STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1250 W Alder St • Union Gap, WA 98903-0009 • (509) 575-2490

March 23, 2021

Allan Gebhard
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435

RE: Comments on DRAFT Remedial Investigation (RI) for Boise Cascade Mill Site

- Site Name: Boise Cascade Mill
- Site Address: 805 North 7th Street, Yakima
- Facility/Site ID: 450
- Cleanup Site ID: 12095

Dear Allan Gebhard:

The Department of Ecology has reviewed the DRAFT Remedial Investigation (RI) for the Boise Cascade Mill Site and has the following comments. They are identified below by RI section for ease of reference. *Please address all comments in your next submittal.*

Introduction:

Add preliminary cleanup levels (PCULs) and contaminants of potential concern (COPCs) for surface water. Revise as necessary to include all identified COPCs for the Site. Separate grab sample data results from monitoring well sample date results in the table on page 14. Add surface water to the list on page 15. Also, ensure the sediments term is used properly (see comments under 3.2.3 for more detail).

Section 2 – Site Description and Background

Please add all Potentially Liable Persons (PLPs), including the City of Yakima.

2.1 Site History

Please reflect the recent parcel transfers to the City of Yakima in this section.

2.2 Land Use

Please describe how precipitation flows across the surface of the Site and clearly identify any sheet flow outlets.

2.3 Previous investigations

Numerous fires have taken place on the Site. As environmentally significant events, please provide dates and note that no sampling was conducted for PFAS/dioxins and furans after these fires.

2.4 Areas of concern

Areas of concern (AOCs) were developed for the RI work plan to assist with the sampling effort at the site, and were never intended to be "stand alone" areas of concern within the larger site for nature and extent of contamination purposes. Please identify any data gaps, update figures and data to show contamination across the entire site rather than by AOCs, especially since many of the AOCs have overlapping borders.

Section 3

3.2.1 Test Pits and Borings

Test pit samples, second bullet point: sampling interval has data gaps from 10 to 15 feet below ground surface (bgs). Additional samples will be needed for AOC 11. Clarify if the additional sample collected from 8-10 feet bgs was ever analyzed.

3.2.3 Pond Bottom and Ditch Bottoms

Throughout this document, pond bottoms and ditch bottoms are alternatively referred to as sediment samples. Sediments are managed under the Sediment Management Standards (SMS), and are a specific subset of saturated soil samples. Please maintain consistency when naming sample media and remove references to sediments as necessary.

First paragraph – Please identify a table or figure where detailed information is located for sampling depths, etc., instead of just referring to the sample log.

Ponds – Please describe the type of riprap present by material, such as woody debris, or concrete chunks. Estimate the volume of water in the Recycle Pond at the time of the sampling and identify whether or not this is a typical volume or if the volume changes due to irrigation pressures on the Yakima River.

Cite figures for all sampling locations referred to in text.

3.2.4 Groundwater

Please describe the alternative sample to FPP-MW-1. Detail any analysis performed on the black oily substance. Please discuss plans to decommission this well and relocate it for future sampling events.

Please describe the rationale for shorter screen lengths in MW-9A and MW-25. Clarify if the sampling interval in Table 1 is the approximate sampling point or the actual saturated screened interval at each well.

3.2.5 Surface Water

Please describe in detail how you plan to assess the water elevations at the river and compare them to the water elevations of the ponds to determine groundwater.

3.2.6 New soil gas wells

Please add any calculations used to extrapolate sampling results based on volumes of differing screen length and diameters in the soil gas wells.

Existing Soil Gas Wells

Identify the wells where volume was resampled after 48 hours.

Section 4

Section 4.2 Hydrology

The Site is located adjacent to the Yakima River – please revise this paragraph to reflect this fact and include additional details, including the length of the current shoreline boundaries and point discharges to the river.

Identify all outfalls (point source discharges) into the Yakima River from the various ditches running throughout the site on a single figure. Identify on a figure the areas where the Fruitvale wasteway daylights, as well as its outfall. Please explain the statement and identify outfalls that were related to the irrigation system and surface water intakes during active log yard operations. Insert discussion regarding the fact that water from the settling ponds was allowed to infiltrate into the soils during active log yard operations.

Describe as precisely as possible how the Yakima River elevation changes seasonally due to irrigation practice.

Discuss the significance of the steep elevation drop in wells between monitoring events.

Please estimate volumes of water in ponds on site, and the change in volume, if any, reflected by irrigation practices.

Section 4.4 Hydrogeology

Expand your discussion of characteristics that control flow in the deeper units, and how you would describe the characteristics of the deeper aquifer. Describe what you mean between "shallow" and "deeper" units by using depths below ground surface.

Update figures to provide any potential confining layers to pertinent cross sections and figures as necessary.

Section 5 – Updated Conceptual Site Model (CSM)

The team has had many conversations regarding the CSM since this draft was delivered to Ecology. Please rewrite the entire section to reflect current understanding of the CSM. Be consistent with the use of the word sediment throughout the report; sediment means something very specific to the State of Washington. Additional areas of hydrocarbon contamination have been identified; please provide updated figures.

5.2.3 Groundwater –surface water.

Groundwater discharge has the potential to affect surface water all along the eastern edge of the site, not just down gradient. Please revise accordingly.

5.2.4 Soil Vapor

Halogenated volatile organic compound (HVOC) vapors were detected at the Site during test pit construction for the proposed roadway.
If vapors were detected in soils above any portion of the Boise Cascade Mill site, additional investigation of HVOC sources may be necessary. This is a potential data gap.

5.3 Preliminary cleanup levels

Through a series of meetings in late 2020, Ecology and the PLPs generated a spreadsheet that details PCULs. The spreadsheet contains agreed upon PCULs and information to verify that the various pathways to receptors are current.

The spreadsheet is attached to this letter; please refer to it for Ecology's comments on the PCULs. Ecology realizes that cleanup levels may be further refined during the feasibility study and that this is a preliminary list.

