Feasibility Study Comprehensive Data Gaps Work Plan
DEQ Comment and Response Matrix

ID No.	Section Name/Topic	Section/Table/ Figure No.	Page No.	DEQ Comment	Category	NW Natural Response
Introduction						
--	--	--	--	The Oregon Department of Environmental Quality (DEQ) reviewed the *Draft Feasibility Study Comprehensive Data Gaps Work Plan*[1] (Draft DGWP) for the Former Gasco Manufactured Gas Plant Operable Unit (Gasco OU) dated September 13, 2022. Anchor QEA, LLC prepared the Draft DGWP on behalf of NW Natural. The Draft DGWP describes sampling of environmental media in the Siltronic Geographic Subarea (GSA) of the Gasco OU and Fill water bearing zone (WBZ) monitoring well pumping tests in the Gasco OU.	--	--
--	--	--	--	The Draft DGWP was prepared in response to DEQ April 11, 2022 comments[2] to the *Draft Remedial Investigation/Human Health and Ecological Risk Assessment Addendum* for the Siltronic GSA[3] (RI/HERA Addendum). Our comments identified chlorinated herbicides and pesticides, polychlorinated biphenyls (PCBs), and dioxins/furans as contaminants with limited data within the Remedial Investigation (RI) and Human Health and Ecological Risk Assessment (HERA) datasets for fill soil and Fill WBZ groundwater on the Siltronic GSA. Our comments also requested additional data density for the southern portion of the Siltronic GSA to improve the understanding of the nature and extent of contamination in this portion of the Gasco OU.	--	--
--	--	--	--	The Draft DGWP proposes using soil and groundwater data collected by Maul Foster & Alongi, Inc. (MFA) on behalf of Siltronic Corporation (Siltronic) between 2016 and 2019 to fill some of the data gaps identified in Our April 11, 2022 comments. These data were collected without DEQ oversight for Siltronic's own use, and therefore required additional support and review for DEQ to conclude that the data could be incorporated into the Gasco OU Feasibility Study (FS) database. NW Natural provided these data to DEQ in an email dated July 29, 2022[4]. On August 10, 2022[5], DEQ outlined the parameters that we planned to use as the basis for our review and approval of the Siltronic data and we identified two data use objectives (DUOs) that would guide our review. Section 2 of the Draft DGWP summarizes these DUOs. In response to a request from DEQ[6], NW Natural provided supplemental information and clarification regarding the sampling approach used during certain Siltronic sampling events on September 20, 2022[7]. DEQ communicated the approval status of the Siltronic-collected data in an email dated September 28, 2022[8].	--	--
--	--	--	--	In general, the Draft DGWP does not provide enough information to justify the proposed sampling scope of work. Please either prepare a "response to comment matrix" providing the necessary information to resolve to our comments below or submit a revised DGWP that addresses our comments.	Agree	NW Natural has prepared this RTC and attached supplemental information to resolve DEQ comments in lieu of submitting a revised DGWP.

[1] Anchor QEA, LLC. 2022. Feasibility Study Comprehensive Data Gaps Work Plan. Gasco OU. Prepared for NW Natural. September.
[2] DEQ. 2022. Draft Remedial Investigation and Human Health and Ecological Risk Assessment Addendum – Siltronic Geographical Subarea, Former Gasco Manufactured Gas Plant Operable Unit, Portland, Oregon, ECSI #84. April 11.
[3] Anchor QEA, LLC and Hahn and Associates, Inc. 2019. Remedial Investigation/Human Health and Ecological Risk Assessment Addendum for the Siltronic GSA. Gasco OU. Prepared for NW Natural. November 22.
[4] Hahn and Associates, Inc. 2022. Email to Wesley Thomas, DEQ. Subject: Siltronic analytical data transfer. July 29.
[5] DEQ. 2022. Email to Rob Ede, Hahn and Associates, Inc. Subject: Siltronic analytical data transfer. August 10.
[6] DEQ 2022. Email to Rob Ede, Hahn and Associates, Inc. Subject: Siltronic analytical data transfer. August 26.
[7] Hahn and Associates, Inc. 2022. Email to Wesley Thomas, DEQ. Subject: Siltronic analytical data transfer. September 20.
[8] 2022. Email to Rob Ede, Hahn and Associates, Inc. Subject: Siltronic analytical data transfer. September 28.

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General Comments						
1.	--	--	--	The Draft DGWP provides figures showing the locations of soil samples and monitoring wells sampled and analyzed for data gap contaminant of interest (COIs) by Siltronic and includes a database export of these data. The Draft DGWP is missing any assessment of the DEQ-approved Siltronic data, including presentation of summary statistics, estimation of exposure point concentrations (EPCs), screening of EPCs against applicable risk-based concentrations (RBCs), and identification of contaminant of concern (COCs). Without this information, DEQ is unable to confirm that the proposed scope of work is sufficient for filling all of the FS data needs. Where detections of data gap COIs exceed applicable RBCs in the fill or Fill WBZ, additional evaluation of data from the Alluvium WBZ is necessary to assess vertical migration of these contaminants. DEQ reserves the ability to request additional data collection to better characterize and delineate data gap COIs that are determined to be COCs, or any other purpose-specific data collection (if warranted) during development of the Gasco OU FS. DEQ does not require a revision to the Draft DGWP to address this comment, but believes that an up-front evaluation of the Siltronic data could serve to avoid additional sampling after reporting the results of the data gaps investigation and in advance of the Gasco OU FS.	Clarification	As discussed with DEQ, an assessment of the Siltronic-collected data was impossible to be conducted while the draft DGWP was being completed due to schedule for DEQ's approval of the Siltronic data in the Siltronic GSA. DEQ's approval was provided on September 28, 2022, and the draft DGWP was submitted to DEQ on September 13, 2022. NW Natural does not agree that detections of data gap COIs exceeding applicable RBCs in the fill or Fill WBZ would necessarily require additional evaluation of data from the Upper Alluvium WBZ. The applicable risk pathways and RBCs for the Upper Alluvium WBZ differ from those for the Fill WBZ, and there are no human health risk pathways associated with the Upper Alluvium WBZ. The migration of any data gap COIs is likely downward from the fill to the Upper Alluvium WBZ. The assessment of Siltronic-collected data from the Siltronic GSA will be completed when the analytical results of the sampling included in this DGWP are available. Further discussions with DEQ will occur after this evaluation is completed to determine whether any additional data gaps remain, which will be addressed in the pre-remedial design/remedial design.
2.	--	--	--	The Draft DGWP proposes reporting and incorporating the results of the field sampling into the Gasco OU FS. Our comments on the Draft RI/HERA Addendum requested that NW Natural prepare a data gaps deliverable that provides the results of the investigations to finalize the Gasco OU COC list, and support final selection of Gasco OU FS preliminary remediation goals (PRGs) and principal indicator compounds (PICs). We understand that NW Natural's responses to our comments propose further discussion of the data gap deliverable during the planned FS 'reboot' meeting in order to streamline the overall schedule as much as possible. DEQ agrees to discuss the scope and timeline for the data gap deliverable, but it will be important to understand whether the data gap COIs are present at concentrations above applicable RBCs in order to determine whether additional sampling may be warranted (See General Comment #1) and how these COCs will be carried forward in the Gasco OU FS. DEQ requests further discussion with NW Natural's technical team after the FS 'reboot' meeting to discuss the process for addressing this comment.	Agree	Anchor QEA, on behalf of NW Natural, and DEQ met on December 15, 2022, and January 6, 2023, to discuss DEQ comments on the draft DGWP and timing of the data gaps evaluation deliverable. As discussed in response to General Comment No. 1, the assessment of Siltronic-collected data from the Siltronic GSA will be completed when the analytical results of the DGWP sampling are available.
3.	--	--	--	We understand that the purpose of Tables 3 through 5 is to identify potential screening level values for proposed analytes across various media to ensure that proposed laboratory methods will provide data of sufficient quality. These tables also use an "X" to identify medium-specific COCs for the Gasco OU. DEQ did not review these tables to confirm that the Gasco OU COCs identified for each medium was complete. We note that the certain COCs were not consistently analyzed across all media, and the absence of an "X" on these tables could indicate that the constituent was not analyzed for in a given medium. Moving forward, please use an "O" on these tables to identify COCs that were not analyzed for in a given medium to distinguish them from analytes that have been analyzed for and determined to not be a COC. Consistent with Specific Comment #75a to the Draft RI/HERA Addendum, DEQ intends to assign PRGs to any analyte identified as a COC, including those with the potential for cross-media impacts, consistent with the Contaminants of Concern, Risk-Based Criteria, and Preliminary Remediation Goals Memorandum (PRG Memo)[9]. We acknowledge that NW Natural and DEQ will have further technical discussions regarding cross media COCs during the assignment of PRGs to Gasco OU COCs. DEQ does not require a revision to the Draft DGWP to address this comment.	Clarification	DEQ is correct that the purpose of Tables 3 through 5 is to ensure that proposed laboratory methods will provide data of sufficient quality. These tables are not meant to identify constituents that were not analyzed in these media. The analytes listed in these tables are the proposed analytes for this sampling program. NW Natural clarifies that the proposed analyte list for each media is provided in Tables 6 through 8 in a simplified format for ease of review.

[9] DEQ. 2021. Contaminants of Concern, Risk-Based Criteria, and Preliminary Remediation Goals, Former Gasco Manufactured Gas Plant Operable Unit, Portland, Oregon, ECSI #84. December 16.

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4.	--	--	--	The Draft DGWP broadly identifies chemical groups to be analyzed across various media. We understand that the analysis will include the full suite of analytes within each chemical group. In general, this should include all COC parameter groups (e.g., VOCs, SVOCs, PAHs) and individual COCs identified in Table 1 of DEQ's May 22, 2015 letter[10] approving and revising the Gasco HERA[11], and any additional COCs specific to the Siltronic GSA. Please confirm our understanding.	Clarification	The analyte lists for each media presented in the DGWP were prepared to include all COCs for that medium and include all analytes from the chemical groups (e.g., VOCs, SVOCs, and pesticides) that are routinely reported. The analyte list, therefore, does not include all COCs identified in Table 1 of DEQ's May 22, 2015, letter. NW Natural clarifies that the proposed analyte list for each media is provided in Tables 6 through 8. As discussed with DEQ on December 15, 2022, NW Natural has added alkylated PAHs to the analyte list for soil samples to be consistent with the analyte list for Doane Creek sediments. This was done to obtain a better understanding of the PAH composition in soils consistent with the sediment alkylated PAH analyses. The attached revised Tables 6 through 8 include the revised analyte lists for all media samples.
5.	--	--	--	The proposed scope of work includes sampling to further assess high total cyanide concentrations measured in two soil samples collected by Siltronic. These concentrations exceed cyanide RBCs in soils by several orders of magnitude. As acknowledged in the PRG Memo, the human health RBC for total cyanide in soil is based on hydrogen cyanide, and that total cyanide in soils at former manufactured gas plant sites typically occurs in complexes with metals. As a result, screening of total cyanide measured in Gasco OU soils against default RBCs may overestimate risk and provide a less reliable basis for making cleanup decisions. To better inform the Gasco OU FS, including assigning PRGs to Gasco OU COCs, DEQ recommends that NW Natural analyze soil samples for total and free cyanide.	Clarification	Anchor QEA has evaluated the two analytical methods proposed by DEQ to analyze soil samples for free cyanide: 1) EPA Method 9016 for free cyanide in water, soils, and solid wastes; and 2) the MADEP Method WSC-CAM to measure total cyanide and physiologically available cyanide. Anchor QEA evaluation has concluded that neither method provides an accurate measurement of free cyanide in soils that meet the objectives of the analysis identified in General Comment No. 5 and in DEQ's PRG memorandum (December 16, 2021) regarding the potential leaching of free cyanide from cyanide contaminated soils. Therefore, free cyanide analysis in soils has not been added to the analyte list for this DGWP. However, there are evaluations that can be conducted to measure free cyanide in soils under conditions that are realistic for the site. These include SPLP testing to evaluate the potential precipitation leaching of free cyanide from soil. NW Natural will consider these evaluations in pre-remedial design/remedial design as necessary. Anchor QEA's concerns with Method 9016 and MADEP Method WSC-CAM are presented in the following paragraphs. **EPA Method 9016:** EPA Method 9016 for soils calls for soils to be extracted at pH 12.5, and Anchor QEA has concerns that such an aggressive high pH extraction will solubilize stable metal-complexed cyanide in soils that would result in over-reporting of free cyanide that can be solubilized from metal-complexed cyanide. It is noted that Method 9016 for water buffers the pH between 6 and 6.5, which is more representative of site conditions. **MADEP Method WSC-CAM:** This method is not appropriate for measuring free cyanide or potential free cyanide leaching from soil under standard site conditions. This method was developed to simulate the release of biologically available cyanide forms in the human stomach and includes free cyanide, simple cyanide salts, and some metal-cyanide complexes.

[10] DEQ. 2015. Revised Human Health and Ecological Risk Assessment Report, NW Natural "Gasco Site," Portland, Oregon, ECSI No. 84. May 22.
[11] Anchor QEA, LLC. 2014. Human Health and Ecological Risk Assessment Report. Gasco OU. Prepared for NW Natural. December.

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6.	--	--	--	The Draft DGWP proposes removing herbicides from the proposed analyte list for various media because it was not previously detected at the Gasco OU, and existing data are sufficient to conclude that herbicides are not present at levels of concern. Other than referencing data provided in Appendix B, these statements are not adequately supported. Please either include herbicides in the scope of the data gaps investigation, or provide an evaluation of existing herbicide data, including the number of samples analyzed broken out by media, frequency of detections, frequency of exceedances of applicable RBCs, summary statistics, and any other evidence necessary to support conclusions that existing data are sufficient to conclude that herbicides are not present at levels of concern.	Agree	NW Natural has prepared summary statistics and screening tables with available human health and ecological RBCs/SLs to support the conclusions that existing data are sufficient to conclude that herbicides are not present at levels of concern. These tables are attached to this RTC (Supplemental Tables 1 through 3).
7a.	--	--	--	The Draft DGWP does not present a basis for the number of proposed soil samples, or clearly establish that the total number of proposed soil sample locations will adequately resolve General Comment #3 to the Draft RI/HERA Addendum. General Comment #3 to the Draft RI/HERA Addendum identified sparce data density in the fill soil and Fill WBZ groundwater in the southwestern third of the Siltronic GSA. Suitable soil data (i.e., representing a more comprehensive suite of analytes) from the Draft RI/HERA Addendum are limited to three locations within Ecological Exposure Area 2 (P-17, P-24 and P-D), which represents approximately 4 acres of open-space and ecological habitat. The sparce sampling in this area limited the ability to calculate a 90% UCL for birds and mammals and provide adequate coverage for the evaluation of plants and invertebrates. This sparce sample soil sampling density also limited the certainty of human health exposure scenario evaluations. Additionally, there is only one soil sample to represent approximately 1.6 acres immediately to the south between Ecological Exposure Area 2 and the Doane Creek riparian area. Please provide the rationale supporting the conclusion that the proposed sampling locations and density will resolve General Comment #3 to the Draft RI/HERA Addendum, and add sampling locations/density, as needed. At minimum, please amend the proposed sampling program as follows: a. Surface soil samples collected from the FS-07 and FS-08 locations should be adjusted slightly so that they are within the boundary of Ecological Exposure Area 2.	Agree	Comment noted. NW Natural has agreed to add the additional soil and sediment samples proposed by DEQ. Please see attached revised Figures 4 and 5 that show the proposed sampling locations within the Siltronic GSA (Figure 4) and Doane Creek area (Figure 5). In addition, attached revised Tables 2 through 9 and Table 11 include the additional samples requested by DEQ and the updates to the analyte lists for soil.
7b.	--	--	--	b. Add at least two soil sampling locations should be added within Ecological Exposure Area 2. This should include sampling on either side of the road that bisects the ecological exposure area.	Agree	See response to General Comment No. 7a.
7c.	--	--	--	c. Add at least two soil sampling locations in the area between Ecological Exposure Area 2 and Doane Creek (generally to the south of FS-07).	Agree	See response to General Comment No. 7a.
7d	--	--	--	d. Provide an additional Doane Creek embankment soil on the opposite side of the creek from DC-EMB057.	Agree	See response to General Comment No. 7a.
Specific Comments						
1	Doane Creek Sediment Sampling	Section 3.3	--	**Section 3.3, Doane Creek Sediment Sampling.** DEQ recommends 5-point composites composed of sediment subsamples from 5 locations including 1) the center point (50% wetted width); 2 and 3) left and right of this location (25% and 75% of wetted width); 4) directly upstream of the center location also at 50% wetted width; and 5), and downstream at the center location (also 50% wetted width).	Agree	Five-point composites of each sediment sample will be completed according to Specific Comment No. 1 and information provided to Anchor QEA in an email received on December 20, 2022 (e.g., samples collected directly upstream and downstream of the center location will be collected at a distance of 25% of the wetted width).

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2	Construction of Temporary Fill WBZ Monitoring Wells	Section 5.1	--	**Section 5.1, Construction of Temporary Fill WBZ Monitoring Wells.** Please indicate when/how the top of the monitoring well casing elevations will be surveyed.	Clarification	There is no plan to survey the top of casing of the temporary monitoring wells. Pump test data are analyzed by using changes in water levels, and the groundwater elevation is not necessary for this evaluation.
3	Construction of Temporary Fill WBZ Monitoring Wells	Section 5.1	--	**Section 5.1, Construction of Temporary Fill WBZ Monitoring Wells.** The second paragraph indicates that the temporary wells will be developed using a combination of surging and pumping. Please provide more information about the well development procedures, including stabilization of groundwater quality parameters.	Agree	Following installation, the temporary wells will be developed by surging for at least 10 minutes with a device equipped with a surge-block in order to move water in and out of the well screen to loosen and flush out fines from the well screen and from the filter sand pack. The well will then be pumped until at least 10 casing volumes of water have been removed (or well becomes dry), water quality parameters (pH, specific conductivity, turbidity, and temperature) have stabilized to ±10% of the previous reading, and sediment is removed from the well. Ideally, development will continue until turbidity is below 50 NTU; however, this is not always possible with poorly producing wells or with wells installed in silty or clayey soils.
4	Pumping Test	Section 5.2.2	--	**Section 5.2.2, Pumping Test.** The first paragraph states that a pressure transducer will be used to collect water level data during the pump testing. Clarify if pressure transducers will also be installed in nearby monitoring wells to monitoring changes in water levels during the tests.	Clarification	NW Natural does not plan to monitor water levels in nearby wells. These tests are short duration pump tests in Fill WBZ wells, and Anchor QEA does not expect to see influence very far from the pumped wells. The plan is for single well pump tests.
5	Pumping Test	Section 5.2.2	--	**Section 5.2.2, Pumping Test.** Please describe how will the pump testing will consider operation of the existing Fill WBZ trenches downgradient of the LNG basin.	Agree	Pumping from the Fill WBZ trenches is relatively stable, maintaining a constant elevation within each trench. Pumping rates within the trenches do not fluctuate as they do in the extraction wells and are not expected to interfere with individual monitoring well pump tests. The pumping of the trenches will be considered a background condition, and the pump test in each well will evaluate change in water levels within the pumped well during pumping and recovery. If insufficient groundwater is present in Fill WBZ wells due to pumping from the trench, the testing process will be modified to include a temporary shutdown of the Fill WBZ trenches as part of the Fill WBZ hydraulic evaluation.
6	--	Table 3	--	**Table 3, Surface Soil Analytical Parameters and Screening Levels.** Footnotes q and w appear to convey similar information about cPAH TEQ.	Agree	Footnotes q and w are combined into a single footnote (footnote q). See updated Table 3 attached to this RTC.
7	--	Table 4	--	**Table 4, Subsurface Soil Analytical Parameters and Screening Levels.** Footnotes m and p appear to convey similar information about cPAH TEQ.	Agree	Footnotes m and p are combined into a single footnote (footnote m). See updated Table 4 attached to this RTC.

Category Key:
Agree: NW Natural accepts DEQ's comment.
Clarification: NW Natural provides additional clarification to the response to DEQ's comment.

Notes:
--: not applicable
COC: contaminant of concern
COI: contaminant of interest
DEQ: Oregon Department of Environmental Quality
DGWP: *Feasibility Study Comprehensive Data Gaps Work Plan*
EPA: U.S. Environmental Protection Agency
GSA: geographic subarea
MADEP: Massachusetts Department of Environmental Protection
NTU: nephelometric turbidity unit
PAH: polycyclic aromatic hydrocarbon
PRG: preliminary remediation goal
RBC: risk-based concentration
RTC: response to comments
Siltronic: Siltronic Corporation
SL: screening level
SPLP: synthetic precipitation leaching procedure
SVOC: semivolatile organic compound
VOC: volatile organic compound
WBZ: water-bearing zone

Revised DGWP Tables

Table 1
Soil Depth Intervals for Existing Siltronic GSA Data Gap Soil Samples

Soil Sample ID	Depth Interval Sampled for Data Gap COIs
WSB-16	7.5–7.5 ft bgs, 10.5–10.5 ft bgs, 29–29 ft bgs*
WSB-17	11.5–11.5 ft bgs, 25.5–25.5 ft bgs, 33.5–33.5 ft bgs*
WSB-18	13–13 ft bgs, 23.5–23.5 bgs, 25–25 ft bgs*
WSB-19	7.5–7.5 ft bgs, 18.5–18.5 ft bgs, 23–23 ft bgs*
WSB-20	6–6 ft bgs, 16.5–16.5 bgs, 24–24 ft bgs*
WSB-21	7–7 ft bgs, 9.5–9.5 bgs
WSB-22	11–11 ft bgs, 17.5–17.5 bgs, 33.5–33.5 bgs*

Notes:
*: soil sample collected at depth interval below fill zone
bgs: below ground surface
COI: contaminants of interest
ft: feet
GSA: geographic subarea

Table 2
Proposed Sampling Locations and Rationale

Proposed Boring Location	Estimated Total Sample Depth (feet bgs)	Primary Sampling Method	Target Location Coordinates		Geographic Sampling Area		Target Sample Interval (feet bgs)	Sample ID[2]	Analyses	Rationale for Sampling
			Easting	Northing	Doane Creek[1]	Siltronic GSA Uplands				
Soil Boring Locations[3]										
FS-01	0–20	Direct push or rotosonic	7623981.4	703882.0		X	Where Prussian Blue wood chip material is present, an interval above the material and an interval below	FS-01-DEPTH-YYMMDD	Total cyanide, sulfide, pH, metals, dioxins/furans, PCBs, chlorinated pesticides, PAHs, SVOCs, VOCs, diesel- and gasoline-range TPH	Delineate the presence of Prussian Blue wood chip material and cyanide levels within, above, and below layers where materials are present based on data from soil boring station WBS-19.
FS-02			7624022.0	704387.5		X		FS-02-DEPTH-YYMMDD		Delineate the presence of Prussian Blue wood chip material and cyanide levels within, above, and below layers where materials are present based on data from soil boring station WBS-20.
FS-03			7624850.1	704414.3		X	0 feet to water table within areas of fill	FS-03-DEPTH-YYMMDD		Collect surface and subsurface soil samples within fill above the water table in the interior and central portions of the Siltronic GSA to fill spatial data gaps for the data gap COIs.
FS-04			7624230.0	704843.6		X		FS-04-DEPTH-YYMMDD		
FS-10			7624428.9	703903.4		X		FS-10-DEPTH-YYMMDD		Collect surface and subsurface soil samples within fill above the water table in Ecological Exposure Area 2 to fill spatial data gaps for the data gap COIs.
FS-11			7624591.2	703773.5		X		FS-11-DEPTH-YYMMDD		
FS-12			7624146.4	703665.4		X		FS-12-DEPTH-YYMMDD		Collect surface and subsurface soil samples within fill above the water table for the area between Ecological Exposure Area 2 and Doane Creek to fill spatial data gaps for the data gap COIs.
FS-13			7624296.5	703442.3		X		FS-13-DEPTH-YYMMDD		
Surface Soil Locations										
FS-01	0–3.5	Hand auger or direct push	7623981.4	703882.0		X	0–3.5	FS-01-DEPTH-YYMMDD	Total cyanide, sulfide, pH, metals, dioxins/furans, PCBs, chlorinated pesticides, PAHs, SVOCs, VOCs, diesel- and gasoline-range TPH	Obtain surface soil data for data gap COIs based on data from soil boring station WBS-19.
FS-02			7624022.0	704387.5		X		FS-02-DEPTH-YYMMDD		Obtain surface soil data for data gap COIs based on data from soil boring station WBS-20.
FS-05			7625144.9	704647.0		X		FS-05-DEPTH-YYMMDD		Obtain surface soil data for data gap COIs based on data from soil boring station WBS-16.
FS-06			7624844.3	705002.5		X		FS-06-DEPTH-YYMMDD		Obtain surface soil data for data gap COIs based on data from soil boring station WBS-17.
FS-07			7624383.8	703663.2		X		FS-07-DEPTH-YYMMDD		Obtain surface soil data for data gap COIs based on data from location adjacent to soil boring station WBS-18, within Ecological Exposure Area 2.
FS-08			7624273.5	703947.3		X		FS-08-DEPTH-YYMMDD		Obtain surface soil data for data gap COIs based on data from location adjacent to soil boring station WBS-21, within Ecological Exposure Area 2.
FS-09			7624699.1	703945.0		X		FS-09-DEPTH-YYMMDD		Obtain surface soil data for data gap COIs based on data from soil boring station WBS-22.
DC-EMB056			7623888.1	703836.1	X			DC-EMB056-DEPTH-YYMMDD		Provide additional data density for data gap COIs in embankment soil near Doane Creek.
DC-EMB057			7624103.3	703526.5	X			DC-EMB057-DEPTH-YYMMDD		
DC-EMB058			7624299.8	703249.3	X			DC-EMB058-DEPTH-YYMMDD		
DC-EMB059			7624219.9	703203.4	X			DC-EMB059-DEPTH-YYMMDD		
DC-EMB060			7624036.2	703480.4	X			DC-EMB060-DEPTH-YYMMDD		
DC-EMB061			7623829.7	703804.5	X			DC-EMB061-DEPTH-YYMMDD		
Surface Sediment Locations										
DC-SED088	0-0.5	Hand auger or trowel[4]	7623905.0	703768.7	X		0–0.5	DC-SED088-DEPTH-YYMMDD	Total cyanide, sulfide, pH, metals, dioxin/furans, PCBs, chlorinated pesticides, PAHs, SVOCs, VOCs, diesel- and gasoline-range TPH	Provide additional data density for data gap COIs in surface sediment within Doane Creek.
DC-SED089			7624082.3	703507.6	X			DC-SED089-DEPTH-YYMMDD		
DC-SED090			7624264.5	703227.5	X			DC-SED090-DEPTH-YYMMDD		

