000	160	20	0.01	5
Benzene (Non Detect)		1,000										
Benzene (Detect)		800										
Field ID	**Date**											
MW-11	4/21/2017	1,400 F	1,700	1,000 N1	28	4.1	8.2	26.1	--	--	--	--
	9/29/2017	1,000 O	3,100	720 N1	<1.0	<1.0	1.9	12.5	--	--	--	--
	4/26/2018	1,240	1,140	<374	<0.200	<1.00	0.56	2.27	--	--	--	--
	8/29/2018	944	251	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/27/2018	1,350	503	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/26/2019	1,540	1,230 F-13,F-20	<150	11.6	<1.00	<0.500	2.34	--	--	--	--
	8/26/2019	1,230	1,060 F-13, F-20	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW12	4/25/2018	<100	<189	<377	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/28/2018	<100	<74.8	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/27/2018	<100	92.8	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/25/2019	<100	<76.2	<152	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/26/2019	<100	<74.8	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW13	4/25/2018	40,900	1,790	<377	1,500	4,710	627	3,780	--	--	--	--
	8/29/2018	39,300	2,500	<150	1,780	3,010	796	4,850	167	<50.0 ec	<25.0 ec	<25.0 ec
	11/27/2018	22,400	3,250	<151	1,380	271	458	3,170	--	--	--	--
	3/25/2019	28,500	4,650 F-11,F-20	<151	701	761	804	4,980	--	--	--	--
MW13R	8/26/2019	966	2,180 F-11,F-20	<151	96.4	<1.00	8.52	28.5	--	--	--	--
MW14	8/29/2018	4,040	487	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	4/25/2018	4,620	900	<374	13.1	<1.00	16.1	<1.50	3.21	<1.00	<0.500 ec	<0.400
	11/27/2018	5,170	933	<151	15.2	<1.00	1.70	<1.50	--	--	--	--
	3/25/2019	2,650	1,070 F-11,F-20	<151	17.8	<1.00	2.04	<1.50	--	--	--	--
	8/26/2019	3,510	1,280 F-11,F-20	<151	44.2	<10.0	5.95	<15	--	--	--	--

Table 2
Groundwater Analytical Results - Fuels and VOCs
Coleman Oil Site
Wenatchee, Washington

		Fuels			Volatiles by EPA Method 8260							
		GRPH	DRPH	ORPH	Benzene	Toluene	Ethylbenzene	Xylene, Total	Naphthalene[1]	MTBE	EDB	EDC
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WA MTCA Method A Cleanup for Groundwater		800/1000	500	500	5	1,000	700	1,000	160	20	0.01	5
Benzene (Non Detect)		1,000										
Benzene (Detect)		800										
Field ID	**Date**											
MW15	4/25/2018 iw	--	--	--	--	--	--	--	--	--	--	--
	8/29/20018 iw	--	--	--	--	--	--	--	--	--	--	--
	11/27/2018 iw	--	--	--	--	--	--	--	--	--	--	--
	3/26/2019 iw	--	--	--	--	--	--	--	--	--	--	--
	8/26/2019 iw	--	--	--	--	--	--	--	--	--	--	--
MW16	4/26/2018	<100	330	<374	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/29/2018	<100	298	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/28/2018	<100	337	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/26/2019	<100	183 F-11	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/26/2019	<100	349 F-11	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW17	4/26/2018	2,800	1,630	<377	1.23	<1.00	1.62	7.66	4.72	<1.00	<0.500 ec	<0.400
	8/29/2018	1,270	986	<150	0.450	<1.00	<0.500	<1.50	5.61	<1.00	<0.500 ec	<0.500
	11/28/2018	1,390	1,580	<151	0.305	<1.00	<0.500	<1.50	--	--	--	--
	3/26/2019	1,180	2,520 F-13,F-20	<151	2.91	<1.00	0.692	1.50	--	--	--	--
	8/26/2019	655	6,730 F-13	<150	2.72	<1.00	<0.500	<1.50	--	--	--	--
MW18	4/26/2018 iw	--	--	--	--	--	--	--	--	--	--	--
	8/2920018 iw	--	--	--	--	--	--	--	--	--	--	--
	11/27/2018 iw	--	--	--	--	--	--	--	--	--	--	--
	3/26/2019 iw	--	--	--	--	--	--	--	--	--	--	--
	8/26/2019 iw	--	--	--	--	--	--	--	--	--	--	--
MW19	4/26/2018	280	979	<377	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/27/2018	<100	406	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/30/2018	<100	<75.5	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/28/2019	447	4,300 F-13	<151	0.673	<1.00	<0.500	<1.50	--	--	--	--
	8/26/2019	--	--	--	--	--	--	--	--	--	--	--