5.3.4 Vapor

Methane was detected at potentially explosive concentrations in the soil gas at various locations on the site. Although MTCA does not have an established default cleanup level for methane in soil gas, any soil gas detected that has the potential for explosivity should be carefully evaluated before further site investigation work is continued. Plans for fieldwork while dealing with potentially explosive vapors must be submitted and approved by Ecology prior to any additional field work.

5.4.1 Soil

Please revise this section based on the values in the PCUL spreadsheet.

5.4.2 Groundwater to Drinking Water Pathway

Please revise this section based on the values in the PCUL spreadsheet

5.4.3 Groundwater to Surface Water Pathway

Please revise this section based on the values in the PCUL spreadsheet

Section 6 – RI results

Areas of concern were used for the RI work plan and were intended to assist field personnel during sampling activities. The data resulting from the field activities should be viewed holistically across the entire site. Please revise this section accordingly to assist the feasibility study and cleanup action. The following are additional comments on the draft RI language:

- Please include a short paragraph generally describing site conditions (depths to groundwater, soil types, sensitive areas, etc.) that encompass the entirety of the Site.

- As previously discussed, please used the term sediments properly.

- Validated data results from previous investigations should be differentiated in some way from the data that was collected specifically according to the approved work plan for this RI.

- Appendices I-2 and I-3 must differentiate between historical data and data collected specifically according to the approved work plan for this RI. Please use the results in the PCUL spreadsheet to revise any draft statements if necessary.

- All data should be analyzed with reference to Site boundaries, and not areas of concern boundaries. This RI should clearly illustrate the extent of contamination found throughout the entire Site. Please revise figures and tables as necessary. Maintain consistency of terminology throughout the document. The draft document compares either "reporting limits" or "PCULs" within the same areas of concern. PCOCs for the entire site are included on the PCUL spreadsheet,

6.2 North First Lateral Drain

Please discuss the importance of organic carbon content calculations for this section of the RI.

6.3 Equipment Boneyard

Total Petroleum Hydrocarbons (TPHs) are generically referred to throughout the document. For clarity, be specific about which fraction (TPH-Gx, TPH-Dx and Heavy Oil) you are discussing at any given time. Data gaps exist where samples were not collected throughout the 15-foot soil depth that is regulated by MTCA.

6.4 Dry Kiln

Any sample, which could not be completed throughout the 15-foot regulated soil column, is considered a data gap.

6.5 Kiln Ponds

Ponds throughout the Site are considered surface water, not groundwater. See MTCA definitions for clarification and revise. Identify the depths at sample locations.

North Kiln Pond

This section contains data gaps and discussions of TPH in general. See comment on Section 6.3 and revise. Clarify if the sample from temporary well TW-01-AOC5 is a grab groundwater sample or a surface water sample. Identify depth(s) at which groundwater was encountered.

South Kiln Pond

Identify whether metal samples were collected at the groundwater –surface water interface. Add detail to this section that explains the assertion that groundwater flow is temporally variable.

6.7 Recycle Pond

Be specific about which sediment core sampling technology was used to collect samples. Be consistent in your discussion of soil versus sediment samples to avoid confusion. Support your assertion of false positive results. For clarity, provide linear measurements from the recycle pond to MW-05. Instead of referring to distinct wells to discuss potential contaminants of concern (page 35, last paragraph), use a holistic site approach to defining nature and extent of contamination. Support all assertions that data collected is not acceptable.

6.8 Settling Pond

Describe your technique to differentiate between pond bottom material and soil material for samples collected. Discuss the difference between soils and sediments for the Settling Pond.

6.9 Fruitvale Wasteway

Include the definition of organic soils that you are relying upon, and describe what laboratory methods were used to aid in your identification of organic soils. Please discuss how you differentiated between the collection of "impacted" versus "non-impacted" soils during the sampling events.

6.1.5 Paint, Machine and Storage Shed

Collection of soil samples that do not extend to 15 feet below ground surface in test pits are considered data gaps. Even though the duplicate sample from TW-01-AOC15 contains concentrations above the PCUL for copper for the surface water pathway, provide details on why this sample was or was not retained.

6.1.6 Fuel Distribution System

Fuel Lines

Detail the depth below ground surface that fuel lines are generally located.

6.1.9 Log Yard Shop

Provide evidence to support the statement that certain exceedances in groundwater samples are not related to former (or current) Site operations.

6.2.5 Sitewide groundwater

Original figures provided in the draft document limit the extent of groundwater contamination to AOC extents. All figures depicting the extent of groundwater contamination must be holistic and encompass the entire site. Provide evidence for your statement that groundwater at monitoring well MW-20 does not flow under any Site areas of interest before reaching the well. Provide a figure that details the groundwater chemistry (both laboratory and field sampled) throughout the Site (ORP, pH, temperature, percent oxygen, etc.) for each quarterly sampling event.

Groundwater Summary

Using the PCUL spreadsheet, revise assertions made in the summary to reflect site conditions. For example, cPAH TEQs are potential surface water contaminants of concern. In addition, discuss how potential false positives were identified and whether or not they are included in the data analysis.

6.26 Sitewide Methane

Provide site figures for each monitoring event, differentiating where UEL and LEL concentrations for methane are located on the figures.

Section 7 – RI summary

Please discuss all data in terms of nature and extent throughout the entire Site instead of using the areas of concern to delineate.

7.2 Groundwater – Drinking Water

MTCA uses the terminology "leaching pathway" to represent areas of drinking water that may be impacted by contamination. Please revise this discussion based on the PCUL spreadsheet. For example, the surface water pathway for some contaminants has not been determined to be incomplete, and must be addressed in some way for the feasibility study (FS). Provide more details regarding any empirical demonstration used to determine pathways.

7.5 and 7.6 AOCs closed out during RI, and included in FS

As stated previously, all data must be considered throughout the entire site before any areas of concern can be included or eliminated.