Table 2
Proposed Sampling Locations and Rationale

Notes:
1. Sampling of Doane Creek bank soil and sediment is dependent upon approval from the BNSF Railway and Portland & Western Railroad.
2. Sample depth will be recorded in decimal feet at the time of sampling.
3. See Section 3.2 of the *Feasibility Study Comprehensive Data Gaps Work Plan* for additional sampling details if field indications of manufactured gas plant residuals are present in soil borings.
4. Samples will be five-point composites. The five-point composite samples will be composed of sediment subsamples from five locations including the following: 1) the center point (50% wetted width); 2 and 3) left and right of this location (25% and 75% of wetted width); 4) directly upstream of the center location (also at 50% wetted width); and 5) downstream at the center location (also 50% wetted width).
bgs: below ground surface
COI: contaminant of interest
GSA: geographic subarea
PAH: polyaromatic hydrocarbon
PCB: polychlorinated biphenyl
SVOC: semivolatile organic compound
TPH: total petroleum hydrocarbons
VOC: volatile organic compound

Table 3
Surface Soil Analytical Parameters and Screening Levels

Analyte	Gasco OU COC[a]			FS Data Gaps COI[b]	FS Data Gaps Screening Levels[c]							
					Gasco OU COC				FS Data Gaps COI			
	Human Health Surface Soil	Ecological Soil	Ecological Doane Creek Soil		Interim FS Human Health Surface Soil Screening Levels[d]		Interim FS Ecological Soil Screening Levels[e]		Ecological Soil DEQ RBC[f]		Occupational Worker Soil DEQ RBC[g]	Doane Creek Trespasser Soil DEQ RBC[h]
Conventionals (mg/kg)												
Total solids (%)	--	--	--	--	--		--		--		--	--
Total organic carbon (%)	--	--	--	--	--		--		--		--	--
Total cyanide	X	X	X	--	700	x	6.65	z	--		--	--
Total sulfide	--	X	X	--	--		0.0179	z	--		--	--
Soil pH	--	--	--	--	--		--		--		--	--
Total Petroleum Hydrocarbons (mg/kg)												
Gasoline range hydrocarbons	X[v]	--	--	--	--[v]		--		--		--	--
Diesel range hydrocarbons	X[v]	--	--	--	--[v]		--		--		--	--
Motor oil range hydrocarbons	X[v]	--	--	--	--[v]		--		--		--	--
Total Petroleum Hydrocarbons Dx Gx Only[i]	X	--	--	--	various	x	--		--		--	--
Metals (mg/kg)					--							
Aluminum	--	X	--	--	--		37,200	y	--		--	--
Antimony	--	X	X	--	--		1.35	z	--		--	--
Arsenic	X	X	--	--	8.8	y	18	aa	--		--	--
Barium	--	--	--	--	--		--		--		--	--
Beryllium	--	--	--	--	--		--		--		--	--
Cadmium	--	X	--	--	--		1.8	z	--		--	--
Chromium	--	X	--	--	--		76	y	--		--	--
Copper	--	X	X	--	--		70	aa	--		--	--
Cobalt	--	--	--	--	--		23	y	--		--	--
Iron	--	X	X	--	--		42,100	y	--		--	--
Lead	--	X	X	--	800	x	79	y	--		--	--
Manganese	--	X	--	--	--		1,800	y	--		--	--
Mercury	--	X	--	--	--		0.23	y	--		--	--
Nickel	--	X	--	--	--		47	y	--		--	--
Selenium	--	--	--	--	--		--		--		--	--
Silver	--	--	--	--	--		--		--		--	--
Thallium	X	X	--	--	12	x	5.2	y	--		--	--
Titanium	--	--	--	--	--		6,500	y	--		--	--
Vanadium	--	X	--	--	--		180	y	--		--	--
Zinc	--	X	X	--	--		180	y	--		--	--
Dioxins/Furans (ng/kg)												
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	X	--		--		0.25	ac	16	5,300
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	X	--		--		0.28	ac	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	X	--		--		1.2	ac	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	X	--		--		0.89	ac	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	X	--		--		0.89	ac	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	X	--		--		7	ac	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	X	--		--		300	ac	--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	X	--		--		3	ac	--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	X	--		--		6.5	ac	--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	X	--		--		0.65	ac	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	X	--		--		1.1	ac	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	X	--		--		1.1	ac	--	--

Table 3
Surface Soil Analytical Parameters and Screening Levels

Analyte	Gasco OU COC[a]			FS Data Gaps COI[b]	FS Data Gaps Screening Levels[c]							
					Gasco OU COC				FS Data Gaps COI			
	Human Health Surface Soil	Ecological Soil	Ecological Doane Creek Soil		Interim FS Human Health Surface Soil Screening Levels[d]		Interim FS Ecological Soil Screening Levels[e]		Ecological Soil DEQ RBC[f]		Occupational Worker Soil DEQ RBC[g]	Doane Creek Trespasser Soil DEQ RBC[h]
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	X	--		--		1.1	ac	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	X	--		--		1.4	ac	--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	X	--		--		11	ac	--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	X	--		--		11	ac	--	--
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	--	X	--		--		220	ac	--	--
Total Dioxin/Furan TEQ 2005 (Mammal)[j]	--	--	--	X	--		--		0.25	ac	16	5,300
PCBs (ng/kg)												
PCB-077	--	--	--	X	--		--		170	ad	--	--
PCB-081	--	--	--	X	--		--		1,500	ad	--	--
PCB-105	--	--	--	X	--		--		43,000	ac	--	--
PCB-114	--	--	--	X	--		--		30,000	ac	--	--
PCB-118 (PCB-106/118)	--	--	--	X	--		--		22,000	ac	--	--
PCB-123	--	--	--	X	--		--		30,000	ac	--	--
PCB-126	--	--	--	X	--		--		8.7	ac	--	--
PCB-156	--	--	--	X	--		--		14,000	ac	--	--
PCB-157	--	--	--	X	--		--		14,000	ac	--	--
PCB-167	--	--	--	X	--		--		17,000	ac	--	--
PCB-169	--	--	--	X	--		--		20	ac	--	--
PCB-189	--	--	--	X	--		--		6,000	ac	--	--
Total PCB Congener[k]	--	--	--	X	--		--		73,000	ac	590,000	200,000,000
Total PCB Congener TEQ 2005 (Mammal)[l]	--	--	--	X	--		--		0.25	ac	16	5,300
Dioxin Furans and PCB Congeners (ng/kg)												
Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal)	--	--	--	X	--		--		0.25	ac	16	5,300
Pesticides (µg/kg)												
4,4'-DDD (p,p'-DDD)	--	--	--	X	--		--		--		12,000	3,900,000
2,4'-DDD (o,p'-DDD)	--	--	--	X	--		--		--		--	--
4,4'-DDE (p,p'-DDE)	--	--	--	X	--		--		--		8,200	2,600,000
2,4'-DDE (o,p'-DDE)	--	--	--	X	--		--		--		--	--
4,4'-DDT (p,p'-DDT)	--	--	--	X	--		--		--		8,500	2,700,000
2,4'-DDT (o,p'-DDT)	--	--	--	X	--		--		--		--	--
Aldrin	--	--	--	X	--		--		4.3	ad	130	44,000
BHC, alpha-	--	--	--	X	--		--		--		360	120,000
BHC, beta-	--	--	--	X	--		--		--		--	--
BHC, delta-	--	--	--	X	--		--		--		--	--
BHC, gamma- (Lindane)	--	--	--	X	--		--		--		2,100	700,000
Chlordane, alpha- (Chlordane, cis-)	--	--	--	X	--		--		--		--	--
Chlordane, beta- (Chlordane, trans-)	--	--	--	X	--		--		--		--	--
Dieldrin	--	--	--	X	--		--		9	ac	140	48,000
Endosulfan I	--	--	--	X	--		--		--		--	--
Endosulfan II	--	--	--	X	--		--		--		--	--
Endosulfan sulfate	--	--	--	X	--		--		--		--	--
Endrin	--	--	--	X	--		--		3.4	aa	250,000	82,000,000
Endrin Aldehyde	--	--	--	X	--		--		--		--	--
Heptachlor	--	--	--	X	--		--		--		450	150,000
Heptachlor epoxide	--	--	--	X	--		--		--		240	78,000

Table 3
Surface Soil Analytical Parameters and Screening Levels

Analyte	Gasco OU COC[a]			FS Data Gaps COI[b]	FS Data Gaps Screening Levels[c]							
					Gasco OU COC				FS Data Gaps COI			
	Human Health Surface Soil	Ecological Soil	Ecological Doane Creek Soil		Interim FS Human Health Surface Soil Screening Levels[d]		Interim FS Ecological Soil Screening Levels[e]		Ecological Soil DEQ RBC[f]		Occupational Worker Soil DEQ RBC[g]	Doane Creek Trespasser Soil DEQ RBC[h]
Hexachlorobenzene	--	--	--	X	--		--		--		930	290,000
Nonachlor, cis-	--	--	--	X	--		--		--		--	--
Nonachlor, trans-	--	--	--	X	--		--		--		--	--
Oxychlordane	--	--	--	X	--		--		--		--	--
Toxaphene	--	--	--	X	--		--		21,000	ad	2,100	700,000
Sum DDD[m]	--	--	--	X	--		--		--		12,000	3,900,000
Sum DDE[m]	--	--	--	X	--		--		--		8,200	2,600,000
Sum DDT[m]	--	--	--	X	--		--		--		8,500	2,700,000
Total DDX[w]	--	--	--	X	--		--		240	ac	--	--
Total BHC[t]	--	--	--	X	--		--		96	ac	--	--
Total Chlordane (alpha, gamma, heptachlor)[n]	--	--	--	X	--		--		1,400	ac,ad	--	--
Total Chlordane (alpha, beta, nona, oxy)[o]	--	--	--	X	--		--		--		7,400	2,500,000
Total Endosulfan (alpha, beta)[p]	--	--	--	X	--		--		6,400	ac	4,900,000	--[ae]
PAHs and Alkylated PAHs (µg/kg)												
1-Methylnaphthalene	X	X	--	--	77000	x	29000	ab	--		--	--
1-Methylphenanthrene	--	--	--	--	--		--	--	--	--	--	--
2,3,5-Trimethylnaphthalene	--	--	--	--	--		--	--	--	--	--	--
2,6-Dimethylnaphthalene	--	--	--	--	--		--	--	--	--	--	--
2-Methylnaphthalene	X	X	--	--	3200000	x	29000	ab	--		--	--
Acenaphthene	--	X	--	--	--		20000	aa	--		--	--
Acenaphthylene	--	X	--	--	--		29000	ab	--		--	--
Anthracene	--	X	--	--	--		29000	ab	--		--	--
Benzo(a)anthracene	X	X	X[v]	--	--[q]	x	5500	z	--		--	--
Benzo(a)pyrene	X	X	X[v]	--	--[q]	x	5500	z	--		--	--
Benzo(b)fluoranthene	X	X	X[v]	--	--[q]	x	5500	z	--		--	--
Benzo(b)naphtho(2,1-d)thiophene	--	--	--	--	--		--	--	--	--	--	--
Benzo(b)thiophene	--	--	--	--	--		--	--	--	--	--	--
Benzo(e)pyrene	--	--	--	--	--		--	--	--	--	--	--
Benzo(g,h,i)perylene	--	X	X[v]	--	--		5500	z	--		--	--
Benzo(j)fluoranthene	--	--	--	--	--		--		--		--	--
Benzo(k)fluoranthene	X	X	X[v]	--	--[q]	x	5500	z	--		--	--
Biphenyl	--	--	--	--	--		--	--	--	--	--	--
C1-Benzo(a)anthracenes/Chrysenes	--	--	--	--	--		--	--	--	--	--	--
C1-Decalins	--	--	--	--	--		--	--	--	--	--	--
C1-Dibenzothiophenes	--	--	--	--	--		--	--	--	--	--	--
C1-Fluoranthenes/Pyrenes	--	--	--	--	--		--	--	--	--	--	--
C1-Fluorenes	--	--	--	--	--		--	--	--	--	--	--
C1-Naphthalenes	--	--	--	--	--		--	--	--	--	--	--
C1-Phenanthrenes/Anthracenes	--	--	--	--	--		--	--	--	--	--	--
C2-Benzo(a)anthracenes/Chrysenes	--	--	--	--	--		--	--	--	--	--	--
C2-Decalins	--	--	--	--	--		--	--	--	--	--	--
C2-Dibenzothiophenes	--	--	--	--	--		--	--	--	--	--	--
C2-Fluoranthenes/Pyrenes	--	--	--	--	--		--	--	--	--	--	--
C2-Fluorenes	--	--	--	--	--		--	--	--	--	--	--
C2-Naphthalenes	--	--	--	--	--		--	--	--	--	--	--

Table 3
Surface Soil Analytical Parameters and Screening Levels

Analyte	Gasco OU COC[a]			FS Data Gaps COI[b]	FS Data Gaps Screening Levels[c]							
					Gasco OU COC				FS Data Gaps COI			
	Human Health Surface Soil	Ecological Soil	Ecological Doane Creek Soil		Interim FS Human Health Surface Soil Screening Levels[d]		Interim FS Ecological Soil Screening Levels[e]		Ecological Soil DEQ RBC[f]		Occupational Worker Soil DEQ RBC[g]	Doane Creek Trespasser Soil DEQ RBC[h]
C2-Phenanthrenes/Anthracenes	--	--	--	--	--		--	--	--	--	--	--
C3-Benzo(a)anthracenes/Chrysenes	--	--	--	--	--		--	--	--	--	--	--
C3-Decalins	--	--	--	--	--		--	--	--	--	--	--
C3-Dibenzothiophenes	--	--	--	--	--		--	--	--	--	--	--
C3-Fluoranthenes/Pyrenes	--	--	--	--	--		--	--	--	--	--	--
C3-Fluorenes	--	--	--	--	--		--	--	--	--	--	--
C3-Naphthalenes	--	--	--	--	--		--	--	--	--	--	--
C3-Phenanthrenes/Anthracenes	--	--	--	--	--		--	--	--	--	--	--
C4-Benzo(a)anthracenes/Chrysenes	--	--	--	--	--		--	--	--	--	--	--
C4-Decalins	--	--	--	--	--		--	--	--	--	--	--
C4-Dibenzothiophenes	--	--	--	--	--		--	--	--	--	--	--
C4-Fluoranthenes/Pyrenes	--	--	--	--	--		--	--	--	--	--	--
C4-Naphthalenes	--	--	--	--	--		--	--	--	--	--	--
C4-Phenanthrenes/Anthracenes	--	--	--	--	--		--	--	--	--	--	--
Chrysene	X	X	X[v]	--	--[q]	x	5500	z	--		--	--
cis-Decalin	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	X	X	X[v]	--	--[q]	x	5500	z	--		--	--
Dibenzothiophene	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	--	X	X[v]	--	--		5500	z	--		--	--
Fluorene	--	X	--	--	--		29000	ab	--		--	--
Indeno(1,2,3-c,d)pyrene	X	X	X[v]	--	--[q]	x	5500	z	--		--	--
Naphthalene	X	X	--	--	23000	x	10000	aa	--		--	--
Perylene	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	--	X	--	--	--		29000	ab	--		--	--
Pyrene	--	X	X[v]	--	--		5500	z	--		--	--
Total Benzofluoranthenes	--	--	--	--	--		--		--		--	--
trans-Decalin	--	--	--	--	--	--	--	--	--	--	--	--
Total cPAH TEQ (EPA 1993)[q]	X[q]	--	--	--	2100	x	--		--		--	--
Total HPAH (Gasco 9 of 17)[r]	--	X	X	--	--		5500	z	--		--	--
Total LPAH (Gasco 8 of 17)[s]	--	X	--	--	--		29000	ab	--		--	--
Semivolatile Organic Compounds (µg/kg)												
Carbazole	--	--	--	--	--		--		--		--	--
Dibenzofuran	--	--	--	--	--		--		--		--	--
2-Chlorophenol	--	--	--	--	--		--		--		--	--
4-Chloro-3-methylphenol	--	--	--	--	--		--		--		--	--
2,4-Dichlorophenol	--	--	--	--	--		--		--		--	--
2,4-Dimethylphenol	--	--	--	--	--		--		--		--	--
2,4-Dinitrophenol	--	--	--	--	--		--		--		--	--
4,6-Dinitro-2-methylphenol	--	--	--	--	--		--		--		--	--
2-Methylphenol	--	--	--	--	--		--		--		--	--
3+4-Methylphenol(s)	--	--	--	--	--		--		--		--	--
2-Nitrophenol	--	--	--	--	--		--		--		--	--
4-Nitrophenol	--	--	--	--	--		--		--		--	--
Pentachlorophenol (PCP)	--	--	--	--	--		--		--		--	--
Phenol	--	--	--	--	--		--		--		--	--

Table 3
Surface Soil Analytical Parameters and Screening Levels

Analyte	Gasco OU COC[a]			FS Data Gaps COI[b]	FS Data Gaps Screening Levels[c]							
					Gasco OU COC				FS Data Gaps COI			
	Human Health Surface Soil	Ecological Soil	Ecological Doane Creek Soil		Interim FS Human Health Surface Soil Screening Levels[d]		Interim FS Ecological Soil Screening Levels[e]		Ecological Soil DEQ RBC[f]		Occupational Worker Soil DEQ RBC[g]	Doane Creek Trespasser Soil DEQ RBC[h]
2,3,4,6-Tetrachlorophenol	--	--	--	--	--		--		--		--	--
2,3,5,6-Tetrachlorophenol	--	--	--	--	--		--		--		--	--
2,4,5-Trichlorophenol	--	--	--	--	--		--		--		--	--
2,4,6-Trichlorophenol	--	--	--	--	--		--		--		--	--
Bis(2-ethylhexyl)phthalate	--	--	--	--	--		--		--		--	--
Butyl benzyl phthalate	--	--	--	--	--		--		--		--	--
Diethylphthalate	--	--	--	--	--		--		--		--	--
Dimethylphthalate	--	--	--	--	--		--		--		--	--
Di-n-butylphthalate	--	--	--	--	--		--		--		--	--
Di-n-octyl phthalate	--	--	--	--	--		--		--		--	--
Volatile Organic Compounds (µg/kg)												
Acetone	--	--	--	--	--		--		--		--	--
Acrylonitrile	--	--	--	--	--		--		--		--	--
Benzene	X	--	--	--	37,000	x	--		--		--	--
Bromobenzene	--	--	--	--	--		--		--		--	--
Bromochloromethane	--	--	--	--	--		--		--		--	--
Bromodichloromethane	--	--	--	--	--		--		--		--	--
Bromoform	--	--	--	--	--		--		--		--	--
Bromomethane	--	--	--	--	--		--		--		--	--
2-Butanone (MEK)	--	--	--	--	--		--		--		--	--
n-Butylbenzene	--	--	--	--	--		--		--		--	--
sec-Butylbenzene	--	--	--	--	--		--		--		--	--
tert-Butylbenzene	--	--	--	--	--		--		--		--	--
Carbon disulfide	--	--	--	--	--		--		--		--	--
Carbon tetrachloride	--	--	--	--	--		--		--		--	--
Chlorobenzene	--	--	--	--	--		--		--		--	--
Chloroethane	--	--	--	--	--		--		--		--	--
Chloroform	--	--	--	--	--		--		--		--	--
Chloromethane	--	--	--	--	--		--		--		--	--
2-Chlorotoluene	--	--	--	--	--		--		--		--	--
4-Chlorotoluene	--	--	--	--	--		--		--		--	--
Dibromochloromethane	--	--	--	--	--		--		--		--	--
1,2-Dibromo-3-chloropropane	--	--	--	--	--		--		--		--	--
1,2-Dibromoethane (EDB)	--	--	--	--	--		--		--		--	--
Dibromomethane	--	--	--	--	--		--		--		--	--
1,2-Dichlorobenzene	--	--	--	--	--		--		--		--	--
1,3-Dichlorobenzene	--	--	--	--	--		--		--		--	--
1,4-Dichlorobenzene	--	--	--	--	--		--		--		--	--
Dichlorodifluoromethane	--	--	--	--	--		--		--		--	--
1,1-Dichloroethane	--	--	--	--	--		--		--		--	--
1,2-Dichloroethane (EDC)	--	--	--	--	--		--		--		--	--
1,1-Dichloroethene	--	--	--	--	--		--		--		--	--
cis-1,2-Dichloroethene	--	--	--	--	--		--		--		--	--
trans-1,2-Dichloroethene	--	--	--	--	--		--		--		--	--
1,2-Dichloropropane	--	--	--	--	--		--		--		--	--

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Surface Soil Analytical Parameters and Screening Levels

Analyte	Gasco OU COC[a]			FS Data Gaps COI[b]	FS Data Gaps Screening Levels[c]							
					Gasco OU COC				FS Data Gaps COI			
	Human Health Surface Soil	Ecological Soil	Ecological Doane Creek Soil		Interim FS Human Health Surface Soil Screening Levels[d]		Interim FS Ecological Soil Screening Levels[e]		Ecological Soil DEQ RBC[f]		Occupational Worker Soil DEQ RBC[g]	Doane Creek Trespasser Soil DEQ RBC[h]
1,3-Dichloropropane	--	--	--	--	--		--		--		--	--
2,2-Dichloropropane	--	--	--	--	--		--		--		--	--
1,1-Dichloropropene	--	--	--	--	--		--		--		--	--
cis-1,3-Dichloropropene	--	--	--	--	--		--		--		--	--
trans-1,3-Dichloropropene	--	--	--	--	--		--		--		--	--
Ethylbenzene	X	X	--	--	150,000	x	25,800	z	--		--	--
Hexachlorobutadiene	--	--	--	--	--		--		--		--	--
2-Hexanone	--	--	--	--	--		--		--		--	--
Isopropylbenzene	--	--	--	--	--		--		--		--	--
4-Isopropyltoluene	--	--	--	--	--		--		--		--	--
Methylene chloride	--	--	--	--	--		--		--		--	--
4-Methyl-2-pentanone (MiBK)	--	--	--	--	--		--		--		--	--
Methyl tert-butyl ether (MTBE)	--	--	--	--	--		--		--		--	--
n-Propylbenzene	--	--	--	--	--		--		--		--	--
Styrene	--	--	--	--	--		--		--		--	--
1,1,1,2-Tetrachloroethane	--	--	--	--	--		--		--		--	--
1,1,2,2-Tetrachloroethane	--	--	--	--	--		--		--		--	--
Tetrachloroethene (PCE)	--	--	--	--	--		--		--		--	--
Toluene	--	--	--	--	--		--		--		--	--
1,2,3-Trichlorobenzene	--	--	--	--	--		--		--		--	--
1,2,4-Trichlorobenzene	--	--	--	--	--		--		--		--	--
1,1,1-Trichloroethane	--	--	--	--	--		--		--		--	--
1,1,2-Trichloroethane	--	--	--	--	--		--		--		--	--
Trichloroethene (TCE)	--	--	--	--	--		--		--		--	--
Trichlorofluoromethane	--	--	--	--	--		--		--		--	--
1,2,3-Trichloropropane	--	--	--	--	--		--		--		--	--
1,2,4-Trimethylbenzene	--	--	--	--	--		--		--		--	--
1,3,5-Trimethylbenzene	--	--	--	--	--		--		--		--	--
Vinyl chloride	--	--	--	--	--		--		--		--	--
m,p-Xylene	--	X[v]	--	--	--		--[v]		--		--	--
o-Xylene	--	X[v]	--	--	--		--[v]		--		--	--
Total Xylene[u]	--	X	--	--	--		100,000	aa	--		--	--