Table 2
Groundwater Analytical Results - Fuels and VOCs
Coleman Oil Site
Wenatchee, Washington

		Fuels			Volatiles by EPA Method 8260							
		GRPH	DRPH	ORPH	Benzene	Toluene	Ethylbenzene	Xylene, Total	Naphthalene[1]	MTBE	EDB	EDC
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WA MTCA Method A Cleanup for Groundwater		800/1000	500	500	5	1,000	700	1,000	160	20	0.01	5
Benzene (Non Detect)		1,000										
Benzene (Detect)		800										
Field ID	**Date**											
MW20	4/26/2018	1,270	1,320	<377	<0.200	<1.00	1.56	5.44	--	--	--	--
	8/30/2018	320	346	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/29/2018	674	1,280	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/28/2019	1,220	2,190 F-13	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/28/2019	588	870 F-11,F-20	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW21	4/26/2018	991	965	<374	<0.200	<1.00	0.835	1.82	--	--	--	--
	8/30/2018	<100	234	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/27/2018	789	992	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/28/2019	799	1,400 F-13	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/27/2019	453	605 F-11,F-20	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW22	4/26/2018	6,960	4,690	<377	118	28.8	102	196	--	--	--	--
	8/30/2018	2,040	1,150	<748 ec	30.4	5.34	30.5	55.9	--	--	--	--
MW23	4/25/2018	<100	419	<381	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/29/2018	<100	266	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/27/2018	<100	380	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/25/2019	<100	339 F-11	<152	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/26/2019	<100	580 F-11	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW24	8/30/2018	<100	220	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/29/2018	154	914	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/28/2019	<100	696 F-13	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/27/2019	<100	560 F-11, F-20	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW25	8/30/2018	<100	<74.8	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/27/2018	<100	121	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/28/2019	<100	302 F-11	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/27/2019	<100	262 F-13	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--

Table 2
Groundwater Analytical Results - Fuels and VOCs
Coleman Oil Site
Wenatchee, Washington

		Fuels			Volatiles by EPA Method 8260							
		GRPH	DRPH	ORPH	Benzene	Toluene	Ethylbenzene	Xylene, Total	Naphthalene[1]	MTBE	EDB	EDC
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WA MTCA Method A Cleanup for Groundwater		800/1000	500	500	5	1,000	700	1,000	160	20	0.01	5
Benzene (Non Detect)		1,000										
Benzene (Detect)		800										
Field ID	**Date**											
MW26	8/30/2018	<100	128	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/29/2018	<100	<75.5	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/28/2019	<100	591 F-13	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/27/2019	<100	266 F-13	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW27	8/30/2018	<100	118	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/29/2018	<100	<75.5	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/28/2019	<100	185 F-13	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/28/2019	<100	467 F-11	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW28	8/30/2018	<100	105	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	12/1/2018	385	486	<158	0.208	<1.00	<0.500	<1.50	--	--	--	--
	3/27/2019	303	1,370 F-13	<151	1.30	<1.00	<0.500	<1.50	--	--	--	--
	8/27/2019	302	1,010 F-13	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW29	8/28/2018	<100	459	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/29/2018	<100	238	809	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/27/2019	237	2,930 F-13,F-15	928 F-16	1.64	<1.00	<0.500	<1.50	--	--	--	--
	8/26/2019	--	--	--	--	--	--	--	--	--	--	--
MW30	8/28/2018	<100	193	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	11/29/2018	<100	304	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/27/2019	<100	612 F-13	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/27/2019	<100	557 F-13	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--

Table 2
Groundwater Analytical Results - Fuels and VOCs
Coleman Oil Site
Wenatchee, Washington