Section 8 – Recommendations

Ecology believes it is appropriate to proceed with the FS. However, data gaps have been identified throughout the draft RI. Ecology looks forward to further discussion on how and when to fill these data gaps.

8.1 Feasibility Study Scoping

Due to the size and complexity of contamination at this Site, Ecology will be requesting a full FS instead of a technical memo. We look forward to collaborating on approaches to fulfill this requirement. Further discussion of edits regarding initial screening of alternatives and the FS schedule are premature, and should be removed from the draft RI for addition to the FS at a later date. This RI is specifically intended to answer the question of nature and extent of contamination at the Site.

Tables

General Comments:

Please use sediments appropriately as discussed previously.

Please update all tables with PCULs from the Ecology provided spreadsheet.

Table 2: Please include a column detailing the change in water levels from previous sampling events.

Table 3: Please update this table.

Table 7: Please use Leaching Pathway instead of the phrase Drinking Water in the table description.

Table 8: Clarify the title of the table-current description is confusing. Separate samples by creating an additional table for the surface water sampling results.

Figures

General comments

For draft RI review purposes, Ecology requested additional figures to delineate nature and extent of contamination. Those figures were provided.

Please identify all surface water intakes and outfalls on a separate figure encompassing the entire site.

Update all figures using Ecology provided PCUL tables. Cross check all legends on figures for completeness. Replace/remove AOC separate figures with Site wide figures depicting lateral and vertical extent of contaminants of concern.

Figure containing groundwater field measurements:

Provide a directional arrow for groundwater flow on all figures.

Cross sectional figures:

The legend contains a monitoring well screen that only appears in one well in the figure. Ecology is not certain what the grey lined boxes around other wells is meant to depict – please update figure for clarity. Cross section F-F' includes a greyed in box at TP-02-AOC11 that does not have a corresponding legend-please clarify.

Update CSM cross section based on previous comments.

Figure 34: Please calculate volumes of log yard material (necessary for FS and draft Corrective Action Plan) and add to figure. Clearly define areal extent of metals contamination on figure.

Figure 38: Define area of potential methane LEL exceedances with a border

Thank you for all your efforts and hard work. We appreciate your commitment as we move this Site forward. Please feel free to contact me by phone at 509-454-7840 or 509-571-6661 or by email at Mary.Monahan@ecy.wa.gov with any questions or concerns.