Table 3
Surface Soil Analytical Parameters and Screening Levels

Notes:
a. Chemicals identified as Surface Soil COCs for the Gasco OU.
b. FS Data Gaps COIs include dioxin/furans, PCBs, and chlorinated pesticides.
c. Screening levels include the screening levels identified in the IFS for Gasco OU COCs (Anchor QEA 2018). For FS Data Gaps COIs, screening levels were selected from the sources of screening levels used in the IFS.
d. Screening levels from IFS Table J1-1a (Anchor QEA 2018).
e. Screening levels from IFS Table J1-3a (Anchor QEA 2018).
f. Lowest of the non-threatened and endangered soil RBC (DEQ 2020)
g. Occupational Worker RBC (DEQ 2018)
h. Site-Specific Trespasser RBC calculated using the exposure parameters identified in the RI/HERA Addendum (Anchor QEA and HAI 2019; DEQ 2018).
i. Total Petroleum Hydrocarbons Dx Gx Only: the sum of NWTPH-Dx and NWTPH-Gx
j. Total Dioxin/Furan TEQ 2005 (Mammal): the sum of 2,3,7,8-TCDD equivalent congeners, calculated by multiplying the dioxin/furan congeners by their respective World Health Organization 2005 mammal toxicity equivalency factors (presented in Van den Berg et al. 2006)
k. Total PCB Congeners: the sum of 209 individual congeners
l. Total PCB TEQ 2005 (Mammal): the sum of the dioxin-like PCB congeners, calculated by multiplying the PCB congeners by their respective World Health Organization 2005 mammal toxicity equivalency factors (presented in Van den Berg et al. 2006)
m. The sum of 4,4' and 2,4' isomers
n. Total Chlordane (alpha, gamma, heptachlor): the sum of alpha-chlordane, gamma-chlordane, and heptachlor) for comparison to ecological screening level
o. Total Chlordane (alpha, beta, nona, oxy): the sum of cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, and oxychlordane) for comparison to human health screening level
p. Total Endosulfan (alpha, beta): the sum of alpha- and beta-endosulfan
q. cPAH evaluated as total cPAH TEQ (EPA 1993). Total cPAH TEQ is the sum of benzo(a)pyrene equivalent concentrations, calculated by multiplying the cPAHs by their respective potency factors. The cPAHs include benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, and dibenzo(a,h)anthracene.
r. Total HPAH: the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(x)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene
s. Total LPAH: the sum of 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene
t. Total BHC: sum of alpha, beta, delta, gamma
u. Total xylenes: the sum of m,p-xylene and o-xylene
v. Chemical is a constituent of a chemical sum identified as a COC.
w. Total DDx: the sum of 2,4' and 4, 4' DDD, DDE, DDT isomers.
x. Occupational Worker Screening Level
y. Natural Background Level
z. Mammal Screening level
aa. Plant Screening Level
ab. Invertebrate Screening Level
ac. Ground-Feeding Mammal Non-T&E Screening Level
ad. Ground-Feeding Birds Non-T&E Screening Level
ae. The calculated RBC is greater than 1,000,000 mg/kg.
--: not applicable
µg/kg: micrograms per kilogram
BHC: benzene hexachloride
COC: contaminant of concern
COI: contaminant of interest
cPAH: carcinogenic polycyclic aromatic hydrocarbon
DDD: dichlorodiphenyldichloroethane
DDE: dichlorodiphenyldichloroethene
DDT: dichlorodiphenyltrichloroethane
DEQ: Oregon Department of Environmental Quality
EPA: U.S. Environmental Protection Agency
FS: Feasibility Study
HPAH: high-molecular-weight polycyclic aromatic hydrocarbon
IFS: *Interim Feasibility Study*
LPAH: low-molecular-weight polycyclic aromatic hydrocarbon

Table 3
Surface Soil Analytical Parameters and Screening Levels

mg/kg: milligram per kilogram
ng/kg: nanogram per kilogram
NWTPH-Dx: Northwest Total Petroleum Hydrocarbons – diesel range
NWTPH-Gx: Northwest Total Petroleum Hydrocarbons – gasoline range
OU: operable unit
PAH: polycyclic aromatic hydrocarbon
RBC: risk-based concentration
RI/HERA Addendum: *Remedial Investigation/Human Health Ecological Risk Assessment Addendum for the Siltronic GSA.*
TEQ: toxic equivalence quotient

References:
Anchor QEA (Anchor QEA, LLC), 2018. *Interim Feasibility Study.* Gasco OU. Prepared for NW Natural. November 21, 2018.
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Table 4
Subsurface Soil Analytical Parameters and Screening Levels

Analyte	Gasco OU COC[a]		FS Data Gaps Screening Levels[c]			
			Gasco OU COC		FS Data Gaps COI	
	Human Health Subsurface	FS Data Gaps COI[b]	Interim FS Human Health Subsurface Soil Screening Level[d]		Construction Worker DEQ RBC[e]	Excavation Worker DEQ RBC[e]
Conventionals (mg/kg)						
Total solids (%)	--	--	--		--	--
Total organic carbon (%)	--	--	--		--	--
Total cyanide	X	--	210	p	--	--
Total sulfide	--	--	--		--	--
Soil pH	--	--	--		--	--
Total Petroleum Hydrocarbons (mg/kg)						
Gasoline range hydrocarbons	X[o]	--	--[o]		--	--
Diesel range hydrocarbons	X[o]	--	--[o]		--	--
Motor oil range hydrocarbons	X[o]	--	--[o]		--	--
Total Petroleum Hydrocarbons Dx Gx Only[f]	X	--	various		--	--
Metals (mg/kg)						
Aluminum	--	--	--		--	--
Antimony	--	--	--		--	--
Arsenic	X	--	15	p	--	--
Barium	--	--	--		--	--
Beryllium	--	--	--		--	--
Cadmium	--	--	--		--	--
Chromium	--	--	--		--	--
Copper	--	--	--		--	--
Cobalt	--	--	--		--	--
Iron	--	--	--		--	--
Lead	X	--	800	p	--	--
Manganese	--	--	--		--	--
Mercury	--	--	--		--	--
Nickel	--	--	--		--	--
Selenium	--	--	--		--	--
Silver	--	--	--		--	--
Thallium	X	--	5.2	q	--	--
Titanium	--	--	--		--	--
Vanadium	--	--	--		--	--
Zinc	--	--	--		--	--
Dioxins/Furans (ng/kg)						
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	X	--		170	4,800
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	X	--		--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	X	--		--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	X	--		--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	X	--		--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	X	--		--	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	X	--		--	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	X	--		--	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	X	--		--	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	X	--		--	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	X	--		--	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	X	--		--	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	X	--		--	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	X	--		--	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	X	--		--	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	X	--		--	--
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	X	--		--	--
Total Dioxin/Furan TEQ 2005 (Mammal)[g]	--	X	--		170	4,800
PCBs (ng/kg)						
Total PCB Congener[h]	--	X	--		4,900,000	140,000,000
Total PCB Congener TEQ 2005 (Mammal)[i]	--	X	--		170	4,800
Dioxin Furans and PCB Congeners (ng/kg)						
Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal)	--	X	--		170	4,800
Pesticides (µg/kg)						
4,4'-DDD (p,p'-DDD)	--	X	--		9,700	270,000
2,4'-DDD (o,p'-DDD)	--	X	--		--	--
4,4'-DDE (p,p'-DDE)	--	X	--		66,000	1,800,000
2,4'-DDE (o,p'-DDE)	--	X	--		--	--
4,4'-DDT (p,p'-DDT)	--	X	--		66,000	1,800,000
2,4'-DDT (o,p'-DDT)	--	X	--		--	--
Aldrin	--	X	--		1,100	30,000
BHC, alpha-	--	X	--		3,000	83,000
BHC, beta-	--	X	--		--	--
BHC, delta-	--	X	--		--	--
BHC, gamma- (Lindane)	--	X	--		17,000	470,000
Chlordane, alpha- (Chlordane, cis-)	--	X	--		--	--
Chlordane, beta- (Chlordane, trans-)	--	X	--		--	--
Dieldrin	--	X	--		1,200	33,000
Endosulfan I	--	X	--		--	--
Endosulfan II	--	X	--		--	--

Table 4
Subsurface Soil Analytical Parameters and Screening Levels

Analyte	Gasco OU COC[a]		FS Data Gaps Screening Levels[c]			
			Gasco OU COC		FS Data Gaps COI	
	Human Health Subsurface	FS Data Gaps COI[b]	Interim FS Human Health Subsurface Soil Screening Level[d]		Construction Worker DEQ RBC[e]	Excavation Worker DEQ RBC[e]
Endosulfan sulfate	--	X	--		--	--
Endrin	--	X	--		80,000	2,200,000
Endrin Aldehyde	--	X	--		--	--
Heptachlor	--	X	--		4,000	110,000
Heptachlor epoxide	--	X	--		2,000	56,000
Hexachlorobenzene	--	X	--		11,000	320,000
Nonachlor, cis-	--	X	--		--	--
Nonachlor, trans-	--	X	--		--	--
Oxychlordane	--	X	--		--	--
Toxaphene	--	X	--		17,000	470,000
Sum DDD[j]	--	X	--		9,700	270,000
Sum DDE[j]	--	X	--		66,000	1,800,000
Sum DDT[j]	--	X	--		66,000	1,800,000
Total Chlordane (alpha, beta, nona, oxy)[k]	--	X	--		61,000	1,700,000
Total Endosulfan (alpha, beta)[l]	--	X	--		1,600,000	45,000,000
PAHs and Alkylated PAHs (µg/kg)						
1-Methylnaphthalene	X	--	600,000	p	--	--
1-Methylphenanthrene	--	--	--		--	--
2,3,5-Trimethylnaphthalene	--	--	--		--	--
2,6-Dimethylnaphthalene	--	--	--		--	--
2-Methylnaphthalene	X	--	1,000,000	p	--	--
Acenaphthene	--	--	--		--	--
Acenaphthylene	--	--	--		--	--
Anthracene	--	--	--		--	--
Benzo(a)anthracene	X	--	--[m]	p	--	--
Benzo(a)pyrene	X	--	--[m]	p	--	--
Benzo(b)fluoranthene	X	--	--[m]	p	--	--
Benzo(b)naphtho(2,1-d)thiophene	--	--	--		--	--
Benzo(b)thiophene	--	--	--		--	--
Benzo(e)pyrene	--	--	--		--	--
Benzo(g,h,i)perylene	--	--	--		--	--
Benzo(j)fluoranthene	--	--	--	--	--	--
Benzo(k)fluoranthene	X	--	--[m]	p	--	--
Biphenyl	--	--	--		--	--
C1-Benzo(a)anthracenes/Chrysenes	--	--	--		--	--
C1-Decalins	--	--	--		--	--
C1-Dibenzothiophenes	--	--	--		--	--
C1-Fluoranthenes/Pyrenes	--	--	--		--	--
C1-Fluorenes	--	--	--		--	--
C1-Naphthalenes	--	--	--		--	--
C1-Phenanthrenes/Anthracenes	--	--	--		--	--
C2-Benzo(a)anthracenes/Chrysenes	--	--	--		--	--
C2-Decalins	--	--	--		--	--
C2-Dibenzothiophenes	--	--	--		--	--
C2-Fluoranthenes/Pyrenes	--	--	--		--	--
C2-Fluorenes	--	--	--		--	--
C2-Naphthalenes	--	--	--		--	--
C2-Phenanthrenes/Anthracenes	--	--	--		--	--
C3-Benzo(a)anthracenes/Chrysenes	--	--	--		--	--
C3-Decalins	--	--	--		--	--
C3-Dibenzothiophenes	--	--	--		--	--
C3-Fluoranthenes/Pyrenes	--	--	--		--	--
C3-Fluorenes	--	--	--		--	--
C3-Naphthalenes	--	--	--		--	--
C3-Phenanthrenes/Anthracenes	--	--	--		--	--
C4-Benzo(a)anthracenes/Chrysenes	--	--	--		--	--
C4-Decalins	--	--	--		--	--
C4-Dibenzothiophenes	--	--	--		--	--
C4-Fluoranthenes/Pyrenes	--	--	--		--	--
C4-Naphthalenes	--	--	--		--	--
C4-Phenanthrenes/Anthracenes	--	--	--		--	--
Chrysene	--	--	--		--	--
cis-Decalin	--	--	--		--	--
Dibenzo(a,h)anthracene	X	--	--[m]		--	--
Dibenzothiophene	--	--	--		--	--
Fluoranthene	--	--	--		--	--
Fluorene	--	--	--		--	--
Indeno(1,2,3-c,d)pyrene	X	--	--[m]	p	--	--
Naphthalene	X	--	580,000	p	--	--
Perylene	--	--	--		--	--
Phenanthrene	--	--	--		--	--
Pyrene	--	--	--		--	--
Total Benzofluoranthenes	--	--	--		--	--

Table 4
Subsurface Soil Analytical Parameters and Screening Levels

Analyte	Gasco OU COC[a]		FS Data Gaps Screening Levels[c]			
			Gasco OU COC		FS Data Gaps COI	
	Human Health Subsurface	FS Data Gaps COI[b]	Interim FS Human Health Subsurface Soil Screening Level[d]		Construction Worker DEQ RBC[e]	Excavation Worker DEQ RBC[e]
trans-Decalin	--	--	--		--	--
Total cPAH TEQ (EPA 1993)[m]	X[m]	--	17,000	p	--	--
Semivolatile Organic Compounds (µg/kg)						
Carbazole	--	--	--		--	--
Dibenzofuran	--	--	--		--	--
2-Chlorophenol	--	--	--		--	--
4-Chloro-3-methylphenol	--	--	--		--	--
2,4-Dichlorophenol	--	--	--		--	--
2,4-Dimethylphenol	--	--	--		--	--
2,4-Dinitrophenol	--	--	--		--	--
4,6-Dinitro-2-methylphenol	--	--	--		--	--
2-Methylphenol	--	--	--		--	--
3+4-Methylphenol(s)	--	--	--		--	--
2-Nitrophenol	--	--	--		--	--
4-Nitrophenol	--	--	--		--	--
Pentachlorophenol (PCP)	--	--	--		--	--
Phenol	--	--	--		--	--
2,3,4,6-Tetrachlorophenol	--	--	--		--	--
2,3,5,6-Tetrachlorophenol	--	--	--		--	--
2,4,5-Trichlorophenol	--	--	--		--	--
2,4,6-Trichlorophenol	--	--	--		--	--
Bis(2-ethylhexyl)phthalate	--	--	--		--	--
Butyl benzyl phthalate	--	--	--		--	--
Diethylphthalate	--	--	--		--	--
Dimethylphthalate	--	--	--		--	--
Di-n-butylphthalate	--	--	--		--	--
Di-n-octyl phthalate	--	--	--		--	--
Volatile Organic Compounds (µg/kg)						
Acetone	--	--	--		--	--
Acrylonitrile	--	--	--		--	--
Benzene	X	--	380,000	p	--	--
Bromobenzene	--	--	--		--	--
Bromochloromethane	--	--	--		--	--
Bromodichloromethane	--	--	--		--	--
Bromoform	--	--	--		--	--
Bromomethane	--	--	--		--	--
2-Butanone (MEK)	--	--	--		--	--
n-Butylbenzene	--	--	--		--	--
sec-Butylbenzene	--	--	--		--	--
tert-Butylbenzene	--	--	--		--	--
Carbon disulfide	--	--	--		--	--
Carbon tetrachloride	--	--	--		--	--
Chlorobenzene	--	--	--		--	--
Chloroethane	--	--	--		--	--
Chloroform	--	--	--		--	--
Chloromethane	--	--	--		--	--
2-Chlorotoluene	--	--	--		--	--
4-Chlorotoluene	--	--	--		--	--
Dibromochloromethane	--	--	--		--	--
1,2-Dibromo-3-chloropropane	--	--	--		--	--
1,2-Dibromoethane (EDB)	--	--	--		--	--
Dibromomethane	--	--	--		--	--
1,2-Dichlorobenzene	--	--	--		--	--
1,3-Dichlorobenzene	--	--	--		--	--
1,4-Dichlorobenzene	--	--	--		--	--
Dichlorodifluoromethane	--	--	--		--	--
1,1-Dichloroethane	--	--	--		--	--
1,2-Dichloroethane (EDC)	X	--	200,000	p	--	--
1,1-Dichloroethene	--	--	--		--	--
cis-1,2-Dichloroethene	--	--	--		--	--
trans-1,2-Dichloroethene	--	--	--		--	--
1,2-Dichloropropane	--	--	--		--	--
1,3-Dichloropropane	--	--	--		--	--
2,2-Dichloropropane	--	--	--		--	--
1,1-Dichloropropene	--	--	--		--	--
cis-1,3-Dichloropropene	--	--	--		--	--
trans-1,3-Dichloropropene	--	--	--		--	--
Ethylbenzene	X	--	1,700,000	p	--	--
Hexachlorobutadiene	--	--	--		--	--
2-Hexanone	--	--	--		--	--
Isopropylbenzene	--	--	--		--	--
4-Isopropyltoluene	--	--	--		--	--
Methylene chloride	--	--	--		--	--

Table 4
Subsurface Soil Analytical Parameters and Screening Levels

Analyte	Gasco OU COC[a]		FS Data Gaps Screening Levels[c]		
			Gasco OU COC	FS Data Gaps COI	
	Human Health Subsurface	FS Data Gaps COI[b]	Interim FS Human Health Subsurface Soil Screening Level[d]	Construction Worker DEQ RBC[e]	Excavation Worker DEQ RBC[e]
4-Methyl-2-pentanone (MiBK)	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	--	--	--	--	--
n-Propylbenzene	--	--	--	--	--
Styrene	--	--	--	--	--
1,1,1,2-Tetrachloroethane	--	--	--	--	--
1,1,2,2-Tetrachloroethane	--	--	--	--	--
Tetrachloroethene (PCE)	--	--	--	--	--
Toluene	--	--	--	--	--
1,2,3-Trichlorobenzene	--	--	--	--	--
1,2,4-Trichlorobenzene	--	--	--	--	--
1,1,1-Trichloroethane	--	--	--	--	--
1,1,2-Trichloroethane	--	--	--	--	--
Trichloroethene (TCE)	--	--	--	--	--
Trichlorofluoromethane	--	--	--	--	--
1,2,3-Trichloropropane	--	--	--	--	--
1,2,4-Trimethylbenzene	--	--	--	--	--
1,3,5-Trimethylbenzene	--	--	--	--	--
Vinyl chloride	--	--	--	--	--
m,p-Xylene	--	--	--	--	--
o-Xylene	--	--	--	--	--
Total Xylene[n]	--	--	--	--	--

Table 4
Subsurface Soil Analytical Parameters and Screening Levels

Notes:
a. Chemicals identified as Subsurface Soil COCs for the Gasco OU
b. FS Data Gaps COIs include dioxin/furans, PCBs, and chlorinated pesticides.
c. Screening levels include the screening levels identified in the IFS for Gasco OU COC (Anchor QEA 2018). For FS Data Gaps COIs, screening levels were selected from the sources of screening levels used in the IFS.
d. Screening levels from IFS Table J1-2a (Anchor QEA 2018)
e. RBC from DEQ 2018
f. Total Petroleum Hydrocarbons Dx Gx Only: the sum of NWTPH-Dx and NWTPH-Gx
g. Total Dioxin/Furan TEQ 2005 (Mammal): the sum of 2,3,7,8-TCDD equivalent congeners, calculated by multiplying the dioxin/furan congeners by their respective World Health Organization 2005 mammal toxicity equivalency factors (presented in Van den Berg et al. 2006)
h. Total PCB Congeners: the sum of 209 individual congeners
i. Total PCB TEQ 2005 (Mammal): the sum of the dioxin-like PCB congeners, calculated by multiplying the PCB congeners by their respective World Health Organization 2005 mammal toxicity equivalency factors (presented in Van den Berg et al. 2006)
j. The sum of 4,4′ and 2,4′ isomers
k. Total Chlordane (alpha, beta, nona, oxy): the sum of cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, and oxychlordane
l. Total Endosulfan (alpha, beta): the sum of alpha- and beta-endosulfan
m. cPAH evaluated as total cPAH TEQ (EPA 1993). Total cPAH TEQ is the sum of benzo(a)pyrene equivalent concentrations, calculated by multiplying the cPAHs by their respective potency factors. The cPAHs include benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, and dibenzo(a,h)anthracene.
n. Total xylenes: the sum of m,p-xylene and o-xylene
o. Chemical is a constituent of a chemical sum identified as a COC.
p. Construction Worker Screening Level
q. Natural Background Level
--: not applicable
µg/kg: micrograms per kilogram
COC: contaminant of concern
COI: contaminant of interest
cPAH: carcinogenic polycyclic aromatic hydrocarbon
DDD: dichlorodiphenyldichloroethane
DDE: dichlorodiphenyldichloroethene
DDT: dichlorodiphenyltrichloroethane
EPA: U.S. Environmental Protection Agency
IFS: *Interim Feasibility Study*
mg/kg: milligram per kilogram
ng/kg: nanogram per kilogram
NWTPH-Dx: Northwest Total Petroleum Hydrocarbons – diesel range
NWTPH-Gx: Northwest Total Petroleum Hydrocarbons – gas range
OU: operable unit
PAH: polycyclic aromatic hydrocarbon
RBC: risk-based concentration
TEQ: toxic equivalence quotient

References:
Anchor QEA (Anchor QEA, LLC), 2018. *Interim Feasibility Study*. Gasco OU. Prepared for NW Natural. November 21, 2018.
DEQ (Oregon Department of Environmental Quality), 2018. Risk-Based Concentrations. May 2018.
EPA (U.S. Environmental Protection Agency), 1993, *Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons.* Office of Research and Development. EPA/600/R-93/089. July 1993.
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Table 5
Sediment Analytical Parameters, Methods, and Quantitation Limits

Analyte	Gasco OU COC[a]		FS Data Gaps COI[b]	FS Data Gaps Screening Levels[c]									
				Gasco OU COC					FS Data Gaps COI				
				Interim FS		HERA Addendum							
	Doane Creek Ecological Soil	Doane Creek Ecological Sediment		Ecological Soil Screening Levels[d]		Final Sediment Toxicity Screening Levels[e]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]		Ecological Soil DEQ RBC[g]		Ecological Sediment DEQ RBC[h]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]		Doane Creek Trespasser Soil DEQ RBC[h]
Conventionals (mg/kg)														
Grain size (%)	--	--	--	--		--	--		--		--	--		--
Total solids (%)	--	--	--	--		--	--		--		--	--		--
Total organic carbon (%)	--	--	--	--		--	--		--		--	--		--
Total cyanide	X	X	--	6.65	ae	0.1	--		--		--	--		--
Total sulfide	X	--	--	0.0179	ae	130	--		--		--	--		--
Soil pH (unitless)	--	--	--	--		--	--		--		--	--		--
Total Petroleum Hydrocarbons (mg/kg)														
Gasoline range hydrocarbons	--	--	--	--		--	--		--		--	--		--
Diesel range hydrocarbons	--	--	--	--		--	--		--		--	--		--
Motor oil range hydrocarbons	--	--	--	--		--	--		--		--	--		--
Total Petroleum Hydrocarbons Dx Gx Only[j]	--	--	--	--		--	--		--		--	--		--
Metals (mg/kg)														
Aluminum	--	--	--	37,200	ah	--	--		--		--	--		--
Antimony	X	--	--	1.35	ae	3	--		--		--	--		--
Arsenic	--	X	--	18	ag	6	8.8	ah	--		--	--		--
Barium	--	--	--	--		--	--		--		--	--		--
Beryllium	--	--	--	--		--	--		--		--	--		--
Cadmium	--	--	--	--		--	--		--		--	--		--
Chromium	--	--	--	--		--	--		--		--	--		--
Copper	X	--	--	70	ag	36	--		--		--	--		--
Cobalt	--	--	--	--		--	--		--		--	--		--
Iron	X	X	--	42,100	ah	20,000	--		--		--	--		--
Lead	X	X	--	79	ah	35	79	ah	--		--	--		--
Manganese	--	--	--	--		--	--		--		--	--		--
Mercury	--	--	--	--		--	--		--		--	--		--
Nickel	--	--	--	--		--	--		--		--	--		--
Selenium	--	--	--	--		--	--		--		--	--		--
Silver	--	--	--	--		--	--		--		--	--		--
Thallium	--	--	--	--		--	--		--		--	--		--
Titanium	--	--	--	--		--	--		--		--	--		--
Vanadium	--	--	--	--		--	--		--		--	--		--
Zinc	X	--	--	180	ah	123	--		--		--	--		--
Dioxins/Furans (ng/kg)														
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	X	--		--	--		0.25	aj	9	0.56	ai	5,300
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	X	--		--	--		0.28	aj	--	17	ai	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	X	--		--	--		1.2	aj	--	34	ai	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	X	--		--	--		0.89	aj	--	420	ae	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	X	--		--	--		0.89	aj	--	420	ae	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	X	--		--	--		7	aj	--	110,000	ae	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	X	--		--	--		300	aj	--	3,600,000	ae	--