		Fuels			Volatiles by EPA Method 8260							
		GRPH	DRPH	ORPH	Benzene	Toluene	Ethylbenzene	Xylene, Total	Naphthalene[1]	MTBE	EDB	EDC
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WA MTCA Method A Cleanup for Groundwater		**800/1000**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**160**	**20**	**0.01**	**5**
Benzene (Non Detect)		**1,000**										
Benzene (Detect)		**800**										
Field ID	**Date**											
MW31	8/28/2018	<100	<74.1	<148	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	12/1/2018	<100	<75.5	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/27/2019	<100	<74.8	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/27/2019	<100	<74.8	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
MW32	8/29/2018	**139**	**161**	<148	<0.200	<1.00	<0.500	<1.50	<2.00	<1.00	**<0.500** ec	<0.500
	11/28/2018	<100	<75.5	<151	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	3/26/2019	<100	**296** F-11	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--
	8/26/2019	<100	**302** F-11	<150	<0.200	<1.00	<0.500	<1.50	--	--	--	--

Notes:
Red denotes concentration in excess of MTCA Method Cleanup Level for Groundwater.
Blue denotes concentration in excess of laboratory method reporting limit (MRL) but below the MTCA Method Cleanup Level for Groundwater.
MTCA Method A Cleanup Levels, WAC 173-340-720 through 173-340-760, revised Nov., 2007
GRPH (gasoline range petroleum hydrocarbons) analyzed by Method NWTPH-Gx.
DRPH (diesel range petroleum hydrocarbons) and ORPH (oil range petroleum hydrocarbons) analyzed by Method NWTPH-Dx.
VOCs = volatile organic compounds
[1] = Naphthalene measured using EPA Method 8260. Total naphthalenes were not calculated because PAHs are not considered to be COCs at the site.
VOCs analyzed by EPA Method 8260C
Total Lead by EPA Method 6020
< = less than method reporting limit shown
--- = not analyzed. MW15 and MW18 not sampled due to lack of water in the well.
ec = Method reporting limit exceeds Clean Up Level shown.
F and O = hydrocarbons indicative of heavier fuels are present in sample and impacting the gasoline result (Farallon 2017b)
N1 = hydrocarbons in the diesel-range are impacting the oil result (Farallon 2017b)
U1 = the practical quantitation limit is elevated due to interferences present in the sample (Farallon 2017b)
F-03 = The result for this hydrocarbon range is elevated due to the presence of individual analyte peaks in the quantitation range that are not representative of the fuel pattern reported.
F-11 = The hydrocarbon pattern indicates possible weathered diesel, or a contribution from a related component.
F-13 = The chromatographic pattern does not resemble the fuel standard used for quantitation.
F-15 = Results for diesel are estimated due to overlap from the reported oil result.
F-16 = Results for oil are estimated due to overlap from the reported diesel result.
F-20 = Result for Diesel is estimated due to overlap from Gasoline Range Organics or other VOCs.
S-02 = Surrogate recovery cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.
S-06 = Surrogate recovery is outside of established control limits.

Table 3
Historical Groundwater Analytical Results - PAHs
Coleman Oil Site
Wenatchee, Washington

	Acenaphthene	Acenaphthylene	Anthracene	Benz [a] anthracene	Benzo [a] pyrene	Benzo [b] fluoranthene	Benzo [k] fluoranthene	Benzo (g,h,i) perylene	Chrysene	Dibenz [a,h] anthracene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WA MTCA Method A Cleanup Level for Groundwater					**0.1**					
Field ID	**Date**									
MW21	4/26/2018	0.193	<0.0935	0.145	<0.0935	<0.0935	<0.0935	<0.0935	<0.0935	<0.0935
MW22	4/26/2018	113	<12.3	8.48	0.284	<0.0943	<0.0943	<0.0943	0.243	<0.0943
	8/30/2018	43.4	4.21	3.32	0.156	<0.0374	<0.0374	<0.0374	0.156	<0.0374
MW32	8/29/2018	<0.0370	<0.0370	<0.0370	<0.0370	<0.0370	<0.0370	<0.0370	<0.0370	<0.0370