Regards,

Mary Monahan
Project Manager
Toxics Cleanup Program
Central Regional Office

Enclosure: PCUL and COPC List

By certified mail: 7014 3490 0001 5526 4670

cc: Derek Threet, Attorney General's Office, Ecology Division

Analyte	CAS	H.H. GW Method A (ug/L)	H.H. GW Method B (ug/L)	Final Protective Value (ug/L)	Consultant MRL (ug/L)	Ecology MRL (ug/L)	Final PQL (ug/L)	PCUL (ug/L)	Highest Value Detected (ug/L)	COPC ?	Note
TPH-Gx (gasoline-extended range) - Benzene Present	x	8.00E+02	x	8.00E+02	5.00E+01	2.50E+02	2.50E+02	8.00E+02	<50	n	
TPH-Dx (diesel and heavy-oil ranges combined)	x	5.00E+02	x	5.00E+02	2.50E+02	2.50E+02	2.50E+02	5.00E+02	8.03E+05	y	Check Well Placement
Acetone	67-64-1	x	7.20E+03	7.20E+03	5.00E+00	1.00E+00	1.00E+00	7.20E+03	6.28E+00	n	
Benzene	71-43-2	5.00E+00	5.00E+00	5.00E+00	1.00E-02	1.00E+00	1.00E+00	5.00E+00	8.19E-02	n	
Bis(2-ethylhexyl)phthalate	117-81-7	x	6.00E+00	6.00E+00	5.00E-01	2.00E-01	2.00E-01	6.00E+00	9.50E-01	n	
Butyl benzyl phthalate	85-68-7	x	4.61E+01	4.61E+01	6.10E-01	2.00E-01	2.00E-01	4.61E+01	<0.61	n	
Carbon tetrachloride	56-23-5	x	5.00E+00	5.00E+00	6.25E-01	1.00E+00	1.00E+00	5.00E+00	<.625	n	
Chloroform	67-66-3	x	1.41E+01	1.41E+01	1.00E+00	1.00E+00	1.00E+00	1.41E+01	2.19E+00	n	
1,2 Dibromethane (EDB)	106-93-4	1.00E-02	5.00E-02	5.00E-02	1.00E-02	1.00E-02	1.00E-02	5.00E-02	<0.01	n	
1,2 Dichloroethane (EDC)	107-06-2	5.00E+00	4.81E+00	5.00E+00	1.00E-02	1.00E+00	1.00E+00	5.00E+00	<0.01	n	
Ethylbenzene	100-41-4	7.00E+02	7.00E+02	7.00E+02	1.00E+00	1.00E+00	1.00E+00	7.00E+02	<1	n	
Methyl ethyl ketone (2-Butanone)	78-93-3	x	x	x	5.00E+00	1.00E+00	1.00E+00	x	<5	n	
Methyl tertiary butyl ether (MTBE)	1634-04-4	2.00E+01	2.43E+01	2.43E+01	1.00E+00	1.00E+00	1.00E+00	2.43E+01	<1	n	
Methylene chloride	75-09-2	5.00E+00	5.00E+00	5.00E+00	1.00E+00	1.00E+00	1.00E+00	5.00E+00	<1	n	
Napthalene	91-20-3	1.60E+02	1.60E+02	1.60E+02	1.00E-01	1.00E+00	1.00E+00	1.60E+02	6.34E-01	n	
Pentachlorophenol	87-86-5	x	1.00E+00	1.00E+00	1.00E-01	6.00E-02	6.00E-02	1.00E+00	8.09E-01	n	
Tetrachloroethylene (PCE)	127-18-4	5.00E+00	5.00E+00	5.00E+00	1.00E+00	1.00E+00	1.00E+00	5.00E+00	<1	n	
Toluene	108-88-3	1.00E+03	6.40E+02	1.00E+03	1.00E+00	1.00E+00	1.00E+00	1.00E+03	3.27E+00	n	
Trichloroethylene (TCE)	79-01-6	5.00E+00	4.00E+00	5.00E+00	5.00E-01	1.00E+00	1.00E+00	5.00E+00	<0.5	n	
Vinyl Chloride	75-01-4	2.00E-01	2.92E-01	2.92E-01	1.00E-01	1.00E+00	1.00E+00	1.00E+00	1.49E-02	n	
Xylenes	1330-20-7	1.00E+03	1.60E+03	1.60E+03	1.00E+00	1.00E+00	1.00E+00	1.60E+03	<1	n	
cPAHs											
Benzo(a)anthracene	56-55-3	x	x	x	1.00E-01	2.00E-02	2.00E-02	x	<0.1	n	
Benzo(a)pyrene	50-32-8	1.00E-01	2.00E-01	2.00E-01	7.30E-03	2.00E-02	2.00E-02	2.00E-01	1.05E-02	n	
Benzo(b)fluoranthene	205-99-2	x	x	x	1.00E-01	2.00E-02	2.00E-02	x	2.35E-01	n	
Benzo(k)fluoranthene	207-08-9	x	x	x	3.20E-02	2.00E-02	2.00E-02	x	<0.032	n	
Chrysene	218-01-9	x	x	x	1.00E-01	2.00E-02	2.00E-02	x	<0.1	n	
Dibenz(a,h)anthracene	53-70-3	x	x	x	2.10E-03	2.00E-02	2.00E-02	x	3.36E-03	n	
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	1.00E-01	2.00E-02	2.00E-02	x	<0.1	n	
Total Toxicity Equivalent (1) Concentration (TEQ)	x	1.00E-01	2.00E-01	2.00E-01		1.40E-01	2.00E-02	2.00E-01	3.43E-02	n	
Metals (mg/L)											
Arsenic	7440-38-2	5.00E+00	5.00E+00	5.00E+00	2.50E-03	5.00E-01	5.00E-01	5.00E+00	1.11E-02	n	
Cadmium	7440-43-9a	5.00E+00	5.00E+00	5.00E+00	2.00E-04	1.00E-01	1.00E-01	5.00E+00	1.02E-03	n	
Chromium VI	18540-29-9	5.00E+01	4.80E+01	5.00E+01		5.00E-01	5.00E-01	5.00E+01		x	
Total Chromium	7440-47-3	5.00E+01	x	5.00E+01	1.00E-03	5.00E-01	5.00E-01	5.00E+01	1.74E-02	n	
Copper	7440-50-8	x	6.40E+02	6.40E+02	5.00E-04	1.00E-01	1.00E-01	6.40E+02	1.11E-01	n	
Iron	7439-89-6	x	x	x	1.00E+00	2.00E+01	2.00E+01	x	5.41E+01	x	
Lead	7439-92-1	1.50E+01	1.50E+01	1.50E+01	1.00E-03	1.00E-01	1.00E-01	1.50E+01	6.08E-03	n	
Manganese	7439-96-5a	x	x	x	2.00E-02	1.00E-01	1.00E-01	x	5.93E+00	x	
Nickel	7440-02-0	x	1.00E+02	1.00E+02	2.00E-03	1.00E-01	1.00E-01	1.00E+02	8.83E-02	n	
Silver	7440-22-4	x	8.00E+01	8.00E+01	2.00E-04	1.00E-01	1.00E-01	8.00E+01	6.81E-04	n	
Zinc	7440-66-6	x	4.80E+03	4.80E+03	3.50E-03	5.00E+00	5.00E+00	4.80E+03	1.31E-01	n	