Table 5
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Analyte	Gasco OU COC[a]		FS Data Gaps COI[b]	FS Data Gaps Screening Levels[c]										
				Gasco OU COC					FS Data Gaps COI					
				Interim FS		HERA Addendum								
	Doane Creek Ecological Soil	Doane Creek Ecological Sediment		Ecological Soil Screening Levels[d]		Final Sediment Toxicity Screening Levels[e]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]		Ecological Soil DEQ RBC[g]		Ecological Sediment DEQ RBC[h]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]		Doane Creek Trespasser Soil DEQ RBC[h]
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	X	--		--	--		3	aj	--	30	al	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	X	--		--	--		6.5	aj	--	95	ai	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	X	--		--	--		0.65	aj	--	1.1	ai	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	X	--		--	--		1.1	aj	--	170	ai	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	X	--		--	--		1.1	aj	--	170	ai	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	X	--		--	--		1.1	aj	--	170	ai	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	X	--		--	--		1.4	aj	--	170	ai	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	X	--		--	--		11	aj	--	43,000	ai	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	X	--		--	--		11	aj	--	43,000	ai	--
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	X	--		--	--		220	aj	--	3,600,000	ae	--
Total Dioxin/Furan TEQ 1998 (Fish)[k]	--	--	X	--		--	--		--		9	0.56	ai	--
Total Dioxin/Furan TEQ 2005 (Mammal)[l]	--	--	X	--		--	--		0.25	aj	--	1.4	ae	5,300
PCBs (ng/kg)														
PCB-077	--	--	X	--		--	--		170	ak	--	40	al	--
PCB-081	--	--	X	--		--	--		1,500	ak	--	20	al	--
PCB-105	--	--	X	--		--	--		43,000	aj	--	19,000	al	--
PCB-114	--	--	X	--		--	--		30,000	aj	--	27,000	ae	--
PCB-118 (PCB-106/118)	--	--	X	--		--	--		22,000	aj	--	33,000	ae	--
PCB-123	--	--	X	--		--	--		30,000	aj	--	33,000	ae	--
PCB-126	--	--	X	--		--	--		8.7	aj	--	7.8	ae	--
PCB-156	--	--	X	--		--	--		14,000	aj	--	24,000	al	--
PCB-157	--	--	X	--		--	--		14,000	aj	--	24,000	al	--
PCB-167	--	--	X	--		--	--		17,000	aj	--	33,000	ae	--
PCB-169	--	--	X	--		--	--		20	aj	--	33	ae	--
PCB-189	--	--	X	--		--	--		6,000	aj	--	180,000	ae	--
Total PCB Congener[m]	--	--	X	--		--	--		73,000	aj	34,000	22,000	ai	200,000,000
Total PCB Congener TEQ 1998 (Fish)[n]	--	--	X	--		--	--		--		9	0.56	ai	--
Total PCB Congener TEQ 2005 (Mammal)[o]	--	--	X	--		--	--		0.25	aj	--	1.4	ae	5,300
Dioxin Furans and PCB Congeners (ng/kg)														
Total Dioxin/Furan and PCB Congener TEQ 1998 (Fish)[p]	--	--	X	--		--	--		--		9	0.56	ai	--
Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal)[q]	--	--	X	--		--	--		0.25	aj	--	1.4	ae	5,300
Pesticides (µg/kg)														
4,4'-DDD (p,p'-DDD)	--	--	X	--		--	--		--		4	--		3,900,000
2,4'-DDD (o,p'-DDD)	--	--	X	--		--	--		--		--	--		--
4,4'-DDE (p,p'-DDE)	--	--	X	--		--	--		--		1.5	--		2,600,000
2,4'-DDE (o,p'-DDE)	--	--	X	--		--	--		--		--	--		--
4,4'-DDT (p,p'-DDT)	--	--	X	--		--	--		--		4	--		2,700,000
2,4'-DDT (o,p'-DDT)	--	--	X	--		--	--		--		--	--		--
Aldrin	--	--	X	--		--	--		4.3	ak	--	--		44,000
BHC, alpha-	--	--	X	--		--	--		--		--	--		120,000
BHC, beta-	--	--	X	--		--	--		--		--	--		--

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Analyte	Gasco OU COC[a]		FS Data Gaps COI[b]	FS Data Gaps Screening Levels[c]									
				Gasco OU COC					FS Data Gaps COI				
				Interim FS		HERA Addendum							
	Doane Creek Ecological Soil	Doane Creek Ecological Sediment		Ecological Soil Screening Levels[d]		Final Sediment Toxicity Screening Levels[e]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]		Ecological Soil DEQ RBC[g]		Ecological Sediment DEQ RBC[h]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]		Doane Creek Trespasser Soil DEQ RBC[h]
BHC, delta-	--	--	X	--		--	--		--		--	--		--
BHC, gamma- (Lindane)	--	--	X	--		--	--		--		0.9	--		700,000
Chlordane, alpha- (Chlordane, cis-)	--	--	X	--		--	--		--		--	--		--
Chlordane, beta- (Chlordane, trans-)	--	--	X	--		--	--		--		--	--		--
Dieldrin	--	--	X	--		--	--		9	aj	3	1.8	al	48,000
Endosulfan I	--	--	X	--		--	--		--		--	--		--
Endosulfan II	--	--	X	--		--	--		--		--	--		--
Endosulfan sulfate	--	--	X	--		--	--		--		--	--		--
Endrin	--	--	X	--		--	--		3.4	ag	3	--		82,000,000
Endrin Aldehyde	--	--	X	--		--	--		--		--	--		--
Heptachlor	--	--	X	--		--	--		--		10	--		150,000
Heptachlor epoxide	--	--	X	--		--	--		--		0.6	--		78,000
Hexachlorobenzene	--	--	X	--		--	--		--		100	61,000	ai	290,000
Nonachlor, cis-	--	--	X	--		--	--		--		--	--		--
Nonachlor, trans-	--	--	X	--		--	--		--		--	--		--
Oxychlordane	--	--	X	--		--	--		--		--	--		--
Toxaphene	--	--	X	--		--	--		21,000	ak	--	--		700,000
Sum DDD[r]	--	--	X	--		--	--		--		4	--		3,900,000
Sum DDE[r]	--	--	X	--		--	--		--		1.5	--		2,600,000
Sum DDT[r]	--	--	X	--		--	--		--		4	--		2,700,000
Total DDx[s]	--	--	X	--		--	--		240	aj	7	0.39	ai	--
Total BHC[t]	--	--	X	--		--	--		96	aj	100	--		--
Total Chlordane (alpha, gamma, heptachlor)[u]	--	--	X	--		--	--		1,400	aj,ak	--	--		--
Total Chlordane (alpha, beta, nona, oxy)[v]	--	--	X	--		--	--		--		4.5	0.5	ai	2,500,000
Total Endosulfan (alpha, beta)[w]	--	--	X	--		--	--		6,400	aj	--	--		--[am]
PAHs and Alkylated PAHs (µg/kg)														
1-Methylnaphthalene	--	--	--	29000		76	--		--		--	--		--
1-Methylphenanthrene	--	--	--	--		--	--		--		--	--		--
2,3,5-Trimethylnaphthalene	--	--	--	--		--	--		--		--	--		--
2,6-Dimethylnaphthalene	--	--	--	--		--	--		--		--	--		--
2-Methylnaphthalene	--	X	--	29,000	af	20.2	--		--		--	--		--
Acenaphthene	--	X	--	20,000	ag	290	--		--		--	--		--
Acenaphthylene	--	--	--	--		--	--		--		--	--		--
Anthracene	--	X	--	29,000	af	57	--		--		--	--		--
Benzo(a)anthracene	X[ad]	X	--	5,500	ae	32	--		--		--	--		--
Benzo(a)pyrene	X[ad]	X	--	5,500	ae	32	--		--		--	--		--
Benzo(b)fluoranthene	X[ad]	X	--	5,500	ae	193	--		--		--	--		--
Benzo(b)naphtho(2,1-d)thiophene	--	--	--	--		--	--		--		--	--		--
Benzo(b)thiophene	--	--	--	--		--	--		--		--	--		--
Benzo(e)pyrene	--	--	--	--		--	--		--		--	--		--
Benzo(g,h,i)perylene	X[ad]	X	--	5,500	ae	300	--		--		--	--		--

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Analyte	Gasco OU COC[a]		FS Data Gaps COI[b]	FS Data Gaps Screening Levels[c]									
				Gasco OU COC					FS Data Gaps COI				
				Interim FS		HERA Addendum							
	Doane Creek Ecological Soil	Doane Creek Ecological Sediment		Ecological Soil Screening Levels[d]		Final Sediment Toxicity Screening Levels[e]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]		Ecological Soil DEQ RBC[g]		Ecological Sediment DEQ RBC[h]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]		Doane Creek Trespasser Soil DEQ RBC[h]
Benzo(j)fluoranthene	--	--	--	--		--	--		--		--	--		--
Benzo(k)fluoranthene	X[ad]	X	--	5,500	ae	27	--		--		--	--		--
Biphenyl	--	--	--	--		--	--		--		--	--		--
C1-Benzo(a)anthracenes/Chrysenes	--	--	--	--		--	--		--		--	--		--
C1-Decalins	--	--	--	--		--	--		--		--	--		--
C1-Dibenzothiophenes	--	--	--	--		--	--		--		--	--		--
C1-Fluoranthenes/Pyrenes	--	--	--	--		--	--		--		--	--		--
C1-Fluorenes	--	--	--	--		--	--		--		--	--		--
C1-Naphthalenes	--	--	--	--		--	--		--		--	--		--
C1-Phenanthrenes/Anthracenes	--	--	--	--		--	--		--		--	--		--
C2-Benzo(a)anthracenes/Chrysenes	--	--	--	--		--	--		--		--	--		--
C2-Decalins	--	--	--	--		--	--		--		--	--		--
C2-Dibenzothiophenes	--	--	--	--		--	--		--		--	--		--
C2-Fluoranthenes/Pyrenes	--	--	--	--		--	--		--		--	--		--
C2-Fluorenes	--	--	--	--		--	--		--		--	--		--
C2-Naphthalenes	--	--	--	--		--	--		--		--	--		--
C2-Phenanthrenes/Anthracenes	--	--	--	--		--	--		--		--	--		--
C3-Benzo(a)anthracenes/Chrysenes	--	--	--	--		--	--		--		--	--		--
C3-Decalins	--	--	--	--		--	--		--		--	--		--
C3-Dibenzothiophenes	--	--	--	--		--	--		--		--	--		--
C3-Fluoranthenes/Pyrenes	--	--	--	--		--	--		--		--	--		--
C3-Fluorenes	--	--	--	--		--	--		--		--	--		--
C3-Naphthalenes	--	--	--	--		--	--		--		--	--		--
C3-Phenanthrenes/Anthracenes	--	--	--	--		--	--		--		--	--		--
C4-Benzo(a)anthracenes/Chrysenes	--	--	--	--		--	--		--		--	--		--
C4-Decalins	--	--	--	--		--	--		--		--	--		--
C4-Dibenzothiophenes	--	--	--	--		--	--		--		--	--		--
C4-Fluoranthenes/Pyrenes	--	--	--	--		--	--		--		--	--		--
C4-Naphthalenes	--	--	--	--		--	--		--		--	--		--
C4-Phenanthrenes/Anthracenes	--	--	--	--		--	--		--		--	--		--
Chrysene	X[ad]	X	--	5,500	ae	57	--		--		--	--		--
cis-Decalin	--	--	--	--		--	--		--		--	--		--
Dibenzo(a,h)anthracene	X[ad]	X	--	5,500	ae	33	--		--		--	--		--
Dibenzothiophene	--	--	--	--		--	--		--		--	--		--
Fluoranthene	X[ad]	X	--	5,500	ae	111	37,000	ai	--		--	--		--
Fluorene	--	X	--	29,000	af	77	--		--		--	--		--
Indeno(1,2,3-c,d)pyrene	X[ad]	X	--	5,500	ae	17	--		--		--	--		--
Naphthalene	--	X	--	10,000	ag	176	--		--		--	--		--
Perylene	--	--	--	--		--	--		--		--	--		--
Phenanthrene	--	X	--	29,000	af	42	--		--		--	--		--

Table 5
Sediment Analytical Parameters, Methods, and Quantitation Limits

Analyte	Gasco OU COC[a]		FS Data Gaps COI[b]	FS Data Gaps Screening Levels[c]										
				Gasco OU COC					FS Data Gaps COI					
				Interim FS		HERA Addendum								
	Doane Creek Ecological Soil	Doane Creek Ecological Sediment		Ecological Soil Screening Levels[d]		Final Sediment Toxicity Screening Levels[e]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]		Ecological Soil DEQ RBC[g]		Ecological Sediment DEQ RBC[h]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]		Doane Creek Trespasser Soil DEQ RBC[h]
Pyrene	X[ad]	X	--	5,500	ae	53	1,900	ai	--		--	--		--
Total Benzofluoranthenes	--	--	--	--		--	--		--		--	--		--
trans-Decalin	--	--	--	--		--	--		--		--	--		--
Total cPAH TEQ (EPA 1993)[x]	--	--	--	--		--	--		--		--	--		--
Total HPAH (Gasco 9 of 17)[y]	X	X	--	5,500	ae	193	--		--		--	--		--
Total LPAH (Gasco 8 of 17)[z]	--	X	--	29,000	af	76	--		--		--	--		--
Total PAH (Gasco 17)[aa]	--	X	--	--		1,610	--		--		--	--		--
PAHESBTU[ab]	--	X	--	--		--	--		--		--	--		--
Semivolatile Organic Compounds (µg/kg)														
Carbazole	--	X	--	--		140	--		--		--	--		--
Dibenzofuran	--	--	--	--		--	--		--		--	--		--
2-Chlorophenol	--	--	--	--		--	--		--		--	--		--
4-Chloro-3-methylphenol	--	--	--	--		--	--		--		--	--		--
2,4-Dichlorophenol	--	--	--	--		--	--		--		--	--		--
2,4-Dimethylphenol	--	--	--	--		--	--		--		--	--		--
2,4-Dinitrophenol	--	--	--	--		--	--		--		--	--		--
4,6-Dinitro-2-methylphenol	--	--	--	--		--	--		--		--	--		--
2-Methylphenol	--	--	--	--		--	--		--		--	--		--
3+4-Methylphenol(s)	--	--	--	--		--	--		--		--	--		--
2-Nitrophenol	--	--	--	--		--	--		--		--	--		--
4-Nitrophenol	--	--	--	--		--	--		--		--	--		--
Pentachlorophenol (PCP)	--	--	--	--		--	--		--		--	--		--
Phenol	--	--	--	--		--	--		--		--	--		--
2,3,4,6-Tetrachlorophenol	--	--	--	--		--	--		--		--	--		--
2,3,5,6-Tetrachlorophenol	--	--	--	--		--	--		--		--	--		--
2,4,5-Trichlorophenol	--	--	--	--		--	--		--		--	--		--
2,4,6-Trichlorophenol	--	--	--	--		--	--		--		--	--		--
Bis(2-ethylhexyl)phthalate	--	--	--	--		--	--		--		--	--		--
Butyl benzyl phthalate	--	--	--	--		--	--		--		--	--		--
Diethylphthalate	--	--	--	--		--	--		--		--	--		--
Dimethylphthalate	--	--	--	--		--	--		--		--	--		--
Di-n-butylphthalate	--	--	--	--		--	--		--		--	--		--
Di-n-octyl phthalate	--	--	--	--		--	--		--		--	--		--
Volatile Organic Compounds (µg/kg)														
Acetone	--	--	--	--		--	--		--		--	--		--
Acrylonitrile	--	--	--	--		--	--		--		--	--		--
Benzene	--	--	--	--		--	--		--		--	--		--
Bromobenzene	--	--	--	--		--	--		--		--	--		--
Bromochloromethane	--	--	--	--		--	--		--		--	--		--
Bromodichloromethane	--	--	--	--		--	--		--		--	--		--
Bromoform	--	--	--	--		--	--		--		--	--		--

Table 5
Sediment Analytical Parameters, Methods, and Quantitation Limits

Analyte	Gasco OU COC[a]		FS Data Gaps COI[b]	FS Data Gaps Screening Levels[c]									
				Gasco OU COC				FS Data Gaps COI					
				Interim FS		HERA Addendum							
	Doane Creek Ecological Soil	Doane Creek Ecological Sediment		Ecological Soil Screening Levels[d]		Final Sediment Toxicity Screening Levels[e]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]	Ecological Soil DEQ RBC[g]		Ecological Sediment DEQ RBC[h]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]		Doane Creek Trespasser Soil DEQ RBC[h]
Bromomethane	--	--	--	--		--	--	--		--	--		--
2-Butanone (MEK)	--	--	--	--		--	--	--		--	--		--
n-Butylbenzene	--	--	--	--		--	--	--		--	--		--
sec-Butylbenzene	--	--	--	--		--	--	--		--	--		--
tert-Butylbenzene	--	--	--	--		--	--	--		--	--		--
Carbon disulfide	--	--	--	--		--	--	--		--	--		--
Carbon tetrachloride	--	--	--	--		--	--	--		--	--		--
Chlorobenzene	--	--	--	--		--	--	--		--	--		--
Chloroethane	--	--	--	--		--	--	--		--	--		--
Chloroform	--	--	--	--		--	--	--		--	--		--
Chloromethane	--	--	--	--		--	--	--		--	--		--
2-Chlorotoluene	--	--	--	--		--	--	--		--	--		--
4-Chlorotoluene	--	--	--	--		--	--	--		--	--		--
Dibromochloromethane	--	--	--	--		--	--	--		--	--		--
1,2-Dibromo-3-chloropropane	--	--	--	--		--	--	--		--	--		--
1,2-Dibromoethane (EDB)	--	--	--	--		--	--	--		--	--		--
Dibromomethane	--	--	--	--		--	--	--		--	--		--
1,2-Dichlorobenzene	--	--	--	--		--	--	--		--	--		--
1,3-Dichlorobenzene	--	--	--	--		--	--	--		--	--		--
1,4-Dichlorobenzene	--	--	--	--		--	--	--		--	--		--
Dichlorodifluoromethane	--	--	--	--		--	--	--		--	--		--
1,1-Dichloroethane	--	--	--	--		--	--	--		--	--		--
1,2-Dichloroethane (EDC)	--	--	--	--		--	--	--		--	--		--
1,1-Dichloroethene	--	--	--	--		--	--	--		--	--		--
cis-1,2-Dichloroethene	--	--	--	--		--	--	--		--	--		--
trans-1,2-Dichloroethene	--	--	--	--		--	--	--		--	--		--
1,2-Dichloropropane	--	--	--	--		--	--	--		--	--		--
1,3-Dichloropropane	--	--	--	--		--	--	--		--	--		--
2,2-Dichloropropane	--	--	--	--		--	--	--		--	--		--
1,1-Dichloropropene	--	--	--	--		--	--	--		--	--		--
cis-1,3-Dichloropropene	--	--	--	--		--	--	--		--	--		--
trans-1,3-Dichloropropene	--	--	--	--		--	--	--		--	--		--
Ethylbenzene	--	--	--	--		--	--	--		--	--		--
Hexachlorobutadiene	--	--	--	--		--	--	--		--	--		--
2-Hexanone	--	--	--	--		--	--	--		--	--		--
Isopropylbenzene	--	--	--	--		--	--	--		--	--		--
4-Isopropyltoluene	--	--	--	--		--	--	--		--	--		--
Methylene chloride	--	--	--	--		--	--	--		--	--		--
4-Methyl-2-pentanone (MiBK)	--	--	--	--		--	--	--		--	--		--
Methyl tert-butyl ether (MTBE)	--	--	--	--		--	--	--		--	--		--
n-Propylbenzene	--	--	--	--		--	--	--		--	--		--

Table 5
Sediment Analytical Parameters, Methods, and Quantitation Limits

Analyte	Gasco OU COC[a]		FS Data Gaps COI[b]	FS Data Gaps Screening Levels[c]									
				Gasco OU COC					FS Data Gaps COI				
				Interim FS		HERA Addendum							
	Doane Creek Ecological Soil	Doane Creek Ecological Sediment		Ecological Soil Screening Levels[d]		Final Sediment Toxicity Screening Levels[e]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]		Ecological Soil DEQ RBC[g]		Ecological Sediment DEQ RBC[h]	Ecological Sediment DEQ Bioaccumulative Screening Levels[f]		Doane Creek Trespasser Soil DEQ RBC[h]
Styrene	--	--	--	--		--	--		--		--	--		--
1,1,1,2-Tetrachloroethane	--	--	--	--		--	--		--		--	--		--
1,1,2,2-Tetrachloroethane	--	--	--	--		--	--		--		--	--		--
Tetrachloroethene (PCE)	--	--	--	--		--	--		--		--	--		--
Toluene	--	--	--	--		--	--		--		--	--		--
1,2,3-Trichlorobenzene	--	--	--	--		--	--		--		--	--		--
1,2,4-Trichlorobenzene	--	--	--	--		--	--		--		--	--		--
1,1,1-Trichloroethane	--	--	--	--		--	--		--		--	--		--
1,1,2-Trichloroethane	--	--	--	--		--	--		--		--	--		--
Trichloroethene (TCE)	--	--	--	--		--	--		--		--	--		--
Trichlorofluoromethane	--	--	--	--		--	--		--		--	--		--
1,2,3-Trichloropropane	--	--	--	--		--	--		--		--	--		--
1,2,4-Trimethylbenzene	--	--	--	--		--	--		--		--	--		--
1,3,5-Trimethylbenzene	--	--	--	--		--	--		--		--	--		--
Vinyl chloride	--	--	--	--		--	--		--		--	--		--
m,p-Xylene	--	--	--	--		--	--		--		--	--		--
o-Xylene	--	--	--	--		--	--		--		--	--		--
Total Xylene[ac]	--	--	--	--		--	--		--		--	--		--