	Dibenzofuran	Fluoranthene	Fluorene	Indeno [1,2,3-cd] pyrene	1- Methyl-naphthalene	2-Methyl- naphthalene	Naphthalene	Phenanthrene	Pyrene	TEQ
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WA MTCA Method A Cleanup Level for Groundwater							**160**			**0.1**
Field ID	**Date**									
MW21	4/26/2018	0.103	<0.0935	0.144	<0.0935	1.48	0.494	1.16	<0.0935	<0.0935	0.0706
MW22	4/26/2018	8.55	3.2	36.7	<0.0943	298	210	**692**	36.6	4.30	0.0968
	8/30/2018	3.34	1.49	14.0	<0.0374	94.2	92.2	**189**	13.7	2.43	0.0433
MW32	8/29/2018	<0.0370	<0.0370	0.0382	<0.0370	<0.0741	<0.0741	<0.0833	<0.0370	<0.0370	0.0279

Notes:
Red denotes concentration in excess of MTCA Method Cleanup Level for groundwater.
MTCA Method A Cleanup Levels, WAC 173-340-720 through 173-340-760, revised Nov., 2007
< = less than method reporting limit shown
ug/L = micrograms per liter (parts per billion)
PAHs by EPA Method 8270D SIM
TEQ = Toxic Equivalent Concentration per Ecology Focus Sheet. One-half the detection limit used for non-detected concentrations.

Table 4
Groundwater Analytical Results - Geochemical Indicators
Coleman Oil Site
Wenatchee, Washington

		Field Parameters			Laboratory Analytical					Field Test
		Dissolved Oxygen	Redox Potential	pH	Nitrate	Sulfate	Alkalinity	Manganese	Methane	Ferrous Iron
		mg/L	mV	Unitless	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L
Field ID	**Date**									
BH01R	8/27/2019	0.30	-83.3	6.16	<0.05	0.50	435	9,780	2,100	5.5
BH-2	8/27/2019	0.37	-80.3	6.10	<0.05	1.41	431	4,410	2,200	4.0
BH-3	8/28/2019	0.29	-79.9	6.16	<0.05	6.78	619	1,570	1,500	6.5
RW-1	8/28/2019	0.92	-17	7.10	<0.05	18.3	487	52.8	340	0.0
MW01S	8/26/2019	0.18	117	6.07	0.75	78.4	185	589	21	0.0
MW03S	8/26/2019	0.18	17	6.44	<0.05	25.4	230	482	29	0.0
MW-6	8/26/2019	0.63	-196	6.42	<0.05	8.79	241	714	3,100	0.0
MW-8	8/26/2019	0.65	-87	6.75	<0.05	<0.1	375	3,370 J	8,100	4.5
MW-9R	8/27/2019	0.71	-21	6.70	<0.05	4.97	148	5,800	540	3.0
MW-10R	8/27/2019	0.71	0	6.80	<0.05	0.39	490	4,410 J	1,600	1.5
MW-11	8/26/2019	0.72	-92	6.78	<0.05	<0.1	334	2,030	6,300	6.5
MW12	8/26/2019	0.18	31.7	6.37	<0.05	39.5	175	130	7.3	0.0
MW13R	8/26/2019	0.54	-91	7.09	<0.05	50.6	333	2,160	200	0.0
MW14	8/26/2019	0.63	-90	6.83	<0.05	<0.1	414	1,890	1,400	0.0
MW15	8/26/2019	--	--	--	--	--	--	--	--	--
MW16	8/26/2019	1.69	85	6.55	2.0	22.2	306	91	<1	0.0
MW17	8/26/2019	0.18	-103.5	6.02	<0.05	0.32	418	3,450	4,100	3.5
MW18	8/26/2019	--	--	--	--	--	--	--	--	--
MW19	8/26/2019	--	--	--	--	--	--	--	--	--
MW20	8/28/2019	0.22	-37	5.97	<0.05	0.18	462	6,980	99	5.0
MW21	8/27/2019	1.03	-8	6.64	<0.05	22.8	468	3,450	1,700	2.0
MW23	8/26/2019	0.69	-117	6.29	<0.05	43.1	284	1,590	140	0.5
MW24	8/27/2019	1.01	-22	6.81	<0.05	15.2	450	1,330	640	3.0
MW25	8/27/2019	0.70	12	7.43	<0.05	20.5	396	330	3.1	0.0
MW26	8/27/2019	0.79	17	7.13	<0.05	14.0	487	810	20	2.0
MW27	8/28/2019	0.93	-36	6.90	<0.05	9.60	504	3,920	500	2.5
MW28	8/27/2019	0.22	-61.6	6.16	<0.05	2.39	472	10,700 J	2,100	4.5
MW29	8/27/2019p	--	--	--	--	--	--	--	--	--
MW30	8/27/2019	0.37	-149.4	6.28	<0.05	2.32	592	1,460	790	3.5
MW31	8/27/2019	0.39	-108.4	6.40	<0.25	63.8	578	413	230	2.5
MW32	8/26/2019	2.77	128.4	6.07	0.35	22.7	279	274	38	0.1