Analyte	CAS	H.H. SW Method B (ug/L)	H.H. SW ARAR (ug/L)	H.H. SW Eco (ug/L)	Final Protective Value (ug/L)	Consultant MRL (ug/L)	Ecology MRL (ug/L)	Final PQL (ug/L)	PCUL (ug/L)	Highest Value Detected (ug/L)	COPC ?
TPH-Gx (gasoline-extended range) - Benzene Present	x	8.00E+02	x	1.00E+03	8.00E+02	5.00E+01	2.50E+02	2.50E+02	8.00E+02	<50	n
TPH-Dx (diesel and heavy-oil ranges combined)	x	5.00E+02	x	3.00E+03	5.00E+02	2.50E+02	2.50E+02	2.50E+02	5.00E+02	8.03E+05	y
Acetone	67-64-1	x	x	x	x	5.00E+00	1.00E+00	1.00E+00	x	6.28E+00	x
Benzene	71-43-2	2.30E+01	4.40E+01	1.00E+01	1.00E+01	1.00E-02	1.00E+00	1.00E+00	1.00E+01	8.19E-02	n
Bis(2-ethylhexyl)phthalate	117-81-7	3.60E+00	4.50E-02	x	4.50E-02	5.00E-01	2.00E-01	2.00E-01	2.00E-01	9.50E-01	y
Butyl benzyl phthalate	85-68-7	8.20E+00	1.30E-02	x	1.30E-02	6.10E-01	2.00E-01	6.10E-01	6.10E-01	<0.61	n
Carbon tetrachloride	56-23-5	4.90E+00	2.00E-01	x	2.00E-01	6.25E-01	1.00E+00	1.00E+00	1.00E+00	<.625	n
Chloroform	67-66-3	5.60E+01	6.00E+01	x	6.00E+01	1.00E+00	1.00E+00	1.00E+00	6.00E+01	2.19E+00	n
1,2 Dibromethane (EDB)	106-93-4	x	x	x	x	1.00E-02	1.00E-02	1.00E-02	x	<0.01	x
1,2 Dichloroethane (EDC)	107-06-2	5.90E+01	8.90E+00	x	8.90E+00	1.00E-02	1.00E+00	1.00E+00	8.90E+00	<0.01	n
Ethylbenzene	100-41-4	6.90E+03	2.90E+01	1.20E+01	1.20E+01	1.00E+00	1.00E+00	1.00E+00	1.20E+01	<1	n
Methyl ethyl ketone (2-Butanone)	78-93-3	x	x	x	x	5.00E+00	1.00E+00	1.00E+00	x	<5	x
Methyl tertiary butyl ether (MTBE)	1634-04-4	x	x	x	x	1.00E+00	1.00E+00	1.00E+00	x	<1	x
Methylene chloride	75-09-2	5.90E+02	1.00E+01	x	1.00E+01	1.00E+00	1.00E+00	1.00E+00	1.00E+01	<1	n
Napthalene	91-20-3	4.90E+03	x	x	4.90E+03	1.00E-01	1.00E+00	1.00E+00	4.90E+03	6.34E-01	n
Pentachlorophenol	87-86-5	1.50E+00	2.00E-03	1.30E+01	2.00E-03	1.00E-01	6.00E-02	6.00E-02	6.00E-02	8.09E-01	y
Tetrachloroethylene (PCE)	127-18-4	1.00E+02	2.40E+00	x	2.40E+00	1.00E+00	1.00E+00	1.00E+00	2.40E+00	<1	n
Toluene	108-88-3	1.90E+04	5.70E+01	5.30E+01	5.30E+01	1.00E+00	1.00E+00	1.00E+00	5.30E+01	3.27E+00	n
Trichloroethylene (TCE)	79-01-6	4.90E+00	3.00E-01	x	3.00E-01	5.00E-01	1.00E+00	1.00E+00	1.00E+00	<0.5	n
Vinyl Chloride	75-01-4	3.70E+00	2.00E-02	x	2.00E-02	1.00E-01	1.00E+00	1.00E+00	1.00E+00	1.49E-02	n
Xylenes	1330-20-7	x	x	5.70E+01	5.70E+01	1.00E+00	1.00E+00	1.00E+00	5.70E+01	<1	n
cPAHs											
Benzo(a)anthracene	56-55-3	x	1.60E-04	x	1.60E-04	1.00E-01	2.00E-02	2.00E-02	2.00E-02	<0.1	n
Benzo(a)pyrene	50-32-8	3.50E-02	1.60E-05	x	1.60E-05	7.30E-03	2.00E-02	2.00E-02	2.00E-02	1.05E-02	n
Benzo(b)fluoranthene	205-99-2	x	1.60E-04	x	1.60E-04	1.00E-01	2.00E-02	2.00E-02	2.00E-02	2.35E-01	n
Benzo(k)fluoranthene	207-08-9	x	1.60E-03	x	1.60E-03	3.20E-02	2.00E-02	2.00E-02	2.00E-02	<0.032	n
Chrysene	218-01-9	x	1.60E-02	x	1.60E-02	1.00E-01	2.00E-02	2.00E-02	2.00E-02	<0.1	n
Dibenz(a,h)anthracene	53-70-3	x	1.60E-05	x	1.60E-05	2.10E-03	2.00E-02	2.00E-02	2.00E-02	3.36E-03	n
Indeno(1,2,3-cd)pyrene	193-39-5	x	1.60E-04	x	1.60E-04	1.00E-01	2.00E-02	2.00E-02	2.00E-02	<0.1	n
Total Toxicity Equivalent (1) Concentration (TEQ)	x	3.50E-02	1.60E-05	x	1.60E-05		1.40E-01	2.00E-02	2.00E-02	3.43E-02	y
Metals (mg/kg)											
Arsenic	7440-38-2	9.80E-02	1.80E-02	1.50E+02	1.80E-02	2.50E-03	5.00E-01	5.00E-01	5.00E-01	1.11E-02	n
Cadmium	7440-43-9a	x	x	7.20E-01	7.20E-01	2.00E-04	1.00E-01	1.00E-01	7.20E-01	1.02E-03	n
Chromium VI	18540-29-9	4.90E+02	x	1.00E+01	1.00E+01	x	5.00E-01	5.00E-01	1.00E+01	x	n
Total Chromium	7440-47-3	x	x	x	x	1.00E-03	5.00E-01	5.00E-01	x	1.74E-02	n
Copper	7440-50-8	2.90E+03	1.30E+03	1.10E+01	1.10E+01	5.00E-04	1.00E-01	1.00E-01	1.10E+01	1.11E-01	n
Iron	7439-89-6	x	1.00E+03	1.00E+03	1.00E+03	1.00E+00	2.00E+01	2.00E+01	1.00E+03	5.41E+01	n
Lead	7439-92-1	x	x	2.50E+00	2.50E+00	1.00E-03	1.00E-01	1.00E-01	2.50E+00	6.08E-03	n
Manganese	7439-96-5a	x	5.00E+01	x	5.00E+01	2.00E-02	1.00E-01	1.00E-01	5.00E+01	5.93E+00	n
Nickel	7440-02-0	1.10E+03	8.00E+01	5.20E+01	5.20E+01	2.00E-03	1.00E-01	1.00E-01	5.20E+01	8.83E-02	n
Silver	7440-22-4	2.60E+04	x	3.20E+00	3.20E+00	2.00E-04	1.00E-01	1.00E-01	3.20E+00	6.81E-04	n
Zinc	7440-66-6	1.70E+04	2.30E+03	1.00E+02	1.00E+02	3.50E-03	5.00E+00	5.00E+00	1.00E+02	1.31E-01	n

Note
Check Well Placement
Check Well Placement
Check Well Placement
Check Well Placement