Table 5
Sediment Analytical Parameters and Screening Levels

Notes:
a. Chemicals identified as Doane Creek Surface Soil and Sediment COCs for the Gasco OU.
b. FS Data Gaps COIs include dioxin/furans, PCBs, and chlorinated pesticides.
c. FS Data Gaps Screening levels include the screening levels identified in the IFS for Gasco OU COC and HERA Addendum for sediment COC (Anchor QEA 2018; Anchor QEA and HAI 2019). For FS Data Gaps COIs, screening levels were selected from the sources of screening levels used in the IFS and DEQ sources used in the HERA Addendum.
d. Screening levels from IFS Table J1-3a (Anchor QEA 2018).
e. Final sediment screening levels from benthic invertebrates from the HERA Addendum.
f. Lowest of birds (population), mammals (population), and fish (freshwater) sediment bioaccumulation screening level values (DEQ 2020)
g. Lowest of the plant, invertebrate, and non-threatened and endangered birds and mammals soil RBC (DEQ 2020).
h. Freshwater sediment RBC (DEQ 2020).
i. Site-specific Trespasser RBC calculated using the exposure parameters identified in the RI/HERA Addendum (Anchor QEA and HAI 2019, DEQ 2018).
j. Total Petroleum Hydrocarbons Dx Gx Only: the sum of NWTPH-Dx and NWTPH-Gx
k. Total Dioxin/Furan TEQ 1998 (Fish): the sum of 2,3,7,8-TCDD equivalent congeners, calculated by multiplying the dioxin/furan congeners by their respective World Health Organization 1998 fish toxicity equivalency factors
l. Total Dioxin/Furan TEQ 2005 (Mammal): the sum of 2,3,7,8-TCDD equivalent congeners, calculated by multiplying the dioxin/furan congeners by their respective World Health Organization 2005 mammal toxicity equivalency factors (presented in Van den Berg et al. 2006)
m. Total PCB Congeners: the sum of 209 individual congeners
n. Total PCB TEQ 1998 (Fish): the sum of the dioxin-like PCB congeners, calculated by multiplying the PCB congeners by their respective World Health Organization 1998 fish toxicity equivalency factors
o. Total PCB TEQ 2005 (Mammal): the sum of the dioxin-like PCB congeners, calculated by multiplying the PCB congeners by their respective World Health Organization 2005 mammal toxicity equivalency factors (presented in Van den Berg et al. 2006)
p. Total Dioxin/Furan and PCB Congener TEQ 1998 (Fish): the sum of Total Dioxin/Furan TEQ 1998 (Fish) and Total PCB TEQ 1998 (Fish)
q. Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal): the sum of Total Dioxin/Furan TEQ 2005 (Mammal) and Total PCB TEQ 2005 (Mammal)
r. The sum of 4,4' and 2,4' isomers
s. Total DDx: the sum of 2,4' and 4, 4' DDD, DDE, DDT isomers
t. Total BHC: the sum of hexachlorocyclohexane (BHC), alpha-, hexachlorocyclohexane (BHC), beta-, hexachlorocyclohexane (BHC), delta-, and hexachlorocyclohexane (BHC), gamma- (Lindane)
u. Total Chlordane (alpha, gamma, heptachlor): the sum of alpha-chlordane, gamma-chlordane, and heptachlor) for comparison to ecological screening level
v. Total Chlordane (alpha, beta, nona, oxy): the sum of cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, and oxychlordane) for comparison to human health screening level
w. Total Endosulfan (alpha, beta): the sum of alpha- and beta-endosulfan
x. Total cPAHs TEQ: the sum of benzo(a)pyrene equivalent concentrations, calculated by multiplying the cPAHs by their respective potency factors; cPAHs include benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, and dibenzo(a,h)anthracene.
y. Total HPAH (Gasco 9 of 17): the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(x)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene.
z. Total LPAH (Gasco 8 or 17): the sum of 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene.
aa. Total PAH (Gasco 17): the sum of Total HPAH (Gasco 9 of 17) and Total LPAH (Gasco 8 or 17)
ab. PAH equilibrium partitioning sediment benchmark (toxic units)
ac. Total Xylene: the sum of m,p-xylene and o-xylene
ad. Chemical is a constituent of a chemical sum identified as a COC.
ae. Mammal Screening level
af. Invertebrate Screening Level
ag. Plant Screening Level
ah. Natural Background Level
ai. Fish Screening Level
aj. Ground-Feeding Mammal Non-T&E Screening Level
ak. Ground-Feeding Birds Non-T&E Screening Level
al. Bird Screening Level
am. The calculated RBC is greater than 1,000,000 mg/kg.
--: not applicable
µg/kg: micrograms per kilogram
BHC: benzene hexachloride
COC: contaminant of concern
COI: contaminant of interest
cPAH: carcinogenic polycyclic aromatic hydrocarbon
DDD: dichlorodiphenyldichloroethane

Table 5
Sediment Analytical Parameters and Screening Levels

DDE: dichlorodiphenyldichloroethene
DDT: dichlorodiphenyltrichloroethane
DEQ: Oregon Department of Environmental Quality
EPA: U.S. Environmental Protection Agency
FS: Feasibility Study
HERA Addendum: Human Health and Ecological Risk Assessment Addendum.
HH: human health
HPAH: high-molecular-weight polycyclic aromatic hydrocarbon
IFS: *Interim Feasibility Study*
LPAH: low-molecular-weight polycyclic aromatic hydrocarbon
mg/kg: milligram per kilogram
ng/kg: nanogram per kilogram
NWTPH-Dx: Northwest Total Petroleum Hydrocarbons – diesel range
NWTPH-Gx: Northwest Total Petroleum Hydrocarbons – gasoline range
OU: operable unit
PAH: polycyclic aromatic hydrocarbon
RBC: risk-based concentration
TEQ: toxic equivalence quotient
T&E: Threatened and Endangered (species)

References:

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EPA (U.S. Environmental Protection Agency), 1993. *Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons.* Office of Research and Development. EPA/600/R-93/089. July 1993.

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Table 6
Surface Soil Analytical Parameters, Methods, and Quantitation Limits

Analyte	Method	Laboratory MDL[a,b]	Laboratory RL[a,b]	Minimum Screening Level[c]
Conventionals (mg/kg)				
Total solids (%)	SM 2540 G	1	1	--
Total organic carbon (%)	EPA 9060A	0.1	0.1	--
Total cyanide	ASTM D7511	0.05	0.1	6.65
Total sulfide	SM4500-S2	1.0	1	0.0179
Soil pH	EPA 9045D	0.5	0.5	--
Total Petroleum Hydrocarbons (mg/kg)				
Gasoline range hydrocarbons	NWTPH-Gx	2.5	5	--
Diesel range hydrocarbons	NWTPH-Dx	10	20	--
Motor oil range hydrocarbons	NWTPH-Dx	20	40	--
Total Petroleum Hydrocarbons Dx Gx Only[d,e]	Calculated, not reported	--	--	Varies
Metals (mg/kg)				
Aluminum	EPA 6020B	12.5	25	37,200
Antimony	EPA 6020B	0.250	0.500	1.35
Arsenic	EPA 6020B	0.250	0.500	8.8
Barium	EPA 6020B	0.25	0.5	--
Beryllium	EPA 6020B	0.050	0.100	--
Cadmium	EPA 6020B	0.050	0.100	1.8
Chromium	EPA 6020B	0.250	0.500	76
Copper	EPA 6020B	0.050	0.10	70
Cobalt	EPA 6020B	0.25	0.5	23
Iron	EPA 6020B	12.5	25	42,100
Lead	EPA 6020B	0.050	0.100	79
Manganese	EPA 6020B	0.250	0.500	1,800
Mercury	EPA 6020B	0.02	0.04	0.23
Nickel	EPA 6020B	0.050	0.100	47
Selenium	EPA 6020B	0.250	0.500	--
Silver	EPA 6020B	0.050	0.100	--
Thallium	EPA 6020B	0.250	0.500	5.2
Titanium	EPA 6020B	1	2	6,500
Vanadium	EPA 6020B	0.500	1.00	180
Zinc	EPA 6020B	1.00	2.00	180
Dioxins/Furans (ng/kg)				
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	EPA 1613B	0.284	0.5	0.25
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	EPA 1613B	0.59	2.5	0.28
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	EPA 1613B	0.602	2.5	1.2
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	EPA 1613B	0.383	2.5	0.89
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	EPA 1613B	0.565	2.5	0.89
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	EPA 1613B	0.535	2.5	7
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	EPA 1613B	1.58	5	300
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	EPA 1613B	0.305	0.5	3
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	EPA 1613B	0.486	2.5	6.5
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	EPA 1613B	0.299	2.5	0.65
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	EPA 1613B	0.648	2.5	1.1
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	EPA 1613B	0.887	2.5	1.1
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	EPA 1613B	0.631	2.5	1.1
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	EPA 1613B	0.783	2.5	1.4
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	EPA 1613B	0.427	2.5	11
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	EPA 1613B	0.651	2.5	11
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	EPA 1613B	0.825	5	220
Total Dioxin/Furan TEQ 2005 (Mammal)[d,f]	Calculated, not reported	--	--	0.25
PCBs (ng/kg)				
PCB-077	EPA 1668A	0.799	2.5	170
PCB-081	EPA 1668A	0.659	2.5	1,500
PCB-105	EPA 1668A	0.497	2.5	43,000
PCB-114	EPA 1668A	0.801	2.5	30,000
PCB-118 (PCB-106/118)	EPA 1668A	1.45	5	22,000
PCB-123	EPA 1668A	0.551	2.5	30,000
PCB-126	EPA 1668A	0.475	2.5	8.7
PCB-156	EPA 1668A	0.378	2.5	14,000
PCB-157	EPA 1668A	0.604	2.5	14,000
PCB-167	EPA 1668A	0.595	2.5	17,000
PCB-169	EPA 1668A	0.731	2.5	20
PCB-189	EPA 1668A	0.704	2.5	6,000
209 PCB Congeners	EPA 1668A	1.12 - 7.79	5 - 15	**--**
Total PCB Congener[d,g]	Calculated, not reported	Varies	Varies	73,000
Total PCB Congener TEQ 2005 (Mammal)[d,h]	Calculated, not reported	--	--	0.25
Dioxin Furans and PCB Congeners (ng/kg)				
Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal)[d,i]	Calculated, not reported	--	--	0.25
Pesticides (µg/kg)				
4,4'-DDD (p,p'-DDD)	EPA 8081B	0.5	1	12,000
2,4'-DDD (o,p'-DDD)	EPA 8081B	0.5	1	--
4,4'-DDE (p,p'-DDE)	EPA 8081B	0.5	1	8,200
2,4'-DDE (o,p'-DDE)	EPA 8081B	0.5	1	--
4,4'-DDT (p,p'-DDT)	EPA 8081B	0.5	1	8,500
2,4'-DDT (o,p'-DDT)	EPA 8081B	0.5	1	--

Table 6
Surface Soil Analytical Parameters, Methods, and Quantitation Limits

Analyte	Method	Laboratory MDL[a,b]	Laboratory RL[a,b]	Minimum Screening Level[c]
Aldrin	EPA 8081B	0.5	1	4.3
BHC, alpha-	EPA 8081B	0.5	1	360
BHC, beta-	EPA 8081B	0.5	1	--
BHC, delta-	EPA 8081B	0.5	1	--
BHC, gamma- (Lindane)	EPA 8081B	0.5	1	2,100
Chlordane, alpha- (Chlordane, cis-)	EPA 8081B	0.5	1	--
Chlordane, beta- (Chlordane, trans-)	EPA 8081B	0.5	1	--
Dieldrin	EPA 8081B	0.5	1	9
Endosulfan I	EPA 8081B	0.5	1	--
Endosulfan II	EPA 8081B	0.5	1	--
Endosulfan sulfate	EPA 8081B	0.5	1	--
Endrin	EPA 8081B	0.5	1	3.4
Endrin Aldehyde	EPA 8081B	1	1	--
Heptachlor	EPA 8081B	0.5	1	450
Heptachlor epoxide	EPA 8081B	0.5	1	240
Hexachlorobenzene	EPA 8081B	1.25	2.5	930
Nonachlor, cis-	EPA 8081B	0.5	1	--
Nonachlor, trans-	EPA 8081B	0.5	1	--
Oxychlordane	EPA 8081B	0.5	1	--
Toxaphene	EPA 8081B	15	30	2,100
Sum DDD[d,j]	Calculated, not reported	--	--	12,000
Sum DDE[d,j]	Calculated, not reported	--	--	8,200
Sum DDT[d,j]	Calculated, not reported	--	--	8,500
Total DDx[d,k]	Calculated, not reported	--	--	240
Total BHC[d,l]	Calculated, not reported	---	---	96
Total Chlordane (alpha, gamma, heptachlor)[d,m]	Calculated, not reported	--	--	1,400
Total Chlordane (alpha, beta, nona, oxy)[d,n]	Calculated, not reported	--	--	7,400
Total Endosulfan (alpha, beta)[d,o]	Calculated, not reported	--	--	6,400
PAHs and Alkylated PAHs (µg/kg)				
1-Methylnaphthalene	EPA 8270E-SIM	0.378	5.00	29,000
1-Methylphenanthrene	EPA 8270E-SIM	0.496	5.00	--
2,3,5-Trimethylnaphthalene	EPA 8270E-SIM	0.449	5.00	--
2,6-Dimethylnaphthalene	EPA 8270E-SIM	0.388	5.00	--
2-Methylnaphthalene	EPA 8270E-SIM	0.445	5.00	29,000
Acenaphthene	EPA 8270E-SIM	0.459	5.00	20,000
Acenaphthylene	EPA 8270E-SIM	0.257	5.00	29,000
Anthracene	EPA 8270E-SIM	0.047	5.00	29,000
Benzo(a)anthracene	EPA 8270E-SIM	1.410	5.00	5,500
Benzo(a)pyrene	EPA 8270E-SIM	0.977	5.00	5,500
Benzo(b)fluoranthene	EPA 8270E-SIM	0.794	5.00	5,500
Benzo(b)naphtho(2,1-d)thiophene	EPA 8270E-SIM	5.000	5.00	--
Benzo(b)thiophene	EPA 8270E-SIM	0.357	5.00	--
Benzo(e)pyrene	EPA 8270E-SIM	0.622	5.00	--
Benzo(g,h,i)perylene	EPA 8270E-SIM	0.519	5.00	5,500
Benzo(j)fluoranthene	EPA 8270E-SIM	0.680	5.00	--
Benzo(k)fluoranthene	EPA 8270E-SIM	0.794	5.00	5,500
Biphenyl	EPA 8270E-SIM	0.335	5.00	--
C1-Benzo(a)anthracenes/Chrysenes	EPA 8270E-SIM	0.706	5.00	--
C1-Decalins	EPA 8270E-SIM	0.486	5.00	--
C1-Dibenzothiophenes	EPA 8270E-SIM	0.652	5.00	--
C1-Fluoranthenes/Pyrenes	EPA 8270E-SIM	1.020	5.00	--
C1-Fluorenes	EPA 8270E-SIM	0.468	5.00	--
C1-Naphthalenes	EPA 8270E-SIM	0.448	5.00	--
C1-Phenanthrenes/Anthracenes	EPA 8270E-SIM	0.934	5.00	--
C2-Benzo(a)anthracenes/Chrysenes	EPA 8270E-SIM	0.706	5.00	--
C2-Decalins	EPA 8270E-SIM	0.486	5.00	--
C2-Dibenzothiophenes	EPA 8270E-SIM	0.652	5.00	--
C2-Fluoranthenes/Pyrenes	EPA 8270E-SIM	1.020	5.00	--
C2-Fluorenes	EPA 8270E-SIM	0.468	5.00	--
C2-Naphthalenes	EPA 8270E-SIM	0.448	5.00	--
C2-Phenanthrenes/Anthracenes	EPA 8270E-SIM	0.934	5.00	--
C3-Benzo(a)anthracenes/Chrysenes	EPA 8270E-SIM	0.706	5.00	--
C3-Decalins	EPA 8270E-SIM	0.486	5.00	--
C3-Dibenzothiophenes	EPA 8270E-SIM	0.652	5.00	--
C3-Fluoranthenes/Pyrenes	EPA 8270E-SIM	1.020	5.00	--
C3-Fluorenes	EPA 8270E-SIM	0.468	5.00	--
C3-Naphthalenes	EPA 8270E-SIM	0.448	5.00	--
C3-Phenanthrenes/Anthracenes	EPA 8270E-SIM	0.934	5.00	--
C4-Benzo(a)anthracenes/Chrysenes	EPA 8270E-SIM	0.706	5.00	--
C4-Decalins	EPA 8270E-SIM	0.486	5.00	--
C4-Dibenzothiophenes	EPA 8270E-SIM	0.652	5.00	--
C4-Fluoranthenes/Pyrenes	EPA 8270E-SIM	1.020	5.00	--
C4-Naphthalenes	EPA 8270E-SIM	0.448	5.00	--

Table 6
Surface Soil Analytical Parameters, Methods, and Quantitation Limits

Analyte	Method	Laboratory MDL[a,b]	Laboratory RL[a,b]	Minimum Screening Level[c]
C4-Phenanthrenes/Anthracenes	EPA 8270E-SIM	0.934	5.00	--
Chrysene	EPA 8270E-SIM	0.706	5.00	5,500
cis-Decalin	EPA 8270E-SIM	0.486	5.00	--
Dibenzo(a,h)anthracene	EPA 8270E-SIM	0.674	5.00	5,500
Dibenzothiophene	EPA 8270E-SIM	0.652	5.00	--
Fluoranthene	EPA 8270E-SIM	1.360	5.00	5,500
Fluorene	EPA 8270E-SIM	0.468	5.00	29,000
Indeno(1,2,3-c,d)pyrene	EPA 8270E-SIM	0.372	5.00	--
Naphthalene	EPA 8270E-SIM	0.448	5.00	10,000
Perylene	EPA 8270E-SIM	0.449	5.00	--
Phenanthrene	EPA 8270E-SIM	0.934	5.00	29,000
Pyrene	EPA 8270E-SIM	1.020	5.00	5,500
Total Benzofluoranthenes	EPA 8270E-SIM	--	--	--
trans-Decalin	EPA 8270E-SIM	0.029	5.00	--
Total cPAH TEQ (EPA 1993)[d,p]	Calculated, not reported	--	--	2,100
Total HPAH (Gasco 9 of 17)[d,q]	Calculated, not reported	--	--	5,500
Total LPAH (Gasco 8 of 17)[d,r]	Calculated, not reported	--	--	29,000
Semivolatile Organic Compounds (µg/kg)				
Carbazole	EPA 8270E	2.00	4.00	--
Dibenzofuran	EPA 8270E	1.33	2.67	--
2-Chlorophenol	EPA 8270E	6.67	13.3	--
4-Chloro-3-methylphenol	EPA 8270E	13.3	26.7	--
2,4-Dichlorophenol	EPA 8270E	6.67	13.3	--
2,4-Dimethylphenol	EPA 8270E	6.67	13.3	--
2,4-Dinitrophenol	EPA 8270E	33.3	66.7	--
4,6-Dinitro-2-methylphenol	EPA 8270E	33.3	66.7	--
2-Methylphenol	EPA 8270E	3.33	6.67	--
3+4-Methylphenol(s)	EPA 8270E	3.33	6.67	--
2-Nitrophenol	EPA 8270E	13.3	26.7	--
4-Nitrophenol	EPA 8270E	13.3	26.7	--
Pentachlorophenol (PCP)	EPA 8270E	13.3	26.7	--
Phenol	EPA 8270E	2.67	5.33	--
2,3,4,6-Tetrachlorophenol	EPA 8270E	6.67	13.3	--
2,3,5,6-Tetrachlorophenol	EPA 8270E	6.67	13.3	--
2,4,5-Trichlorophenol	EPA 8270E	6.67	13.3	--
2,4,6-Trichlorophenol	EPA 8270E	6.67	13.3	--
Bis(2-ethylhexyl)phthalate	EPA 8270E	20	40	--
Butyl benzyl phthalate	EPA 8270E	6.67	13.3	--
Diethylphthalate	EPA 8270E	6.67	13.3	--
Dimethylphthalate	EPA 8270E	6.67	13.3	--
Di-n-butylphthalate	EPA 8270E	6.67	13.3	--
Di-n-octyl phthalate	EPA 8270E	10.7	13.3	--
Volatile Organic Compounds (µg/kg)				
Acetone	EPA 8260D	500	1,000	--
Acrylonitrile	EPA 8260D	50	100	--
Benzene	EPA 8260D	5	10	37,000
Bromobenzene	EPA 8260D	12.5	25	--
Bromochloromethane	EPA 8260D	25	50	--
Bromodichloromethane	EPA 8260D	25	50	--
Bromoform	EPA 8260D	50	100	--
Bromomethane	EPA 8260D	500	500	--
2-Butanone (MEK)	EPA 8260D	250	500	--
n-Butylbenzene	EPA 8260D	25	50	--
sec-Butylbenzene	EPA 8260D	25	50	--
tert-Butylbenzene	EPA 8260D	25	50	--
Carbon disulfide	EPA 8260D	250	500	--
Carbon tetrachloride	EPA 8260D	25	50	--
Chlorobenzene	EPA 8260D	12.5	25	--
Chloroethane	EPA 8260D	250	500	--
Chloroform	EPA 8260D	25	50	--
Chloromethane	EPA 8260D	125	250	--
2-Chlorotoluene	EPA 8260D	25	50	--
4-Chlorotoluene	EPA 8260D	25	50	--
Dibromochloromethane	EPA 8260D	50	100	--
1,2-Dibromo-3-chloropropane	EPA 8260D	125	250	--
1,2-Dibromoethane (EDB)	EPA 8260D	25	50	--
Dibromomethane	EPA 8260D	25	50	--
1,2-Dichlorobenzene	EPA 8260D	12.5	25	--
1,3-Dichlorobenzene	EPA 8260D	12.5	25	--
1,4-Dichlorobenzene	EPA 8260D	12.5	25	--
Dichlorodifluoromethane	EPA 8260D	50	100	--
1,1-Dichloroethane	EPA 8260D	12.5	25	--
1,2-Dichloroethane (EDC)	EPA 8260D	12.5	25	--
1,1-Dichloroethene	EPA 8260D	12.5	25	--
cis-1,2-Dichloroethene	EPA 8260D	12.5	25	--
trans-1,2-Dichloroethene	EPA 8260D	12.5	25	--

Table 6
Surface Soil Analytical Parameters, Methods, and Quantitation Limits

Analyte	Method	Laboratory MDL[a,b]	Laboratory RL[a,b]	Minimum Screening Level[c]
1,2-Dichloropropane	EPA 8260D	12.5	25	--
1,3-Dichloropropane	EPA 8260D	25	50	--
2,2-Dichloropropane	EPA 8260D	25	50	--
1,1-Dichloropropene	EPA 8260D	25	50	--
cis-1,3-Dichloropropene	EPA 8260D	25	50	--
trans-1,3-Dichloropropene	EPA 8260D	25	50	--
Ethylbenzene	EPA 8260D	12.5	25	25,800
Hexachlorobutadiene	EPA 8260D	50	100	--
2-Hexanone	EPA 8260D	250	500	--
Isopropylbenzene	EPA 8260D	25	50	--
4-Isopropyltoluene	EPA 8260D	25	50	--
Methylene chloride	EPA 8260D	250	500	--
4-Methyl-2-pentanone (MiBK)	EPA 8260D	250	500	--
Methyl tert-butyl ether (MTBE)	EPA 8260D	25	50	--
n-Propylbenzene	EPA 8260D	12.5	25	--
Styrene	EPA 8260D	25	50	--
1,1,1,2-Tetrachloroethane	EPA 8260D	12.5	25	--
1,1,2,2-Tetrachloroethane	EPA 8260D	25	50	--
Tetrachloroethene (PCE)	EPA 8260D	12.5	25	--
Toluene	EPA 8260D	25	50	--
1,2,3-Trichlorobenzene	EPA 8260D	125	250	--
1,2,4-Trichlorobenzene	EPA 8260D	125	250	--
1,1,1-Trichloroethane	EPA 8260D	12.5	25	--
1,1,2-Trichloroethane	EPA 8260D	12.5	25	--
Trichloroethene (TCE)	EPA 8260D	12.5	25	--
Trichlorofluoromethane	EPA 8260D	50	100	--
1,2,3-Trichloropropane	EPA 8260D	25	50	--
1,2,4-Trimethylbenzene	EPA 8260D	25	50	--
1,3,5-Trimethylbenzene	EPA 8260D	25	50	--
Vinyl chloride	EPA 8260D	12.5	25	--
m,p-Xylene	EPA 8260D	25	50	--
o-Xylene	EPA 8260D	12.5	25	--
Total Xylene[d,s]	Calculated, not reported	--	--	100,000

Table 6
Surface Soil Analytical Parameters, Methods, and Quantitation Limits

Notes:
a. Actual MDLs and RLs may vary based on sample aliquot size, matrix interference, and required dilution factor.
b. Nondetect compounds analyzed by high resolution methodology will be reported at the EDL, which is typically two to five times lower than the RL.
c. Screening level sources are shown in Table 3.
d. Totals are calculated values; therefore, there are no MDLs or RLs for these parameters.
e. Total Petroleum Hydrocarbons Dx Gx Only: the sum of NWTPH-Dx and NWTPH-Gx
f. Total Dioxin/Furan TEQ 2005 (Mammal): the sum of 2,3,7,8-TCDD equivalent congeners, calculated by multiplying the dioxin/furan congeners by their respective World Health Organization 2005 mammal toxicity equivalency factors (presented in Van den Berg et al. 2006)
g. Total PCB Congeners: the sum of 209 individual congeners
h. Total PCB TEQ 2005 (Mammal): the sum of the dioxin-like PCB congeners, calculated by multiplying the PCB congeners by their respective World Health Organization 2005 mammal toxicity equivalency factors (presented in Van den Berg et al. 2006)
i. Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal): the sum of Total Dioxin/Furan TEQ 2005 (Mammal) and Total PCB TEQ 2005 (Mammal)
j. The sum of 4,4’ and 2,4’ isomers
k. Total DDx: the sum of 2,4' and 4, 4' DDD, DDE, DDT isomers
l. Total BHC: the sum of hexachlorocyclohexane (BHC), alpha-, hexachlorocyclohexane (BHC), beta-, hexachlorocyclohexane (BHC), delta-, and hexachlorocyclohexane (BHC), gamma- (Lindane)
m. Total Chlordane (alpha, gamma, heptachlor): the sum of alpha-chlordane, gamma-chlordane, and heptachlor) for comparison to ecological screening level
n. Total Chlordane (alpha, beta, nona, oxy): the sum of cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, and oxychlordane) for comparison to human health screening level
o. Total Endosulfan (alpha, beta): the sum of alpha- and beta-endosulfan
p. Total cPAHs TEQ: the sum of benzo(a)pyrene equivalent concentrations, calculated by multiplying the cPAHs by their respective potency factors; cPAHs include benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, and dibenzo(a,h)anthracene
q. Total HPAH (Gasco 9 of 17): the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(x)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene
r. Total LPAH (Gasco 8 or 17): the sum of 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene
s. Total Xylene: the sum of m,p-xylene and o-xylene
--: not applicable
µg/kg: micrograms per kilogram
ASTM: ASTM International
BHC: benzene hexachloride
cPAH: carcinogenic polycyclic aromatic hydrocarbon
DDD: dichlorodiphenyldichloroethane
DDE: dichlorodiphenyldichloroethene
DDT: dichlorodiphenyltrichloroethane
EDL: estimated detection limit
EPA: U.S. Environmental Protection Agency
HPAH: high molecular weight polycyclic aromatic hydrocarbon
LPAH: high molecular weight polycyclic aromatic hydrocarbon
MDL: method detection limit
mg/kg: milligram per kilogram
ng/kg: nanogram per kilogram
NWTPH-Dx: Northwest Total Petroleum Hydrocarbons – diesel range
NWTPH-Gx: Northwest Total Petroleum Hydrocarbons – gas range
PAH: polycyclic aromatic hydrocarbon
RL: reporting limit
SIM: selected ion monitoring
SM: Standard Method
TEQ: toxic equivalence quotient

References:
EPA (U.S. Environmental Protection Agency), 1993. *Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons.* Office of Research and Development. EPA/600/R-93/089. July 1993.
Van den Berg, M., L.S. Birnbaum, M. Denison, M. De Vito, W. Farland, M. Feeley, H. Fiedler, H. Hakansson, A. Hanberg, L. Haws, M. Rose, S. Safe, D. Schrenk, C. Tohyama, A. Tritscher, J. Tuomisto, M. Tysklind, N. Walker, and R.E. Peterson, 2006. "The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds." *Toxicological Sciences* 93(2):223–41.