Notes:
Field parameters measured during sample collection using a YSI multi-parameter meter.
Nitrate analyzed by EPA Method 300.0.
Sulfate analyzed by EPA Method 300.0.
Manganese analyzed by EPA Method 200.8.
Alkalinity analyzed by Method SM3220-B.
Ferrous Iron by Hach test kit.
< = less than method reporting limit shown
--- = not analyzed. MW15, MW18, and MW19 not sampled due to lack of water in the well.
p = Product recorded in well. No sample collected.
J = estimated value - Matrix spike and or duplicate analysis was performed on this sample. % recovery or RPD for this analyte is outside laboratory control limits.

Table 5
Sediment Sample Results - Fuels and BTEX
Coleman Oil Site
Wenatchee, Washington

			Fuels			BTEX			
			GRPH	DRPH	ORPH	Benzene	Toluene	Ethylbenzene	Total Xylenes
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SCUM II Sediment Management Standards (SMS) for Freshwater Sediments[1]				**340**	**3,600**				
Field ID	**Sample Depth (feet)**	**Date**							
SEDIMENT SAMPLES									
SS01-13.97cm	0.46	4/23/2018	<25.2	**842**	**392**	<0.0503	**0.395**	<0.126	<0.378
SS01-0.5	0.5	3/26/2019	--	<262	**1,730**	--	--	--	--
SS01-1.5	1.5	3/26/2019	--	**39.8**	**168**	--	--	--	--
SS01-2	2	3/26/2019	--	<26.3	**83.7**	--	--	--	--
SS02-11.75cm	0.38	4/23/2018	<13.7	**473**	**175**	<0.0274	**0.182**	<0.0684	<0.205
SS02-0.5	0.5	3/26/2019	--	<33.1	**66.3**	--	--	--	--
SS02-1.5	1.5	3/26/2019	--	<25.8	<51.6	--	--	--	--
SS02-2	2	3/26/2019	--	<31	**76.5**	--	--	--	--
SS03-13.97cm	0.46	4/23/2018	<16.2	**207**	**147**	<0.325	<0.0162	<0.0811	<0.243
SS04-11.82 cm	0.39	4/23/2018	<16.6	<45.1	**90.6**	<0.0333	<0.166	<0.0832	<0.0250
SS05-13.97	0.46	4/23/2018	<13.8	<38.1	**87.2**	<0.0276	<0.138	<0.0690	<0.207
SS06-0.5	0.5	3/26/2019	--	<32.2	**87.5**	--	--	--	--
SS06-1.5	1.5	3/26/2019	--	<32.6	**68.3**	--	--	--	--
SS07-0.5	0.5	3/26/2019	--	<30.8	**95.6**	--	--	--	--
SS07-1.5	1.5	3/26/2019	--	<31.9	**151**	--	--	--	--
SS08-0.5	0.5	3/26/2019	--	<41.5	**84.7**	--	--	--	--
SS02-1.5	1.5	3/26/2009	--	<30.8	<61.5	--	--	--	--
SEDIMENT SAMPLES WITH ACID/SILICA GEL CLEANUP									
SS01-13.97cm	0.46	4/23/2018	--	**947**	<105	--	--	--	--
SS01-0.5	0.5	3/26/2019	--	<26.2	**1,510**	--	--	--	--
SS01-1.5	1.5	3/26/2019	--	**35.4**	**169**	--	--	--	--
SS01-2	2	3/26/2019	--	<26.3	**87.3**	--	--	--	--
SS02-11.75cm	0.38	4/23/2018	--	**526**	<73.4	--	--	--	--
SS02-0.5	0.5	3/26/2019	--	<33.1	**66.8**	--	--	--	--
SS02-2	2	3/26/2019	--	<31	**79.3**	--	--	--	--
SS03-13.97cm	0.46	4/23/2018	--	**238**	<78.4	--	--	--	--
SS04-11.82 cm	0.39	4/23/2018	--	<45.1	<90.3	--	--	--	--
SS05-13.97	0.46	4/23/2018	--	<38.1	<76.1	--	--	--	--
SS06-0.5	0.5	3/26/2019	--	<32.2	**91.2**	--	--	--	--
SS06-1.5	1.5	3/26/2019	--	<32.6	**87.5**	--	--	--	--
SS07-0.5	0.5	3/26/2019	--	<30.8	**95.9**	--	--	--	--
SS07-1.5	1.5	3/26/2019	--	<31.9	**134**	--	--	--	--
SS08-0.5	0.5	3/26/2019	--	<41.5	**148**	--	--	--	--