3-Phase Model - Soil protective of groundwater/surface water	
Groundwater Cleanup Level (µg/Liter)	1.00E+02
Units Conversion (1 mg/1000 µg)	1.00E-03
Dilution Factor - Saturated Zone (1)	2.00E+01
Distribution Coefficient Kd (Liters/kg)	6.20E+01
Water-filled Soil Porosity - Saturated (ml water/ml soil)	3.00E-01
Air-filled Soil Porosity Saturated (ml air/ml soil)	1.30E-01
Henry's Law Constant - Hcc - dimensionless	0.00E+00
Dry Soil Bulk Density (kg/Liter)	1.50E+00
Soil Cleanup Level Protective of Groundwater - Saturated (mg/kg)	1.24E+02
Unsaturated Conditions	

Analyte	CAS	GW PCUL (ug/L)	SW PCUL (ug/L)	HCC @ 13° C (no unit)	Koc (L/Kg)	Kd (L/Kg)
TPH-Gx (gasoline-extended range) - Benzene Present	x	8.00E+02	8.00E+02	x	x	x
TPH-Dx (diesel and heavy-oil ranges combined)	x	5.00E+02	5.00E+02	x	x	x
Acetone	67-64-1	7.20E+03	x	9.68E-04	5.75E-01	5.75E-04
Benzene	71-43-2	5.00E+00	1.00E+01	1.33E-01	6.20E+01	6.20E-02
Bis(2-ethylhexyl)phthalate	117-81-7	6.00E+00	2.00E-01	6.56E-07	1.11E+05	1.11E+02
Butyl benzyl phthalate	85-68-7	4.61E+01	6.10E-01	1.11E-05	1.37E+04	1.37E+01
Carbon tetrachloride	56-23-5	5.00E+00	1.00E+00	7.42E-01	1.52E+02	1.52E-01
Chloroform	67-66-3	1.41E+01	6.00E+01	9.15E-02	5.30E+01	5.30E-02
1,2 Dibromethane (EDB)	106-93-4	5.00E-02	x	1.54E-02	6.60E+01	6.60E-02
1,2 Dichloroethane (EDC)	107-06-2	5.00E+00	8.90E+00	2.28E-02	3.80E+01	3.80E-02
Ethylbenzene	100-41-4	7.00E+02	1.20E+01	1.62E-01	2.04E+02	2.04E-01
Methyl ethyl ketone (2-Butanone)	78-93-3	x	x	1.31E-03	x	x
Methyl tertiary butyl ether (MTBE)	1634-04-4	2.43E+01	x	1.59E-02	1.09E+01	1.09E-02
Methylene chloride	75-09-2	5.00E+00	1.00E+01	5.67E-02	1.00E+01	1.00E-02
Napthalene	91-20-3	1.60E+02	4.90E+03	8.24E-03	1.19E+03	1.19E+00
Pentachlorophenol	87-86-5	1.00E+00	6.00E-02	2.10E-07	5.92E+02	5.92E-01
Tetrachloroethylene (PCE)	127-18-4	5.00E+00	2.40E+00	3.98E-01	2.65E+02	2.65E-01
Toluene	108-88-3	1.00E+03	5.30E+01	1.48E-01	1.40E+02	1.40E-01
Trichloroethylene (TCE)	79-01-6	5.00E+00	1.00E+00	2.39E-01	9.40E+01	9.40E-02
Vinyl Chloride	75-01-4	1.00E+00	1.00E+00	8.07E-01	1.86E+01	1.86E-02
Xylenes	1330-20-7	1.60E+03	5.70E+01	1.38E-01	2.33E+02	2.33E-01
cPAHs						
Benzo(a)anthracene	56-55-3	x	2.00E-02	1.37E-04	3.58E+05	3.58E+02
Benzo(a)pyrene	50-32-8	2.00E-01	2.00E-02	6.39E-06	9.69E+05	9.69E+02
Benzo(b)fluoranthene	205-99-2	x	2.00E-02	7.73E-04	1.23E+06	1.23E+03
Benzo(k)fluoranthene	207-08-9	x	2.00E-02	5.13E-06	1.23E+06	1.23E+03
Chrysene	218-01-9	x	2.00E-02	7.13E-04	3.98E+05	3.98E+02
Dibenz(a,h)anthracene	53-70-3	x	2.00E-02	6.03E-07	1.79E+06	1.79E+03
Indeno(1,2,3-cd)pyrene	193-39-5	x	2.00E-02	8.40E-06	3.47E+06	3.47E+03
Total Toxicity Equivalent (1) Concentration (TEQ)	x	2.00E-01	2.00E-02	6.39E-06	9.69E+05	9.69E+02
Metals (mg/kg)						
Arsenic	7440-38-2	5.00E+00	5.00E-01	0.00E+00	x	2.90E+01
Cadmium	7440-43-9a	5.00E+00	7.20E-01	0.00E+00	x	6.70E+00
Chromium VI	18540-29-9	5.00E+01	1.00E+01	0.00E+00	x	1.90E+01
Total Chromium	7440-47-3	5.00E+01	x	x	x	x
Copper	7440-50-8	6.40E+02	1.10E+01	0.00E+00	x	2.20E+01
Iron	7439-89-6	x	1.00E+03	0.00E+00	x	x
Lead	7439-92-1	1.50E+01	2.50E+00	0.00E+00	x	1.00E+04
Manganese	7439-96-5a	x	5.00E+01	0.00E+00	x	x
Nickel	7440-02-0	1.00E+02	5.20E+01	0.00E+00	x	6.50E+01
Silver	7440-22-4	8.00E+01	3.20E+00	0.00E+00	x	8.30E+00
Zinc	7440-66-6	4.80E+03	1.00E+02	0.00E+00	x	6.20E+01