Table 7
Subsurface Soil Analytical Parameters, Methods, and Quantitation Limits

Analyte	Method	Laboratory MDL[a,b]	Laboratory RL[a,b]	Minimum Screening Level[c]
Conventionals (mg/kg)				
Total solids (%)	SM 2540 G	1	1	--
Total organic carbon (%)	EPA 9060A	0.1	0.1	--
Total cyanide	ASTM D7511	0.05	0.1	210
Total sulfide	SM4500-S2	1.0	1	--
Soil pH	EPA 9045D	0.5	0.5	--
Total Petroleum Hydrocarbons (mg/kg)				
Gasoline range hydrocarbons	NWTPH-Gx	2.5	5	--
Diesel range hydrocarbons	NWTPH-Dx	10	20	--
Motor oil range hydrocarbons	NWTPH-Dx	20	40	--
Total Petroleum Hydrocarbons Dx Gx Only[d,e]	Calculated, not reported	--	--	various
Metals (mg/kg)				
Aluminum	EPA 6020B	12.5	25	--
Antimony	EPA 6020B	0.250	0.500	--
Arsenic	EPA 6020B	0.250	0.500	15
Barium	EPA 6020B	0.25	0.5	--
Beryllium	EPA 6020B	0.050	0.100	--
Cadmium	EPA 6020B	0.050	0.100	--
Chromium	EPA 6020B	0.250	0.500	--
Copper	EPA 6020B	0.050	0.10	--
Cobalt	EPA 6020B	0.25	0.5	--
Iron	EPA 6020B	12.5	25	--
Lead	EPA 6020B	0.050	0.100	800
Manganese	EPA 6020B	0.250	0.500	--
Mercury	EPA 6020B	0.02	0.04	--
Nickel	EPA 6020B	0.050	0.100	--
Selenium	EPA 6020B	0.250	0.500	--
Silver	EPA 6020B	0.050	0.100	--
Thallium	EPA 6020B	0.250	0.500	5.2
Titanium	EPA 6020B	1	2	--
Vanadium	EPA 6020B	0.500	1.00	--
Zinc	EPA 6020B	1.00	2.00	--
Dioxins/Furans (ng/kg)				
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	EPA 1613B	0.284	0.5	170
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	EPA 1613B	0.59	2.5	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	EPA 1613B	0.602	2.5	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	EPA 1613B	0.383	2.5	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	EPA 1613B	0.565	2.5	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	EPA 1613B	0.535	2.5	--
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	EPA 1613B	1.58	5	--
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	EPA 1613B	0.305	0.5	--
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	EPA 1613B	0.486	2.5	--
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	EPA 1613B	0.299	2.5	--
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	EPA 1613B	0.648	2.5	--
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	EPA 1613B	0.887	2.5	--
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	EPA 1613B	0.631	2.5	--
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	EPA 1613B	0.783	2.5	--
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	EPA 1613B	0.427	2.5	--
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	EPA 1613B	0.651	2.5	--
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	EPA 1613B	0.825	5	--
Total Dioxin/Furan TEQ 2005 (Mammal)[d,f]	Calculated, not reported	--	--	170
PCBs (ng/kg)				
209 PCB Congeners	EPA 1668A	1.12 - 7.79	5 - 15	--
Total PCB Congener[d,g]	Calculated, not reported	Varies	Varies	4,900,000
Total PCB Congener TEQ 2005 (Mammal)[d,h]	Calculated, not reported	--	--	170
Dioxin Furans and PCB Congeners (ng/kg)				
Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal)[d,i]	Calculated, not reported	--	--	170
Pesticides (µg/kg)				
4,4'-DDD (p,p'-DDD)	EPA 8081B	0.5	1	9,700
2,4'-DDD (o,p'-DDD)	EPA 8081B	0.5	1	--
4,4'-DDE (p,p'-DDE)	EPA 8081B	0.5	1	66,000
2,4'-DDE (o,p'-DDE)	EPA 8081B	0.5	1	--
4,4'-DDT (p,p'-DDT)	EPA 8081B	0.5	1	66,000
2,4'-DDT (o,p'-DDT)	EPA 8081B	0.5	1	--
Aldrin	EPA 8081B	0.5	1	1,100
BHC, alpha-	EPA 8081B	0.5	1	3,000
BHC, beta-	EPA 8081B	0.5	1	--
BHC, delta-	EPA 8081B	0.5	1	--
BHC, gamma- (Lindane)	EPA 8081B	0.5	1	17,000
Chlordane, alpha- (Chlordane, cis-)	EPA 8081B	0.5	1	--
Chlordane, beta- (Chlordane, trans-)	EPA 8081B	0.5	1	--
Dieldrin	EPA 8081B	0.5	1	1,200
Endosulfan I	EPA 8081B	0.5	1	--
Endosulfan II	EPA 8081B	0.5	1	--
Endosulfan sulfate	EPA 8081B	0.5	1	--
Endrin	EPA 8081B	0.5	1	80,000
Endrin Aldehyde	EPA 8081B	1	1	--
Heptachlor	EPA 8081B	0.5	1	4,000
Heptachlor epoxide	EPA 8081B	0.5	1	2,000

Table 7
Subsurface Soil Analytical Parameters, Methods, and Quantitation Limits

Analyte	Method	Laboratory MDL[a,b]	Laboratory RL[a,b]	Minimum Screening Level[c]
Hexachlorobenzene	EPA 8081B	1.25	2.5	11,000
Nonachlor, cis-	EPA 8081B	0.5	1	--
Nonachlor, trans-	EPA 8081B	0.5	1	--
Oxychlordane	EPA 8081B	0.5	1	--
Toxaphene	EPA 8081B	15	30	17,000
Sum DDD[d,j]	Calculated, not reported	--	--	9,700
Sum DDE[d,j]	Calculated, not reported	--	--	66,000
Sum DDT[d,j]	Calculated, not reported	--	--	66,000
Total Chlordane (alpha, beta, nona, oxy)[d,k]	Calculated, not reported	--	--	61,000
Total Endosulfan (alpha, beta)[d,l]	Calculated, not reported	--	--	1,600,000
PAHs and Alkylated PAHs (µg/kg)				
1-Methylnaphthalene	EPA 8270E-SIM	0.378	5.00	600,000
1-Methylphenanthrene	EPA 8270E-SIM	0.496	5.00	--
2,3,5-Trimethylnaphthalene	EPA 8270E-SIM	0.449	5.00	--
2,6-Dimethylnaphthalene	EPA 8270E-SIM	0.388	5.00	--
2-Methylnaphthalene	EPA 8270E-SIM	0.445	5.00	1,000,000
Acenaphthene	EPA 8270E-SIM	0.459	5.00	--
Acenaphthylene	EPA 8270E-SIM	0.257	5.00	--
Anthracene	EPA 8270E-SIM	0.047	5.00	--
Benzo(a)anthracene	EPA 8270E-SIM	1.410	5.00	--
Benzo(a)pyrene	EPA 8270E-SIM	0.977	5.00	--
Benzo(b)fluoranthene	EPA 8270E-SIM	0.794	5.00	--
Benzo(b)naphtho(2,1-d)thiophene	EPA 8270E-SIM	5.000	5.00	--
Benzo(b)thiophene	EPA 8270E-SIM	0.357	5.00	--
Benzo(e)pyrene	EPA 8270E-SIM	0.622	5.00	--
Benzo(g,h,i)perylene	EPA 8270E-SIM	0.519	5.00	--
Benzo(j)fluoranthene	EPA 8270E-SIM	0.680	5.00	--
Benzo(k)fluoranthene	EPA 8270E-SIM	0.794	5.00	--
Biphenyl	EPA 8270E-SIM	0.335	5.00	--
C1-Benzo(a)anthracenes/Chrysenes	EPA 8270E-SIM	0.706	5.00	--
C1-Decalins	EPA 8270E-SIM	0.486	5.00	--
C1-Dibenzothiophenes	EPA 8270E-SIM	0.652	5.00	--
C1-Fluoranthenes/Pyrenes	EPA 8270E-SIM	1.020	5.00	--
C1-Fluorenes	EPA 8270E-SIM	0.468	5.00	--
C1-Naphthalenes	EPA 8270E-SIM	0.448	5.00	--
C1-Phenanthrenes/Anthracenes	EPA 8270E-SIM	0.934	5.00	--
C2-Benzo(a)anthracenes/Chrysenes	EPA 8270E-SIM	0.706	5.00	--
C2-Decalins	EPA 8270E-SIM	0.486	5.00	--
C2-Dibenzothiophenes	EPA 8270E-SIM	0.652	5.00	--
C2-Fluoranthenes/Pyrenes	EPA 8270E-SIM	1.020	5.00	--
C2-Fluorenes	EPA 8270E-SIM	0.468	5.00	--
C2-Naphthalenes	EPA 8270E-SIM	0.448	5.00	--
C2-Phenanthrenes/Anthracenes	EPA 8270E-SIM	0.934	5.00	--
C3-Benzo(a)anthracenes/Chrysenes	EPA 8270E-SIM	0.706	5.00	--
C3-Decalins	EPA 8270E-SIM	0.486	5.00	--
C3-Dibenzothiophenes	EPA 8270E-SIM	0.652	5.00	--
C3-Fluoranthenes/Pyrenes	EPA 8270E-SIM	1.020	5.00	--
C3-Fluorenes	EPA 8270E-SIM	0.468	5.00	--
C3-Naphthalenes	EPA 8270E-SIM	0.448	5.00	--
C3-Phenanthrenes/Anthracenes	EPA 8270E-SIM	0.934	5.00	--
C4-Benzo(a)anthracenes/Chrysenes	EPA 8270E-SIM	0.706	5.00	--
C4-Decalins	EPA 8270E-SIM	0.486	5.00	--
C4-Dibenzothiophenes	EPA 8270E-SIM	0.652	5.00	--
C4-Fluoranthenes/Pyrenes	EPA 8270E-SIM	1.020	5.00	--
C4-Naphthalenes	EPA 8270E-SIM	0.448	5.00	--
C4-Phenanthrenes/Anthracenes	EPA 8270E-SIM	0.934	5.00	--
Chrysene	EPA 8270E-SIM	0.706	5.00	--
cis-Decalin	EPA 8270E-SIM	0.486	5.00	--
Dibenzo(a,h)anthracene	EPA 8270E-SIM	0.674	5.00	--
Dibenzothiophene	EPA 8270E-SIM	0.652	5.00	--
Fluoranthene	EPA 8270E-SIM	1.360	5.00	--
Fluorene	EPA 8270E-SIM	0.468	5.00	--
Indeno(1,2,3-c,d)pyrene	EPA 8270E-SIM	0.372	5.00	--
Naphthalene	EPA 8270E-SIM	0.448	5.00	580,000
Perylene	EPA 8270E-SIM	0.449	5.00	--
Phenanthrene	EPA 8270E-SIM	0.934	5.00	--
Pyrene	EPA 8270E-SIM	1.020	5.00	--
Total Benzofluoranthenes	EPA 8270E-SIM	--	--	--
trans-Decalin	EPA 8270E-SIM	0.029	5.00	--
Total cPAH TEQ (EPA 1993)[d,m]	Calculated, not reported	--	--	17,000
Semivolatile Organic Compounds (µg/kg)				
Carbazole	EPA 8270E	2.00	4.00	--
Dibenzofuran	EPA 8270E	1.33	2.67	--
2-Chlorophenol	EPA 8270E	6.67	13.3	--

Table 7
Subsurface Soil Analytical Parameters, Methods, and Quantitation Limits

Analyte	Method	Laboratory MDL[a,b]	Laboratory RL[a,b]	Minimum Screening Level[c]
4-Chloro-3-methylphenol	EPA 8270E	13.3	26.7	--
2,4-Dichlorophenol	EPA 8270E	6.67	13.3	--
2,4-Dimethylphenol	EPA 8270E	6.67	13.3	--
2,4-Dinitrophenol	EPA 8270E	33.3	66.7	--
4,6-Dinitro-2-methylphenol	EPA 8270E	33.3	66.7	--
2-Methylphenol	EPA 8270E	3.33	6.67	--
3+4-Methylphenol(s)	EPA 8270E	3.33	6.67	--
2-Nitrophenol	EPA 8270E	13.3	26.7	--
4-Nitrophenol	EPA 8270E	13.3	26.7	--
Pentachlorophenol (PCP)	EPA 8270E	13.3	26.7	--
Phenol	EPA 8270E	2.67	5.33	--
2,3,4,6-Tetrachlorophenol	EPA 8270E	6.67	13.3	--
2,3,5,6-Tetrachlorophenol	EPA 8270E	6.67	13.3	--
2,4,5-Trichlorophenol	EPA 8270E	6.67	13.3	--
2,4,6-Trichlorophenol	EPA 8270E	6.67	13.3	--
Bis(2-ethylhexyl)phthalate	EPA 8270E	20	40	--
Butyl benzyl phthalate	EPA 8270E	6.67	13.3	--
Diethylphthalate	EPA 8270E	6.67	13.3	--
Dimethylphthalate	EPA 8270E	6.67	13.3	--
Di-n-butylphthalate	EPA 8270E	6.67	13.3	--
Di-n-octyl phthalate	EPA 8270E	10.7	13.3	--
Volatile Organic Compounds (µg/kg)				
Acetone	EPA 8260D	500	1,000	--
Acrylonitrile	EPA 8260D	50	100	--
Benzene	EPA 8260D	5	10	380,000
Bromobenzene	EPA 8260D	12.5	25	--
Bromochloromethane	EPA 8260D	25	50	--
Bromodichloromethane	EPA 8260D	25	50	--
Bromoform	EPA 8260D	50	100	--
Bromomethane	EPA 8260D	500	500	--
2-Butanone (MEK)	EPA 8260D	250	500	--
n-Butylbenzene	EPA 8260D	25	50	--
sec-Butylbenzene	EPA 8260D	25	50	--
tert-Butylbenzene	EPA 8260D	25	50	--
Carbon disulfide	EPA 8260D	250	500	--
Carbon tetrachloride	EPA 8260D	25	50	--
Chlorobenzene	EPA 8260D	12.5	25	--
Chloroethane	EPA 8260D	250	500	--
Chloroform	EPA 8260D	25	50	--
Chloromethane	EPA 8260D	125	250	--
2-Chlorotoluene	EPA 8260D	25	50	--
4-Chlorotoluene	EPA 8260D	25	50	--
Dibromochloromethane	EPA 8260D	50	100	--
1,2-Dibromo-3-chloropropane	EPA 8260D	125	250	--
1,2-Dibromoethane (EDB)	EPA 8260D	25	50	--
Dibromomethane	EPA 8260D	25	50	--
1,2-Dichlorobenzene	EPA 8260D	12.5	25	--
1,3-Dichlorobenzene	EPA 8260D	12.5	25	--
1,4-Dichlorobenzene	EPA 8260D	12.5	25	--
Dichlorodifluoromethane	EPA 8260D	50	100	--
1,1-Dichloroethane	EPA 8260D	12.5	25	--
1,2-Dichloroethane (EDC)	EPA 8260D	12.5	25	200,000
1,1-Dichloroethene	EPA 8260D	12.5	25	--
cis-1,2-Dichloroethene	EPA 8260D	12.5	25	--
trans-1,2-Dichloroethene	EPA 8260D	12.5	25	--
1,2-Dichloropropane	EPA 8260D	12.5	25	--
1,3-Dichloropropane	EPA 8260D	25	50	--
2,2-Dichloropropane	EPA 8260D	25	50	--
1,1-Dichloropropene	EPA 8260D	25	50	--
cis-1,3-Dichloropropene	EPA 8260D	25	50	--
trans-1,3-Dichloropropene	EPA 8260D	25	50	--
Ethylbenzene	EPA 8260D	12.5	25	1,700,000
Hexachlorobutadiene	EPA 8260D	50	100	--
2-Hexanone	EPA 8260D	250	500	--
Isopropylbenzene	EPA 8260D	25	50	--
4-Isopropyltoluene	EPA 8260D	25	50	--
Methylene chloride	EPA 8260D	250	500	--
4-Methyl-2-pentanone (MiBK)	EPA 8260D	250	500	--
Methyl tert-butyl ether (MTBE)	EPA 8260D	25	50	--
n-Propylbenzene	EPA 8260D	12.5	25	--
Styrene	EPA 8260D	25	50	--
1,1,1,2-Tetrachloroethane	EPA 8260D	12.5	25	--
1,1,2,2-Tetrachloroethane	EPA 8260D	25	50	--
Tetrachloroethene (PCE)	EPA 8260D	12.5	25	--
Toluene	EPA 8260D	25	50	--
1,2,3-Trichlorobenzene	EPA 8260D	125	250	--
1,2,4-Trichlorobenzene	EPA 8260D	125	250	--
1,1,1-Trichloroethane	EPA 8260D	12.5	25	--
1,1,2-Trichloroethane	EPA 8260D	12.5	25	--

Table 7
Subsurface Soil Analytical Parameters, Methods, and Quantitation Limits

Analyte	Method	Laboratory MDL[a,b]	Laboratory RL[a,b]	Minimum Screening Level[c]
Trichloroethene (TCE)	EPA 8260D	12.5	25	--
Trichlorofluoromethane	EPA 8260D	50	100	--
1,2,3-Trichloropropane	EPA 8260D	25	50	--
1,2,4-Trimethylbenzene	EPA 8260D	25	50	--
1,3,5-Trimethylbenzene	EPA 8260D	25	50	--
Vinyl chloride	EPA 8260D	12.5	25	--
m,p-Xylene	EPA 8260D	25	50	--
o-Xylene	EPA 8260D	12.5	25	--
Total Xylene[d,n]	Calculated, not reported	--	--	--

Table 7
Subsurface Soil Analytical Parameters, Methods, and Quantitation Limits

Notes:
a. Actual MDLs and RLs may vary based on sample aliquot size, matrix interference, and required dilution factor.
b. Nondetect compounds analyzed by high resolution methodology will be reported at the EDL, which is typically two to five times lower than the RL.
c. Screening level sources are shown in Table 4.
d. Totals are calculated values; therefore, there are no MDLs or RLs for these parameters.
e. Total Petroleum Hydrocarbons Dx Gx Only: the sum of NWTPH-Dx and NWTPH-Gx
f. Total Dioxin/Furan TEQ 2005 (Mammal): the sum of 2,3,7,8-TCDD equivalent congeners, calculated by multiplying the dioxin/furan congeners by their respective World Health Organization 2005 mammal toxicity equivalency factors (presented in Van den Berg et al. 2006)
g. Total PCB Congeners: the sum of 209 individual congeners
h. Total PCB TEQ 2005 (Mammal): the sum of the dioxin-like PCB congeners, calculated by multiplying the PCB congeners by their respective World Health Organization 2005 mammal toxicity equivalency factors (presented in Van den Berg et al. 2006)
i. Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal): the sum of Total Dioxin/Furan TEQ 2005 (Mammal) and Total PCB TEQ 2005 (Mammal)
j. The sum of 4,4′ and 2,4′ isomers
k. Total Chlordane (alpha, beta, nona, oxy): the sum of cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, and oxychlordane) for comparison to human health screening level
l. Total Endosulfan (alpha, beta): the sum of alpha- and beta-endosulfan
m. Total cPAHs TEQ: the sum of benzo(a)pyrene equivalent concentrations, calculated by multiplying the cPAHs by their respective potency factors; cPAHs include benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, and dibenzo(a,h)anthracene
n. Total Xylene: the sum of m,p-xylene and o-xylene
--: not applicable
µg/kg: micrograms per kilogram
ASTM: ASTM International
BHC: benzene hexachloride
cPAH: carcinogenic polycyclic aromatic hydrocarbon
DDD: dichlorodiphenyldichloroethane
DDE: dichlorodiphenyldichloroethene
DDT: dichlorodiphenyltrichloroethane
EDL: estimated detection limit
EPA: U.S. Environmental Protection Agency
HPAH: high molecular weight polycyclic aromatic hydrocarbon
LPAH: high molecular weight polycyclic aromatic hydrocarbon
MDL: method detection limit
mg/kg: milligram per kilogram
ng/kg: nanogram per kilogram
NWTPH-Dx: Northwest Total Petroleum Hydrocarbons – diesel range
NWTPH-Gx: Northwest Total Petroleum Hydrocarbons – gas range
PAH: polycyclic aromatic hydrocarbon
RL: reporting limit
SIM: selected ion monitoring
SM: Standard Method
TEQ: toxic equivalence quotient

References:
EPA (U.S. Environmental Protection Agency), 1993. *Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons.* Office of Research and Development. EPA/600/R-93/089. July 1993.
Van den Berg, M., L.S. Birnbaum, M. Denison, M. De Vito, W. Farland, M. Feeley, H. Fiedler, H. Hakansson, A. Hanberg, L. Haws, M. Rose, S. Safe, D. Schrenk, C. Tohyama, A. Tritscher, J. Tuomisto, M. Tysklind, N. Walker, and R.E. Peterson, 2006. "The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds." *Toxicological Sciences* 93(2):223–41.