Notes

Red denotes concentration in excess of Sediment Management Standard (SMS) for Freshwater Sediment.

Blue denotes concentration that exceeds the MRL but is below the SMS

GRPH (gasoline range petroleum hydrocarbons) analyzed by Method NWTPH-Gx.

DRPH (diesel range petroleum hydrocarbons) and ORPH (oil range petroleum hydrocarbons) analyzed by Method NWTPH-Dx.

BTEX analyzed by EPA Method 8260C.

[1]SCUMII 173-204 WAC - Sediment Management Standards for Freshwater Sediments

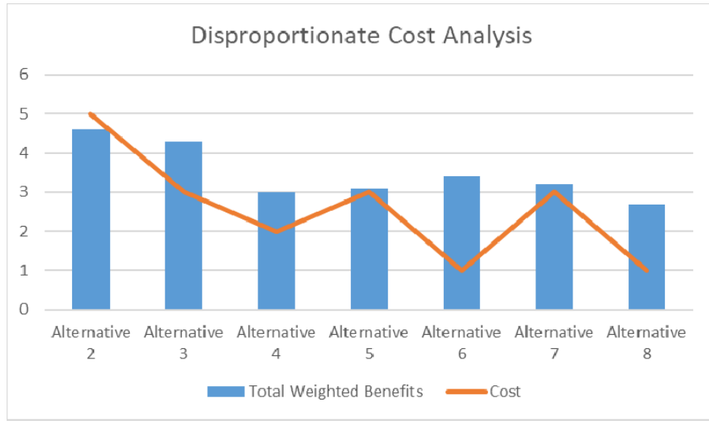
SCO = Sediment Cleanup Objective

< = less than method reporting limit shown

--- = not analyzed

Table 6
Remedial Alternative Screening
Coleman Oil Site
Wenatchee, Washington

BENEFITS	Weighting Factor	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8
Protectiveness	30%	5	4	3	3	2	3	2
Permanence	20%	5	4	3	3	4	4	2
Long-Term Effectiveness	20%	5	5	3	3	4	3	2
Short-Term Risk	10%	4	5	3	4	4	4	5
Implementability	10%	4	5	3	3	5	2	5
Consideration of Public Concerns	10%	3	3	3	3	3	3	3
TOTAL WEIGHTED BENEFITS		4.6	4.3	3	3.1	3.4	3.2	2.7
COST		5	3	2	3	1	3	1



Notes:

Alternative 1 - No Action	This alternative is rejected as it does not meet minimum requirements under WAC 173-340-360
Alternative 2 - Excavation and Offsite Disposal	This method is considered to be a baseline remediation method which will be compared agains all others
Alternative 3 - Groundwater Pump & Treat	This method is currently active at the site
Alternative 4 - Biodegrable Solvent	This alternative has concerns for mobilizing contamination and/or product into the Columbia River
Alternative 5 - In-Situ Chemical Oxidation	
Alternative 6 - Monitored Natural Attenuation	This method is similar to No Action except performance monitoring is an included component
Alternative 7 - Barrier Wall (Containment)	This is an institutional control to prevent impact to surface water - should not be considered a stand alone remedy
Alternative 8 - Institutional Controls	This action would place an environmental covenant (EC) on the property

Costs are based on a scale of 1 to 5 with the cheapest being 1 and the most expensive as 5