Soil Protective of GW (mg/kg)	Soil Protective of SW (mg/kg)
3.00E+01	3.00E+01
2.00E+03	2.00E+03
2.89E+01	x
2.74E-02	5.47E-02
1.33E+01	4.45E-01
1.28E+01	1.70E-01
4.16E-02	8.33E-03
7.36E-02	3.13E-01
2.67E-04	x
2.40E-02	4.27E-02
5.85E+00	1.00E-01
x	x
1.03E-01	x
2.15E-02	4.30E-02
4.45E+00	1.36E+02
1.58E-02	9.50E-04
4.99E-02	2.40E-02
7.06E+00	3.74E-01
3.15E-02	6.29E-03
5.77E-03	5.77E-03
1.42E+01	5.07E-01
x	1.43E-01
3.88E+00	3.88E-01
x	4.92E-01
x	4.92E-01
x	1.59E-01
x	7.16E-01
x	1.39E+00
3.88E+00	3.88E-01
2.92E+00	2.92E-01
6.90E-01	9.94E-02
1.92E+01	3.84E+00
x	x
2.84E+02	4.88E+00
x	x
3.00E+03	5.00E+02
x	x
1.30E+02	6.78E+01
1.36E+01	5.44E-01
5.97E+03	1.24E+02

Analyte	CAS	Soil Method A (mg/kg)	Soil Method B Direct Contact (mg/kg)	Soil Method B Protection of Groundwater (mg/kg)	Method B Protection of Surface Water (mg/kg)	Simplified TEE Unrestricted (mg/kg)	Consultant Reporting Limit (mg/kg)	Ecology Reporting Limit (mg/kg)	Agreed upon PQL (mg/kg)	Natural Background (mg/kg)	PCUL (mg/kg)	Highest Recorded Value (mg/kg)	COC?	Based on?
TPH-Gx (gasoline-extended range) - Benzene Present	x	3.00E+01	x	3.00E+01	3.00E+01	2.00E+02	5.89E+00	5.00E+00	5.00E+00	x	3.00E+01	1.80E+02	y	H.H.
TPH-Dx (diesel and heavy-oil ranges combined)	x	2.00E+03	x	2.00E+03	2.00E+03	4.60E+02	2.48E+01	2.50E+01	2.50E+01	x	4.60E+02	2.86E+04	y	TEE
Acetone	67-64-1	x	7.20E+04	2.89E+01	x	x	5.00E-01	1.00E-01	5.00E-01	x	7.20E+04	ND	n	
Benzene	71-43-2	3.00E-02	1.80E+01	2.74E-02	5.47E-02	x	2.35E-02	5.00E-03	2.35E-02	x	1.80E+01	1.52E-01	n	
Bis(2-ethylhexyl)phthalate	117-81-7	x	7.10E+01	1.33E+01	4.45E-01	x	5.30E-02	5.00E-02	5.30E-02	x	4.45E-01	1.26E+00	y	Soil>GW>SW
Butyl benzyl phthalate	85-68-7	x	5.30E+02	1.28E+01	1.70E-01	x	5.20E-02	5.00E-02	5.20E-02	x	5.30E+02	2.41E-01	n	
Carbon tetrachloride	56-23-5	x	1.40E+01	4.16E-02	8.33E-03	x	5.00E-02	1.00E-03	5.00E-02	x	1.40E+01	ND	n	
Chloroform	67-66-3	x	3.20E+01	7.36E-02	3.13E-01	x	2.21E-02	1.00E-03	2.21E-02	x	3.20E+01	1.57E-01	n	
1,2 Dibromethane (EDB)	106-93-4	5.00E-03	5.00E-01	2.67E-04	x	x	5.00E-03	1.00E-03	5.00E-03	x	5.00E-01	ND	n	
1,2 Dichloroethane (EDC)	107-06-2	x	1.10E+01	2.40E-02	4.27E-02	x	2.00E-02	1.00E-03	2.00E-02	x	1.10E+01	ND	n	
Ethylbenzene	100-41-4	6.00E+00	8.00E+03	5.85E+00	1.00E-01	x	2.92E-02	5.00E-03	2.92E-02	x	8.00E+03	6.10E+00	n	
Methyl ethyl ketone (2-Butanone)	78-93-3	x	4.80E+04	x	x	x	5.00E-02	1.00E-03	5.00E-02	x	4.80E+04	ND	n	
Methyl tertiary butyl ether (MTBE)	1634-04-4	x	5.60E+02	1.03E-01	x	x	5.00E-02	1.00E-03	5.00E-02	x	5.60E+02	ND	n	
Methylene chloride	75-09-2	2.00E-02	9.40E+01	2.15E-02	4.30E-02	x	5.00E-02	1.00E-03	5.00E-02	x	9.40E+01	ND	n	
Napthalene	91-20-3	5.00E+00	1.60E+03	4.45E+00	1.36E+02	x	4.23E-02	5.00E-01	4.23E-02	x	1.60E+03	ND	n	
Pentachlorophenol	87-86-5	x	2.50E+00	1.58E-02	9.50E-04	1.10E+01	4.10E-02	1.60E-02	4.10E-02	x	4.10E-02	ND	n	
Tetrachloroethylene (PCE)	127-18-4	5.00E-02	4.80E+02	4.99E-02	2.40E-02	x	5.00E-02	1.00E-03	5.00E-02	x	4.80E+02	ND	n	
Toluene	108-88-3	7.00E+00	6.40E+03	7.06E+00	3.74E-01	x	2.23E-02	5.00E-03	2.23E-02	x	6.40E+03	2.35E+01	n	
Trichloroethylene (TCE)	79-01-6	3.00E-02	1.20E+01	3.15E-02	6.29E-03	x	5.00E-02	1.00E-03	5.00E-02	x	1.20E+01	ND	n	
Vinyl Chloride	75-01-4	x	6.70E-01	5.77E-03	5.77E-03	x	5.00E-02	1.00E-03	5.00E-02	x	6.70E-01	ND	n	
Xylenes	1330-20-7	9.00E+00	1.60E+04	1.42E+01	5.07E-01	x	5.91E-02	5.00E-03	5.91E-02	x	1.60E+04	1.71E-01	n	
cPAHs														
Benzo(a)anthracene	56-55-3	x	x	x	1.43E-01	x	4.23E-02	5.00E-02	5.00E-02	x	x	1.08E+01	n	
Benzo(a)pyrene	50-32-8	1.00E-01	1.90E-01	3.88E+00	3.88E-01	3.00E+01	4.22E-02	5.00E-02	5.00E-02	x	1.90E-01	1.02E+01	y	H.H
Benzo(b)fluoranthene	205-99-2	x	x	x	4.92E-01	x	4.23E-02	5.00E-02	5.00E-02	x	x	8.05E+00	n	
Benzo(k)fluoranthene	207-08-9	x	x	x	4.92E-01	x	4.23E-02	5.00E-02	5.00E-02	x	x	ND	n	
Chrysene	218-01-9	x	x	x	1.59E-01	x	4.22E-02	5.00E-02	5.00E-02	x	x	1.06E+01	n	
Dibenz(a,h)anthracene	53-70-3	x	x	x	7.16E-01	x	4.26E-02	5.00E-02	5.00E-02	x	x	1.53E-01	n	
Indeno(1,2,3-cd)pyrene	193-39-5	x	x	x	1.39E+00	x	4.32E-02	5.00E-02	5.00E-02	x	x	2.79E-01	n	
Total Toxicity Equivalent (1) Concentration (TEQ)	x	1.00E-01	1.90E-01	3.88E+00	3.88E-01	x		5.00E-02	5.00E-02	x	1.90E-01	1.30E+01	y	H.H
Metals (mg/kg)														
Arsenic	7440-38-2	2.00E+01	6.70E-01	2.92E+00	2.92E-01	2.00E+01	3.22E-01	1.00E-01	3.22E-01	2.00E+01	2.00E+01	2.92E+01	y	N.B.
Cadmium	7440-43-9a	2.00E+00	8.00E+01	6.90E-01	9.94E-02	2.50E+01	1.72E-01	1.00E-01	1.72E-01	1.00E+00	2.50E+01	4.15E+00	n	
Chromium VI	18540-29-9	1.90E+01	2.40E+02	1.92E+01	3.84E+00	4.20E+01	5.51E-01	5.00E-01	5.51E-01	4.20E+01	4.20E+01	5.80E-01	n	
Total Chromium	7440-47-3	x	x	x	x	4.20E+01	x	5.00E-01	5.00E-01	4.20E+01	x	ND	n	
Copper	7440-50-8	x	3.20E+03	2.84E+02	4.88E+00	1.00E+02	2.57E-01	1.00E-01	2.57E-01	3.60E+01	1.00E+02	9.75E+01	n	
Iron	7439-89-6	x	5.60E+04	x	x	x	x	5.00E+00	5.00E+00	5.15E+04	5.60E+04	ND	n	
Lead	7439-92-1	2.50E+02	x	3.00E+03	5.00E+02	2.20E+02	2.57E-01	1.00E-01	2.57E-01	1.70E+01	2.20E+02	1.87E+03	y	TEE
Manganese	7439-96-5a	x	3.70E+03	x	x	x	x	1.00E-01	1.00E-01	1.10E+03	3.70E+03	ND	n	
Nickel	7440-02-0	x	1.60E+03	1.30E+02	6.78E+01	1.00E+02	6.44E-01	1.00E-01	6.44E-01	4.60E+01	1.00E+02	3.60E+01	n	
Silver	7440-22-4	x	4.00E+02	1.36E+01	5.44E-01	x	8.69E-02	1.00E-01	8.69E-02	x	4.00E+02	5.06E-01	n	
Zinc	7440-66-6	x	2.40E+04	5.97E+03	1.24E+02	2.70E+02	6.44E-01	5.00E+00	6.44E-01	8.60E+01	2.70E+02	5.61E+02	y	TEE