Table 8
Sediment Analytical Parameters, Methods, and Quantitation Limits

Analyte	Method	Laboratory MDL[a,b]	Laboratory RL[a,b]	Minimum Screening Level[c]
Conventionals (mg/kg)				
Grain size (%)	ASTM D422	0.01	0.01	--
Total solids (%)	SM 2540 G	1	1	--
Total organic carbon (%)	EPA 9060A	0.1	0.1	--
Total cyanide	ASTM D7511	0.05	0.1	0.1
Total sulfide	EPA 376.2	1.0	1	0.0179
Soil pH (unitless)	EPA 9045D	0.5	0.5	--
Total Petroleum Hydrocarbons (mg/kg)				
Gasoline range hydrocarbons	NWTPH-Gx	2.5	5	--
Diesel range hydrocarbons	NWTPH-Dx	10	20	--
Motor oil range hydrocarbons	NWTPH-Dx	20	40	--
Total Petroleum Hydrocarbons Dx Gx Only[d,e]	Calculated, not reported	--	--	--
Metals (mg/kg)				
Aluminum	EPA 6020B	12.5	25	37,200
Antimony	EPA 6020B	0.250	0.500	1.35
Arsenic	EPA 6020B	0.250	0.500	6
Barium	EPA 6020B	0.25	0.5	--
Beryllium	EPA 6020B	0.050	0.100	--
Cadmium	EPA 6020B	0.050	0.100	--
Chromium	EPA 6020B	0.250	0.500	--
Copper	EPA 6020B	0.050	0.10	36
Cobalt	EPA 6020B	0.25	0.5	--
Iron	EPA 6020B	12.5	25	20,000
Lead	EPA 6020B	0.050	0.100	35
Manganese	EPA 6020B	0.250	0.500	--
Mercury	EPA 6020B	0.02	0.04	--
Nickel	EPA 6020B	0.050	0.100	--
Selenium	EPA 6020B	0.250	0.500	--
Silver	EPA 6020B	0.050	0.100	--
Thallium	EPA 6020B	0.250	0.500	--
Titanium	EPA 6020B	1	2	--
Vanadium	EPA 6020B	0.500	1.00	--
Zinc	EPA 6020B	1.00	2.00	123
Dioxins/Furans (ng/kg)				
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	EPA 1613B	0.284	0.5	0.25
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	EPA 1613B	0.59	2.5	0.28
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	EPA 1613B	0.602	2.5	1.2
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	EPA 1613B	0.383	2.5	0.89
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	EPA 1613B	0.565	2.5	0.89
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	EPA 1613B	0.535	2.5	7
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	EPA 1613B	1.58	5	300
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	EPA 1613B	0.305	0.5	3
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	EPA 1613B	0.486	2.5	6.5
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	EPA 1613B	0.299	2.5	0.65
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	EPA 1613B	0.648	2.5	1.1
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	EPA 1613B	0.887	2.5	1.1
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	EPA 1613B	0.631	2.5	1.1
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	EPA 1613B	0.783	2.5	1.4
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	EPA 1613B	0.427	2.5	11
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	EPA 1613B	0.651	2.5	11
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	EPA 1613B	0.825	5	220
Total Dioxin/Furan TEQ 1998 (Fish)[d,f]	Calculated, not reported	--	--	0.56
Total Dioxin/Furan TEQ 2005 (Mammal)[d,g]	Calculated, not reported	--	--	0.25
PCBs (ng/kg)				
PCB-077	EPA 1668A	0.799	2.5	40
PCB-081	EPA 1668A	0.659	2.5	20
PCB-105	EPA 1668A	0.497	2.5	19,000
PCB-114	EPA 1668A	0.801	2.5	27,000
PCB-118 (PCB-106/118)	EPA 1668A	1.45	5	22,000
PCB-123	EPA 1668A	0.551	2.5	30,000
PCB-126	EPA 1668A	0.475	2.5	8
PCB-156	EPA 1668A	0.378	2.5	14,000
PCB-157	EPA 1668A	0.604	2.5	14,000
PCB-167	EPA 1668A	0.595	2.5	17,000
PCB-169	EPA 1668A	0.731	2.5	20
PCB-189	EPA 1668A	0.704	2.5	6,000
209 PCB Congeners	EPA 1668A	1.12 - 7.79	5 - 15	--
Total PCB Congener[d,h]	Calculated, not reported	Varies	Varies	22,000
Total PCB Congener TEQ 1998 (Fish)[d,i]	Calculated, not reported	--	--	0.56
Total PCB Congener TEQ 2005 (Mammal)[d,j]	Calculated, not reported	--	--	0.25
Dioxin Furans and PCB Congeners (ng/kg)				
Total Dioxin/Furan and PCB Congener TEQ 1998 (Fish)[d,k]	Calculated, not reported	--	--	0.56
Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal)[d,l]	Calculated, not reported	--	--	0.25
Pesticides (µg/kg)				
4,4'-DDD (p,p'-DDD)	EPA 8081B	0.5	1	4
2,4'-DDD (o,p'-DDD)	EPA 8081B	0.5	1	--

Table 8
Sediment Analytical Parameters, Methods, and Quantitation Limits

Analyte	Method	Laboratory MDL[a,b]	Laboratory RL[a,b]	Minimum Screening Level[c]
4,4'-DDE (p,p'-DDE)	EPA 8081B	0.5	1	1.5
2,4'-DDE (o,p'-DDE)	EPA 8081B	0.5	1	--
4,4'-DDT (p,p'-DDT)	EPA 8081B	0.5	1	4
2,4'-DDT (o,p'-DDT)	EPA 8081B	0.5	1	--
Aldrin	EPA 8081B	0.5	1	4.3
BHC, alpha-	EPA 8081B	0.5	1	120,000
BHC, beta-	EPA 8081B	0.5	1	--
BHC, delta-	EPA 8081B	0.5	1	--
BHC, gamma- (Lindane)	EPA 8081B	0.5	1	1
Chlordane, alpha- (Chlordane, cis-)	EPA 8081B	0.5	1	--
Chlordane, beta- (Chlordane, trans-)	EPA 8081B	0.5	1	--
Dieldrin	EPA 8081B	0.5	1	2
Endosulfan I	EPA 8081B	0.5	1	--
Endosulfan II	EPA 8081B	0.5	1	--
Endosulfan sulfate	EPA 8081B	0.5	1	--
Endrin	EPA 8081B	0.5	1	3
Endrin Aldehyde	EPA 8081B	1	1	--
Heptachlor	EPA 8081B	0.5	1	10
Heptachlor epoxide	EPA 8081B	0.5	1	1
Hexachlorobenzene	EPA 8081B	1.25	2.5	100
Nonachlor, cis-	EPA 8081B	0.5	1	--
Nonachlor, trans-	EPA 8081B	0.5	1	--
Oxychlordane	EPA 8081B	0.5	1	--
Toxaphene	EPA 8081B	15	30	21,000
Sum DDD[d,m]	Calculated, not reported	--	--	4
Sum DDE[d,m]	Calculated, not reported	--	--	2
Sum DDT[d,m]	Calculated, not reported	--	--	4
Total DDx[d,n]	Calculated, not reported	--	--	0
Total BHC[d,o]	Calculated, not reported	--	--	96
Total Chlordane (alpha, gamma, heptachlor)[d,p]	Calculated, not reported	--	--	1,400
Total Chlordane (alpha, beta, nona, oxy)[d,q]	Calculated, not reported	--	--	1
Total Endosulfan (alpha, beta)[d,r]	Calculated, not reported	--	--	6,400
PAHs and Alkylated PAHs (µg/kg)				
1-Methylnaphthalene	EPA 8270E-SIM	0.378	5.00	76
1-Methylphenanthrene	EPA 8270E-SIM	0.496	5.00	--
2,3,5-Trimethylnaphthalene	EPA 8270E-SIM	0.449	5.00	--
2,6-Dimethylnaphthalene	EPA 8270E-SIM	0.388	5.00	--
2-Methylnaphthalene	EPA 8270E-SIM	0.445	5.00	20.2
Acenaphthene	EPA 8270E-SIM	0.459	5.00	290
Acenaphthylene	EPA 8270E-SIM	0.257	5.00	--
Anthracene	EPA 8270E-SIM	0.0468	5.00	57
Benzo(a)anthracene	EPA 8270E-SIM	1.41	5.00	32
Benzo(a)pyrene	EPA 8270E-SIM	0.977	5.00	32
Benzo(b)fluoranthene	EPA 8270E-SIM	0.794	5.00	193
Benzo(b)naphtho(2,1-d)thiophene	EPA 8270E-SIM	5	5.00	--
Benzo(b)thiophene	EPA 8270E-SIM	0.357	5.00	--
Benzo(e)pyrene	EPA 8270E-SIM	0.622	5.00	--
Benzo(g,h,i)perylene	EPA 8270E-SIM	0.519	5.00	300
Benzo(j)fluoranthene	EPA 8270E-SIM	0.68	5.00	27
Benzo(k)fluoranthene	EPA 8270E-SIM	0.794	5.00	27
Biphenyl	EPA 8270E-SIM	0.335	5.00	--
C1-Benzo(a)anthracenes/Chrysenes	EPA 8270E-SIM	0.706	5.00	
C1-Decalins	EPA 8270E-SIM	0.486	5.00	--
C1-Dibenzothiophenes	EPA 8270E-SIM	0.652	5.00	--
C1-Fluoranthenes/Pyrenes	EPA 8270E-SIM	1.02	5.00	--
C1-Fluorenes	EPA 8270E-SIM	0.468	5.00	--
C1-Naphthalenes	EPA 8270E-SIM	0.448	5.00	--
C1-Phenanthrenes/Anthracenes	EPA 8270E-SIM	0.934	5.00	--
C2-Benzo(a)anthracenes/Chrysenes	EPA 8270E-SIM	0.706	5.00	
C2-Decalins	EPA 8270E-SIM	0.486	5.00	--
C2-Dibenzothiophenes	EPA 8270E-SIM	0.652	5.00	--
C2-Fluoranthenes/Pyrenes	EPA 8270E-SIM	1.02	5.00	--
C2-Fluorenes	EPA 8270E-SIM	0.468	5.00	--
C2-Naphthalenes	EPA 8270E-SIM	0.448	5.00	--
C2-Phenanthrenes/Anthracenes	EPA 8270E-SIM	0.934	5.00	--
C3-Benzo(a)anthracenes/Chrysenes	EPA 8270E-SIM	0.706	5.00	
C3-Decalins	EPA 8270E-SIM	0.486	5.00	--
C3-Dibenzothiophenes	EPA 8270E-SIM	0.652	5.00	--
C3-Fluoranthenes/Pyrenes	EPA 8270E-SIM	1.02	5.00	--
C3-Fluorenes	EPA 8270E-SIM	0.468	5.00	--
C3-Naphthalenes	EPA 8270E-SIM	0.448	5.00	--
C3-Phenanthrenes/Anthracenes	EPA 8270E-SIM	0.934	5.00	--
C4-Benzo(a)anthracenes/Chrysenes	EPA 8270E-SIM	0.706	5.00	
C4-Decalins	EPA 8270E-SIM	0.486	5.00	--
C4-Dibenzothiophenes	EPA 8270E-SIM	0.652	5.00	
C4-Fluoranthenes/Pyrenes	EPA 8270E-SIM	1.02	5.00	--

Table 8
Sediment Analytical Parameters, Methods, and Quantitation Limits

Analyte	Method	Laboratory MDL[a,b]	Laboratory RL[a,b]	Minimum Screening Level[c]
C4-Naphthalenes	EPA 8270E-SIM	0.448	5.00	--
C4-Phenanthrenes/Anthracenes	EPA 8270E-SIM	0.934	5.00	--
Chrysene	EPA 8270E-SIM	0.706	5.00	57
cis-Decalin	EPA 8270E-SIM	0.486	5.00	--
Dibenzo(a,h)anthracene	EPA 8270E-SIM	0.674	5.00	33
Dibenzothiophene	EPA 8270E-SIM	0.652	5.00	--
Fluoranthene	EPA 8270E-SIM	1.36	5.00	111
Fluorene	EPA 8270E-SIM	0.468	5.00	77
Indeno(1,2,3-c,d)pyrene	EPA 8270E-SIM	0.372	5.00	17
Naphthalene	EPA 8270E-SIM	0.448	5.00	176
Perylene	EPA 8270E-SIM	0.449	5.00	--
Phenanthrene	EPA 8270E-SIM	0.934	5.00	42
Pyrene	EPA 8270E-SIM	1.02	5.00	53
Total Benzofluoranthenes	EPA 8270E-SIM	--	--	--
trans-Decalin	EPA 8270E-SIM	0.0286	5.00	--
Total cPAH TEQ (EPA 1993)[d,s]	Calculated, not reported	--	--	--
Total HPAH (Gasco 9 of 17)[d,t]	Calculated, not reported	--	--	193
Total LPAH (Gasco 8 of 17)[d,u]	Calculated, not reported	--	--	76
Total PAH (Gasco 17)[d,v]	Calculated, not reported	--	--	1,610
PAHESBTU[d,w]	Calculated, not reported	--	--	--
Semivolatile Organic Compounds (µg/kg)				
Carbazole	EPA 8270E	2	4.00	140
Dibenzofuran	EPA 8270E	1.33	2.67	--
2-Chlorophenol	EPA 8270E	6.67	13.3	--
4-Chloro-3-methylphenol	EPA 8270E	13.3	26.7	--
2,4-Dichlorophenol	EPA 8270E	6.67	13.3	--
2,4-Dimethylphenol	EPA 8270E	6.67	13.3	--
2,4-Dinitrophenol	EPA 8270E	33.3	66.7	--
4,6-Dinitro-2-methylphenol	EPA 8270E	33.3	66.7	--
2-Methylphenol	EPA 8270E	3.33	6.67	--
3+4-Methylphenol(s)	EPA 8270E	3.33	6.67	--
2-Nitrophenol	EPA 8270E	13.3	26.7	--
4-Nitrophenol	EPA 8270E	13.3	26.7	--
Pentachlorophenol (PCP)	EPA 8270E	13.3	26.7	--
Phenol	EPA 8270E	2.67	5.33	--
2,3,4,6-Tetrachlorophenol	EPA 8270E	6.67	13.3	--
2,3,5,6-Tetrachlorophenol	EPA 8270E	6.67	13.3	--
2,4,5-Trichlorophenol	EPA 8270E	6.67	13.3	--
2,4,6-Trichlorophenol	EPA 8270E	6.67	13.3	--
Bis(2-ethylhexyl)phthalate	EPA 8270E	20	40	--
Butyl benzyl phthalate	EPA 8270E	6.67	13.3	--
Diethylphthalate	EPA 8270E	6.67	13.3	--
Dimethylphthalate	EPA 8270E	6.67	13.3	--
Di-n-butylphthalate	EPA 8270E	6.67	13.3	--
Di-n-octyl phthalate	EPA 8270E	10.7	13.3	--
Volatile Organic Compounds (µg/kg)				
Acetone	EPA 8260D	500	1,000	--
Acrylonitrile	EPA 8260D	50	100	--
Benzene	EPA 8260D	5	10	--
Bromobenzene	EPA 8260D	12.5	25	--
Bromochloromethane	EPA 8260D	25	50	--
Bromodichloromethane	EPA 8260D	25	50	--
Bromoform	EPA 8260D	50	100	--
Bromomethane	EPA 8260D	500	500	--
2-Butanone (MEK)	EPA 8260D	250	500	--
n-Butylbenzene	EPA 8260D	25	50	--
sec-Butylbenzene	EPA 8260D	25	50	--
tert-Butylbenzene	EPA 8260D	25	50	--
Carbon disulfide	EPA 8260D	250	500	--
Carbon tetrachloride	EPA 8260D	25	50	--
Chlorobenzene	EPA 8260D	12.5	25	--
Chloroethane	EPA 8260D	250	500	--
Chloroform	EPA 8260D	25	50	--
Chloromethane	EPA 8260D	125	250	--
2-Chlorotoluene	EPA 8260D	25	50	--
4-Chlorotoluene	EPA 8260D	25	50	--
Dibromochloromethane	EPA 8260D	50	100	--
1,2-Dibromo-3-chloropropane	EPA 8260D	125	250	--
1,2-Dibromoethane (EDB)	EPA 8260D	25	50	--
Dibromomethane	EPA 8260D	25	50	--
1,2-Dichlorobenzene	EPA 8260D	12.5	25	--
1,3-Dichlorobenzene	EPA 8260D	12.5	25	--
1,4-Dichlorobenzene	EPA 8260D	12.5	25	--
Dichlorodifluoromethane	EPA 8260D	50	100	--
1,1-Dichloroethane	EPA 8260D	12.5	25	--
1,2-Dichloroethane (EDC)	EPA 8260D	12.5	25	--

Table 8
Sediment Analytical Parameters, Methods, and Quantitation Limits

Analyte	Method	Laboratory MDL[a,b]	Laboratory RL[a,b]	Minimum Screening Level[c]
1,1-Dichloroethene	EPA 8260D	12.5	25	--
cis-1,2-Dichloroethene	EPA 8260D	12.5	25	--
trans-1,2-Dichloroethene	EPA 8260D	12.5	25	--
1,2-Dichloropropane	EPA 8260D	12.5	25	--
1,3-Dichloropropane	EPA 8260D	25	50	--
2,2-Dichloropropane	EPA 8260D	25	50	--
1,1-Dichloropropene	EPA 8260D	25	50	--
cis-1,3-Dichloropropene	EPA 8260D	25	50	--
trans-1,3-Dichloropropene	EPA 8260D	25	50	--
Ethylbenzene	EPA 8260D	12.5	25	--
Hexachlorobutadiene	EPA 8260D	50	100	--
2-Hexanone	EPA 8260D	250	500	--
Isopropylbenzene	EPA 8260D	25	50	--
4-Isopropyltoluene	EPA 8260D	25	50	--
Methylene chloride	EPA 8260D	250	500	--
4-Methyl-2-pentanone (MiBK)	EPA 8260D	250	500	--
Methyl tert-butyl ether (MTBE)	EPA 8260D	25	50	--
n-Propylbenzene	EPA 8260D	12.5	25	--
Styrene	EPA 8260D	25	50	--
1,1,1,2-Tetrachloroethane	EPA 8260D	12.5	25	--
1,1,2,2-Tetrachloroethane	EPA 8260D	25	50	--
Tetrachloroethene (PCE)	EPA 8260D	12.5	25	--
Toluene	EPA 8260D	25	50	--
1,2,3-Trichlorobenzene	EPA 8260D	125	250	--
1,2,4-Trichlorobenzene	EPA 8260D	125	250	--
1,1,1-Trichloroethane	EPA 8260D	12.5	25	--
1,1,2-Trichloroethane	EPA 8260D	12.5	25	--
Trichloroethene (TCE)	EPA 8260D	12.5	25	--
Trichlorofluoromethane	EPA 8260D	50	100	--
1,2,3-Trichloropropane	EPA 8260D	25	50	--
1,2,4-Trimethylbenzene	EPA 8260D	25	50	--
1,3,5-Trimethylbenzene	EPA 8260D	25	50	--
Vinyl chloride	EPA 8260D	12.5	25	--
m,p-Xylene	EPA 8260D	25	50	--
o-Xylene	EPA 8260D	12.5	25	--
Total Xylene[d,x]	Calculated, not reported	--	--	--

Table 8
Sediment Analytical Parameters, Methods, and Quantitation Limits

Notes:
a. Actual MDLs and RLs may vary based on sample aliquot size, matrix interference, and required dilution factor.
b. Nondetect compounds analyzed by high resolution methodology will be reported at the EDL, which is typically two to five times lower than the RL.
c. Screening level sources are shown in Table 5.
d. Totals are calculated values; therefore, there are no MDLs or RLs for these parameters.
e. Total Petroleum Hydrocarbons Dx Gx Only: the sum of NWTPH-Dx and NWTPH-Gx
f. Total Dioxin/Furan TEQ 1998 (Fish): the sum of 2,3,7,8-TCDD equivalent congeners, calculated by multiplying the dioxin/furan congeners by their respective World Health Organization 1998 fish toxicity equivalency factors
g. Total Dioxin/Furan TEQ 2005 (Mammal): the sum of 2,3,7,8-TCDD equivalent congeners, calculated by multiplying the dioxin/furan congeners by their respective World Health Organization 2005 mammal toxicity equivalency factors (presented in Van den Berg et al. 2006)
h. Total PCB Congeners: the sum of 209 individual congeners
i. Total PCB TEQ 1998 (Fish): the sum of the dioxin-like PCB congeners, calculated by multiplying the PCB congeners by their respective World Health Organization 1998 fish toxicity equivalency factors
j. Total PCB TEQ 2005 (Mammal): the sum of the dioxin-like PCB congeners, calculated by multiplying the PCB congeners by their respective World Health Organization 2005 mammal toxicity equivalency factors (presented in Van den Berg et al. 2006)
k. Total Dioxin/Furan and PCB Congener TEQ 1998 (Fish): the sum of Total Dioxin/Furan TEQ 1998 (Fish) and Total PCB TEQ 1998 (Fish)
l. Total Dioxin/Furan and PCB Congener TEQ 2005 (Mammal): the sum of Total Dioxin/Furan TEQ 2005 (Mammal) and Total PCB TEQ 2005 (Mammal)
m. The sum of 4,4′ and 2,4′ isomers
n. Total DDx: the sum of 2,4' and 4, 4' DDD, DDE, DDT isomers
o. Total BHC: the sum of hexachlorocyclohexane (BHC), alpha-, hexachlorocyclohexane (BHC), beta-, hexachlorocyclohexane (BHC), delta-, and hexachlorocyclohexane (BHC), gamma- (Lindane)
p. Total Chlordane (alpha, gamma, heptachlor): the sum of alpha-chlordane, gamma-chlordane, and heptachlor) for comparison to ecological screening level
q. Total Chlordane (alpha, beta, nona, oxy): the sum of cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, and oxychlordane) for comparison to human health screening level
r. Total Endosulfan (alpha, beta): the sum of alpha- and beta-endosulfan
s. Total cPAHs TEQ: the sum of benzo(a)pyrene equivalent concentrations, calculated by multiplying the cPAHs by their respective potency factors; cPAHs include benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, and dibenzo(a,h)anthracene
t. Total HPAH (Gasco 9 of 17): the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(x)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene
u. Total LPAH (Gasco 8 or 17): the sum of 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene
v. Total PAH (Gasco 17): the sum of Total HPAH (Gasco 9 of 17) and Total LPAH (Gasco 8 or 17)
w. PAH equilibrium partitioning sediment benchmark (toxic units)
x. Total Xylene: the sum of m,p-xylene and o-xylene
--: not applicable
µg/kg: micrograms per kilogram
ASTM: ASTM International
BHC: benzene hexachloride
cPAH: carcinogenic polycyclic aromatic hydrocarbon
DDD: dichlorodiphenyldichloroethane
DDE: dichlorodiphenyldichloroethene
DDT: dichlorodiphenyltrichloroethane
EDL: estimated detection limit
EPA: U.S. Environmental Protection Agency
HPAH: high molecular weight polycyclic aromatic hydrocarbon
LPAH: high molecular weight polycyclic aromatic hydrocarbon
MDL: method detection limit
mg/kg: milligram per kilogram
ng/kg: nanogram per kilogram
NWTPH-Dx: Northwest Total Petroleum Hydrocarbons – diesel range
NWTPH-Gx: Northwest Total Petroleum Hydrocarbons – gas range
PAH: polycyclic aromatic hydrocarbon
RL: reporting limit
SIM: selected ion monitoring
SM: Standard Method
TEQ: toxic equivalence quotient

References:
EPA (U.S. Environmental Protection Agency), 1993, *Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons.* Office of Research and Development. EPA/600/R-93/089. July 1993.
Van den Berg, M., L.S. Birnbaum, M. Denison, M. De Vito, W. Farland, M. Feeley, H. Fiedler, H. Hakansson, A. Hanberg, L. Haws, M. Rose, S. Safe, D. Schrenk, C. Tohyama, A. Tritscher, J. Tuomisto, M. Tysklind, N. Walker, and R.E. Peterson, 2006. "The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds." *Toxicological Sciences* 93(2):223–41.

Table 9
Sample Containers, Preservatives, and Holding Times

Parameter	Container Size and Type[a]	Holding Time	Preservation
Grain Size	1-gallon ziplock bag	None	Cool < 6°C
Total solids	16-oz glass jar	14 days	Cool < 6°C
		6 months	Freeze -18 °C
Total organic carbon		28 days	Cool < 6°C
		6 months	Freeze -18 °C
Metals		180 days; 28 days for Hg	Cool < 6°C
		2 years (except Hg)	Freeze -18 °C
pH		1 day	Cool < 6°C
Total cyanide		14 days	Cool < 6°C
Sulfide	4-oz glass jar	7 days	Cool < 6°C; 5 mL Zinc Acetate
Dioxin/furans	8-oz amber glass jar	1 year to extraction	Cool < 6°C or Freeze -18°C
PCB congeners		1 year after extraction	
Pesticides, PAHs/SVOCs, TPH-Dx	16-oz glass jar	14 days until extraction	Cool < 6°C
		1 year until extraction	Freeze -18°C
		40 days after extraction	Cool < 6°C
VOCs	Three 40-mL vials	14 days	Cool < 6°C; Methanol
TPH-Gx	Three 40-mL vials	14 days	Cool < 6°C; Methanol

Notes:

a. Subject to laboratory availability, container sizes may vary.

b. Samples for dissolved metals should be field filtered or preserved with acid at the laboratory after filtration.

Hg: mercury

mL: milliliter

oz: ounce

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

SVOC: semivolatile organic compound

TPH-Dx: total petroleum hydrocarbons – diesel range

TPH-Gx: total petroleum hydrocarbons – gasoline range

VOC: volatile organic compound

Table 10
Laboratory Quality Assurance and Quality Control Frequency

Analysis Type	Initial Calibration	Ongoing Calibration	LCS/SRM[a]	Duplicates	Matrix Spikes	Matrix Spike Duplicates	Method Blanks	Surrogate Spikes
Surface and Subsurface Soil								
Total solids	--	--	--	1 per 10 samples	--	--	--	--
Total organic carbon	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	--	1 per 20 samples	--
pH	Daily	--	--	--	--	--	--	--
Sulfide	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	--	1 per 20 samples	--
Total cyanide	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	--	1 per 20 samples	--
Metals	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	--	1 per 20 samples	--
Dioxins/furans	As needed[b]	Every 12 hours	1 per 20 samples	1 per 20 samples	--[c]	--[c]	1 per 20 samples	Every sample
PCBs	As needed[b]	1 per 10 samples	1 per 20 samples	--	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
Pesticides	As needed[b]	1 per 10 samples	1 per 20 samples	--	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
SVOCs/PAHs/ alkylated PAHs	As needed[b]	Every 12 hours	1 per 20 samples	--	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
VOCs/TPH-G	As needed[b]	Every 12 hours	1 per 20 samples	--	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
TPH-D	As needed[b]	1 per 10 samples	1 per 20 samples	--	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
Doane Creek Sediment								
Grain size	--	--	--	1 per 20 samples	--	--	--	--
Total solids	--	--	--	1 per 10 samples	--	--	--	--
Total organic carbon	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	--	1 per 20 samples	--
pH	Daily	--	--	--	--	--	--	--
Total cyanide	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	--	1 per 20 samples	--

Table 10
Laboratory Quality Assurance and Quality Control Frequency

Analysis Type	Initial Calibration	Ongoing Calibration	LCS/SRM[a]	Duplicates	Matrix Spikes	Matrix Spike Duplicates	Method Blanks	Surrogate Spikes
Sulfide	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	--	1 per 20 samples	--
Metals	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	--	1 per 20 samples	--
Dioxin/furans	As needed[b]	Every 12 hours	1 per 20 samples	1 per 20 samples	--[c]	--[c]	1 per 20 samples	Every sample
PCBs	As needed[b]	1 per 10 samples	1 per 20 samples	--	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
Pesticides	As needed[b]	1 per 10 samples	1 per 20 samples	--	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
SVOCs/PAHs/ alkylated PAHs	As needed[b]	Every 12 hours	1 per 20 samples	--	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
VOCs/TPH-Gx	As needed[b]	Every 12 hours	1 per 20 samples	--	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
TPH-Dx	As needed[b]	1 per 10 samples	1 per 20 samples	--	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample

Notes:
a. When a standard reference material is available, it may be used in lieu of an LCS.
b. Initial calibrations are considered valid until the ongoing continuing calibration no longer meets method specifications. At that point, a new initial calibration is performed.
c. Isotope dilution is required by the method.

--: not applicable
LCS: laboratory control sample
PAH: polycyclic aromatic hydrocarbon
PCB: polychlorinated biphenyl
SRM: standard reference material
SVOC: semivolatile organic compound
TPH-Dx: diesel- and oil-range total petroleum hydrocarbons
TPH-Gx: gasoline-range total petroleum hydrocarbons
VOC: volatile organic compound

Table 11
Laboratory Data Quality Objectives

Parameter	Precision	Accuracy	Completeness
Surface and Subsurface Soil			
Total solids	± 20% RPD	--	95%
Total organic carbon	± 25% RPD	70–130% R	95%
pH	± 20% RPD	--	95%
Total cyanide	± 25% RPD	70–130% R	95%
Sulfide	± 25% RPD	70–130% R	95%
Metals	± 25% RPD	70–130% R	95%
Dioxins/furans	± 35% RPD	50–150% R	95%
PCB congeners	± 35% RPD	50–150% R	95%
Pesticides	± 35% RPD	50–150% R	95%
SVOCs/PAHs/Alkylated PAHs	± 35% RPD	50–150% R	95%
VOCs/TPH-G	± 35% RPD	50–150% R	95%
TPH-D	± 35% RPD	50–150% R	95%
Doane Creek Sediment			
Grain size	± 20% RPD	--	95%
Total solids	± 20% RPD	--	95%
Total organic carbon	± 25% RPD	70–130% R	95%
pH	± 20% RPD	--	95%
Total cyanide	± 25% RPD	70–130% R	95%
Sulfide	± 25% RPD	70–130% R	95%
Metals	± 25% RPD	70–130% R	95%
Dioxins/furans	± 35% RPD	50–150% R	95%
PCB congeners	± 35% RPD	50–150% R	95%
Pesticides	± 35% RPD	50–150% R	95%
SVOCs/PAHs/Alkylated PAHs	± 35% RPD	50–150% R	95%
VOCs/TPH-Gx	± 35% RPD	50–150% R	95%
TPH-Dx	± 35% RPD	50–150% R	95%

Notes:
--: not applicable
PAH: polycyclic aromatic hydrocarbon
PCB: polychlorinated biphenyl
R: recovery
RPD: relative percent difference
SVOC: semivolatile organic compound
TPH-Dx: diesel- and oil-range total petroleum hydrocarbons
TPH-Gx: gasoline-range total petroleum hydrocarbons
VOC: volatile organic compound

Table 12

Proposed Fill WBZ Single Well Pump Test Locations

Well ID	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Geographic Subarea				
			Former Office Area	Former Koppers/LNG Area	FAMM/Former Spent Oxide Area	Former Tar Pond Area	Siltronic GSA
Existing Monitoring Well							
MW-39F	11.8	16.8			X		
OW-10F	20.7	25.7			X		
OW-09-25	20.0	25.0			X		
MW-02-32	21.5	31.5			X		
OW-08-15	10.1	15.1			X		
MW-03-26	15.0	25.0				X	
MW-46F	6.1	16.1		X			
MW-47F	22.0	32.0			X		
MW-48F	15.6	25.6				X	
MW-49F	19.0	29.0			X		
OW-05F	28.5	33.5				X	
OW-01F	30.0	35.0					X
NWN-09-31	16.0	31.0					X
WS-46-33	28.4	33.4					X
WS-42-36	25.8	35.8					X
WS-10-27	11.0	26.0					X
NWN-02-20	10.0	20.0					X
NWN-03-17	7.0	17.0					X
Proposed Temporary Monitoring Well							
FW-1	5.0	15.0	X				
FW-2	20.0	30.0				X	

Notes:
bgs: below ground surface
FAMM: Fuel and Marine Marketing
GSA: geographic subarea
LNG: liquefied natural gas

Supplemental RTC Tables

Supplemental Table 1
Siltronic GSA Herbicide Soil Data Summary

	Sample Count	Count Detects	Frequency of Detection	Location of Maximum Detected Result	Detected Result Range	Non-Detect Result Range	Human Health RBCs	Note	Ecological RBCs	Note	HH Max HQ (Non-Detect)	HH Max HQ (Detect)	Eco Max HQ (Non-Detect)	Eco Max HQ (Detect)
Herbicides (µg/kg)														
2,2-Dichloropropionic acid (Dalapon)	15	0	0	--	--	77-150	--		--		--	--	--	--
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)	15	1	0.07	WSB-19_MFA	3.2-3.2	1.2-2.3	8,200,000	a	--		2.8E-07	--	--	--
2,4,5-TP (Silvex)	15	0	0	--	--	2.5-4.8	6,600,000	a	55	d	7.3E-07	--	8.7E-02	--
2,4-D (2,4-Dichlorophenoxyacetic acid)	15	0	0	--	--	15-29	8,200,000	b	--		3.5E-06	--	--	--
2,4-DB (2,4-D derivative)	15	2	0.13	WSB-19_MFA	61-90	17-33	8,200,000	b,c	--		4.0E-06	1.1E-05	--	--
Dicamba	15	0	0	--	--	1.3-2.6	25,000,000	a	--		1.0E-07	--	--	--
Dichloroprop	15	1	0.07	WSB-20_MFA	1100-1100	18-28	--		--		--	--	--	--
Dinoseb	15	0	0	--	--	5.4-10	820,000	a	15	d	1.2E-05	--	0.7	--
Mecoprop (MCPP)	15	0	0	--	--	3400-6500	--		--		--	--	--	--
Mephanac (MCPA)	15	0	0	--	--	2200-4200	410.000,000	b	--		1.0E-05	--	--	--

Notes:
non-detect or detect values exceed ecological RBC
--: not applicable
a: EPA Industrial Worker RSL (EPA 2022)
b: DEQ Occupational Worker RBC (DEQ 2018)
c: DEQ Occupational Worker RBC for 2,4-D used to screen 2,4-DB (2,4-D derivative)
d: Most stringent of the EPA Region 4 Ecological Soil Screening Levels (EPA 2018)
µg/kg: micrograms per kilogram
Eco: ecological
EPA: U.S. Environmental Protection Agency
HH: human health
HQ: hazard quotient
Max: maximum
RBC: risk-based concentration
RSL: risk screening level

References:
DEQ (Oregon Department of Environmental Quality), 2018. *Risk-Based Concentrations* . May 2018.
EPA (U.S. Environmental Protection Agency), 2022. *Regional Screening Levels.* November 2022.

Supplemental Table 2
Siltronic GSA Fill WBZ Herbicide Summary

	Sample Count	Count Detects	Frequency of Detection	Location of Maximum Detected Result	Detected Result Range	Non-Detect Result Range	Human Health RBCs	Note	Ecological RBCs	Note	HH Max HQ (Non-Detect)	HH Max HQ (Detect)	Eco Max HQ (Non-Detect)	Eco Max HQ (Detect)
Herbicides (µg/L)														
2,2-Dichloropropionic acid (Dalapon)	31	0	0	--	--	0.15-4.3	--		--		--	--	--	--
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)	31	0	0	--	--	0.13-1.3	--		--		--	--	--	--
2,4,5-TP (Silvex)	31	0	0	--	--	0.11-1.1	--		30	b	--	--	3.7E-02	--
2,4-D (2,4-Dichlorophenoxyacetic acid)	31	0	0	--	--	0.21-2.1	77,000	a	79.2	b	2.7E-05	--	2.7E-02	--
2,4-DB (2,4-D derivative)	31	0	0	--	--	1.3-13	77,000	a	79.2	b	1.7E-04	--	0.2	--
Dicamba	31	1	0.03	WS-43-36	0.45-0.45	0.16-4	--		14.7	b	--	--	3.1E-02	3.1E-02
Dichloroprop	31	1	0.03	WS-43-36	2-2	0.49-4.9	--		--		--	--	--	--
Dinoseb	31	0	0	--	--	0.19-1.9	--		0.48	b	--	--	4.0	--
Mecoprop (MCPP)	31	0	0	--	--	63-630	--		--		--	--	--	--
Mephanac (MCPA)	31	1	0.03	WS-43-36	350-350	45-450	1,700	a	2.6	b	0.3	0.2	173.1	134.6

Notes:
non-detect or detect values exceed ecological RBC
--: not applicable
a: DEQ Construction/Excavation Worker RBC (DEQ 2018)
b: EPA Region 4 Chronic Freshwater Ecological Screening Level (EPA 2018)
µg/L: micrograms per liter
Eco: ecological
EPA: U.S. Environmental Protection Agency
HH: human health
HQ: hazard quotient
Max: maximum
RBC: risk-based concentration

References:
DEQ (Oregon Department of Environmental Quality), 2018. *Risk-Based Concentrations* . May 2018.
EPA (U.S. Environmental Protection Agency), 2018. *Region 4 Ecological Risk Assessment Supplemental Guidance* . March 2018

Supplemental Table 3
Siltronic GSA Upper Alluvium Herbicide Summary

	Sample Count	Count Detects	Frequency of Detection	Location of Maximum Detected Result	Detected Result Range	Non-Detect Result Range	Ecological RBCs	Note	Eco Max HQ (Non-Detect)	Eco Max HQ (Detect)
Herbicides (µg/L)										
2,2-Dichloropropionic acid (Dalapon)	23	0	0	--	--	0.5-3.7	--		--	--
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)	23	0	0	--	--	0.17-1.3	--		--	--
2,4,5-TP (Silvex)	23	0	0	--	--	0.22-1.1	30	a	3.7E-02	--
2,4-D (2,4-Dichlorophenoxyacetic acid)	23	0	0	--	--	0.5-2.1	79.2	a	2.7E-02	--
2,4-DB (2,4-D derivative)	23	0	0	--	--	1.4-13	79.2	a	0.2	--
Dicamba	23	0	0	--	--	0.16-4	14.7	a	0.3	--
Dichloroprop	23	0	0	--	--	1-4.9	--		--	--
Dinoseb	23	0	0	--	--	0.5-1.9	0.48	a	4.0	--
Mecoprop (MCPP)	23	0	0	--	--	100-630	--		--	--
Mephanac (MCPA)	23	1	0.04	WS-33-81	1000-1000	100-450	2.6	a	173.1	384.6

Notes:
non-detect or detect values exceed ecological RBC
--: not applicable
a: EPA Region 4 Chronic Freshwater Ecological Screening Level (EPA 2018)
µg/L: micrograms per liter
Eco: ecological
EPA: U.S. Environmental Protection Agency
HQ: hazard quotient
Max: maximum
RBC: risk-based concentration

Reference:
EPA (U.S. Environmental Protection Agency), 2018. *Region 4 Ecological Risk Assessment Supplemental Guidance* . March 2018

Revised DGWP Figures

LEGEND:

- Site Boundary (Siltronic GSA)
- Approximate Gasco OU Boundary
- Tax Lot Boundary

NOTES:

1. Arrow indicates direction of flow of river.
2. Horizontal datum is NAD83 (HARN 91) Oregon State Plane North, International Feet.
3. Aerial imagery from City of Portland 2021.

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Feet

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ANCHOR QEA

Figure 1
Site Vicinity
Feasibility Study Comprehensive Data Gaps Work Plan
Gasco OU

LEGEND:

- Site Boundary (Siltronic GSA)
- Approximate Gasco OU Boundary
- Siltronic Collected Fill Soil Sample Location – 2018
- Siltronic Collected Fill WBZ Groundwater Sample Location – NW Natural Duplicate Groundwater Data – 2016 to 2018
- Siltronic Collected Fill WBZ Groundwater Sample Location – Bayer CropScience, Inc., Split Groundwater Data – 2017 to 2018
- Siltronic Collected Fill WBZ Groundwater Sample Location – EIB Groundwater Data – 2019

NOTES:

1. Arrow indicates direction of flow of river.
2. Horizontal datum is NAD83 Oregon State Plane North, International Feet.
3. Aerial imagery from City of Portland 2021.

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ANCHOR QEA

Figure 2
Siltronic Collected Fill Soil and Fill WBZ Groundwater Sample Locations
Feasibility Study Comprehensive Data Gaps Work Plan
Gasco OU

LEGEND:

- Site Boundary (Siltronic GSA)
- Approximate Gasco OU Boundary
- Ecological Exposure Area 1
- Ecological Exposure Area 2
- Ecological Exposure Area 3
- Doane Creek Sediment (0–0.5 foot bgs)

Soil Sampling Locations

- 0–3.5 feet
- 0–20 feet

NOTES:

1. Arrow indicates direction of flow of river.
2. Horizontal datum is NAD83 Oregon State Plane North, International Feet.
3. Aerial imagery from City of Portland 2021.

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Figure 3
Soil and Sediment Sample Locations in Siltronic GSA in the Risk Assessment Dataset
Feasibility Study Comprehensive Data Gaps Work Plan
Gasco OU

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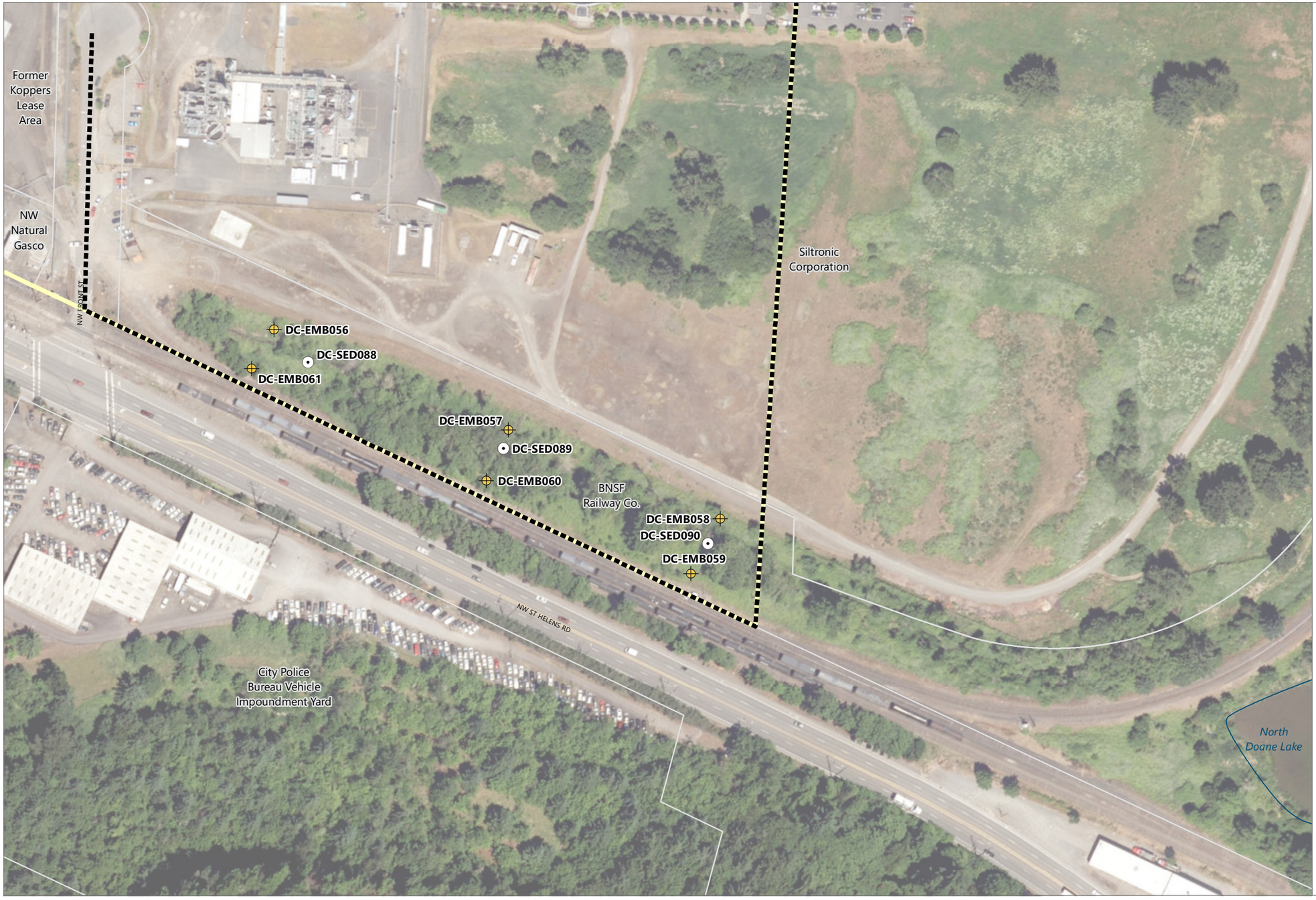
ANCHOR QEA

Figure 4
Proposed Sample Locations for Siltronic GSA
Feasibility Study Comprehensive Data Gaps Work Plan
Gasco OU



LEGEND:

- Site Boundary (Siltronic GSA)
- Approximate Gasco OU Boundary
- Proposed Composite Doane Creek Sediment Sample (0–0.5 feet)
- Proposed Doane Creek Soil Sample (0–3.5 feet)

NOTES:

1. Arrow indicates direction of flow of river.
2. Horizontal datum is NAD83 (HARN 91) Oregon State Plane North, International Feet.
3. Aerial imagery from City of Portland 2021.

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Feet

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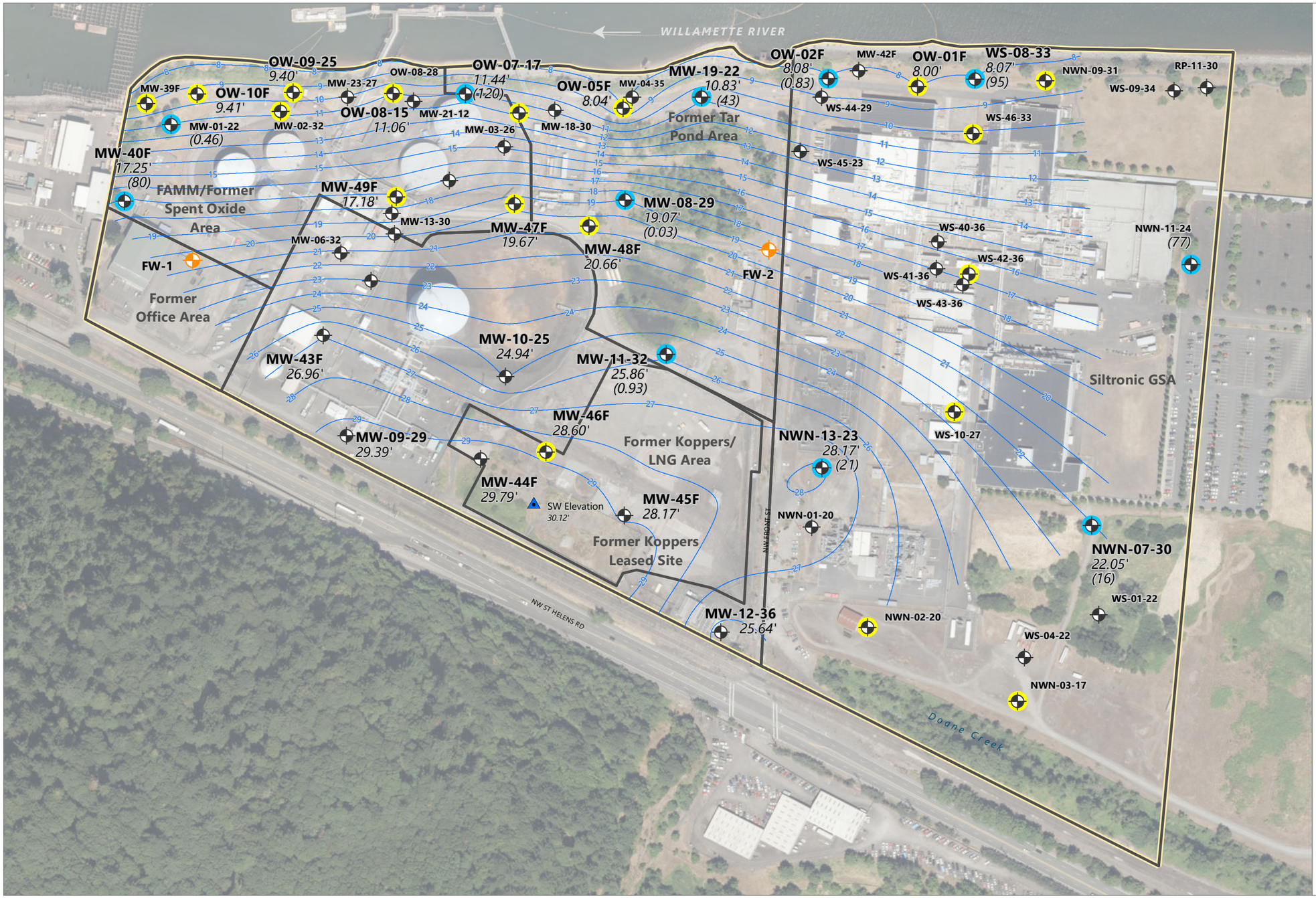
ANCHOR QEA

Figure 5
Proposed Sample Locations for Doane Creek
Feasibility Study Comprehensive Data Gaps Work Plan
Gasco OU



LEGEND:

- Existing Fill WBZ Monitoring Well Location
- Proposed Temporary Monitoring Well for Pumping Test
- Existing Well Proposed for Pumping Test
- Wells with K from Historical Pumping Test
- Surface Water Elevation
- Groundwater Elevation Contour Lines (1-foot interval)
- Approximate Gasco OU Boundary
- Geographic Subareas
- *8.08* Average Groundwater Elevation in January 2019 (feet COP)
- *(0.83)* Horizontal Hydraulic Conductivity in Feet per Day from 2016 Single-Well Pumping Test

NOTES:

1. Groundwater elevation is reported in reference to City of Portland datum (COP) in units of feet.
2. Averaged groundwater elevation contours were created using ordinary kriging interpolation method in ArcGIS software.
3. Several existing monitoring wells are not included in the proposed single-well pumping test for the following reasons: MW-09-29 and MW-12-36 are screened in upper alluvium; MW-10-25 has questionable access and is no longer in the monitoring program due to the presence of NAPL; MW-43F, MW-44F, and MW-45F lie within a DNAPL-saturated zone.
4. Large font size indicates wells with transducers that are used for contouring.
5. Proposed wells on Siltronic for pumping test are pending verification of access and subsurface conditions.
6. The surface water elevation of the Koppers basin is based on a single measurement from January 3, 2019.
7. Arrow indicates direction of flow of river.
8. Horizontal datum is NAD83 Oregon State Plan North, International Feet.
9. Aerial imagery provided by City of Portland, Oregon, and dated summer 2018.

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Figure 6
Proposed Fill WBZ Pump Test Locations
Feasibility Study Comprehensive Data Gaps Work Plan
Gasco OU