Additional Contaminants Not Detected	
Analyte	**CAS**
PCBs	
Aroclor 1016	12674-11-2
Aroclor 1221	11104-28-2
Aroclor 1232	11141-16-5
Aroclor 1242	53469-21-9
Aroclor 1248	12672-29-6
Aroclor 1254	11097-69-1
Aroclor 1260	11096-82-5
Aroclor 1262	37324-23-5
Aroclor 1268	11100-14-4
Herbicides	
2,4,5-TP (Silvex)	93-72-1
2,4,5-Trichlorophenoxyacetic Acid	93-76-5
2,4-D	94-75-7
2,4-DB	94-82-6
3,5-Dichlorobenzoic Acid	51-36-5
4-Nitrophenol	100-02-7
Acifluorfen	62476-59-9
Bentazone	25057-89-0
Chloramben	133-90-4
Dalapon	75-99-0
DCPA Acid (Dacthal)	1861-32-1
Dicamba	1918-00-9
Dichloroprop	120-36-5
Dinoseb (DNBP)	88-85-7
MCPA	94-74-6
MCPP	93-65-2
Picloram	2/1/1918
Pesticides	
4',4-DDD	72-54-8
4',4-DDE	72-55-9
4,4-DDT	50-29-3
a-BHC	319-84-6
Aldrin	309-00-2
b-BHC	319-85-7
Chlordane, cis (alpha)	5103-71-9
Chlordane, gamma	12789-03-6
d-BHC	319-86-8
Dieldrin	60-57-1
Endosulfan I	959-98-8
Endosulfan II	33213-65-9
Endosulfan Sulfate	1031-07-8
Endrin	72-20-8
Endrin Aldehyde	7421-93-4
Endrin Ketone	53494-70-5
g-BHC	58-89-9
Heptachlor	76-44-8
Heptachlor Epoxide	1024-57-3
Methoxychlor	72-43-5
Toxaphene	8001-35-2