



# Oregon

Kate Brown, Governor

Department of Environmental Quality

Northwest Region

700 NE Multnomah Street, Suite 600

Portland, OR 97232

(503) 229-6900

FAX (503) 229-6945

TTY 711

August 19, 2019

*via electronic delivery*

Dwight Leisle, PE  
Port of Portland  
7200 NE Airport Way  
Portland, OR 97218

RE: Groundwater Source Control Evaluation and Alternative Analysis  
Willamette Cove Upland Facility  
ECSI No. 2066

Dwight:

The Department of Environmental Quality (DEQ) has reviewed the *Groundwater Source Control Evaluation and Alternative Analysis* (SCE/AA) for the Willamette Cove Upland Facility (“site”) prepared by Apex on behalf of the Port of Portland (Port) and dated June 21, 2019. The site is situated on the northeast bank of the Willamette River between River Miles 6 and 7, and is comprised of approximately 24 acres of upland area. The document serves to satisfy DEQ’s request to complete a focused SCE/AA for groundwater. The Port’s Response to Comments Letter to resolve comments on the March 2019 *Revised Feasibility Study and Source Control Evaluation* (FS/SCE) will be addressed under separate correspondence. Remedial investigation and source control measures are performed under a Voluntary Agreement (DEQ No. ECVC-NWR-00-26) between the Port, Metro (current landowner), and DEQ. The SCE/AA and the FS/SCE are intended to support preparation of an upland Record of Decision (ROD) and source control determination by DEQ. The United States Environmental Protection Agency (EPA) will oversee remediation of in-water and riverbank contamination associated with the site.

EPA and the Five Tribes, as participants in the Portland Harbor Superfund Site provided comments on the SCE/AA, which are enclosed. DEQ is in agreement with a majority of comments and several warrant further consideration.

### **Five Tribes Comments**

Comments from the Five Tribes (Attachment 1) are consistent with those of DEQ and EPA. While the West Parcel should be the focus of future groundwater source control activities, DEQ agrees the report does not present a sufficiently robust argument to eliminate the East Parcel as a potential groundwater source for metals, and additional presentation is warranted.

### **EPA Comments**

DEQ concurs with EPA comments included as Attachment 2 to this comment letter.

### **DEQ Comments**

General Comment 1. There are a number of errors or omissions in the document that are significant. Revision and re-submission is warranted. In the meantime, DEQ will begin work on a staff report outlining a recommended remedy to address upland contamination. The staff report will include a “partial” source control decision, indicating that groundwater contamination (e.g. the West Parcel) exceeds Portland Harbor

cleanup levels (CULs) and, at this point, is considered an uncontrolled contaminant source. Remaining pathways for upland contaminant migration to the river – erodible surface soil or riverbank material and direct surface water discharge – do not represent a source control concern or will be addressed as part of forthcoming in-water work. Based on our current evaluation of the site data and conceptual site model we anticipate additional analysis in a revised SCE/AA will confirm that metals are not a significant groundwater concern in the East Parcel. However, a more robust evaluation and presentation is needed to address this portion of the site.

General Comment 2. The document should be amended to include a conceptual work plan that includes an in-water investigation to determine the extent to which groundwater contamination may be impacting the Willamette River. This should include an overview of what data will be collected and how it will be evaluated. The discussion should include information on the sediment management area (SMA) offshore of the site as identified in the January 2017 Portland Harbor ROD, SMA contaminants, technology assignments, etc., and challenges associated with discrimination between upland (groundwater) and in-water sources in future work. It is DEQ’s expectation that source control related sampling will include, at a minimum, contaminant analysis in porewater. Flux measurements will be necessary to both determine location and “rate” of groundwater/contaminant flux to the river.

Based on verbal commitment from the Port/Metro, it is DEQ’s expectation that the evaluation will be sufficiently comprehensive to determine whether upland groundwater contamination can/may migrate to the Willamette River, and support source control remedial design work (as necessary).

General Comment 3. DEQ requests additional groundwater sampling of West Parcel monitoring wells (MW-1 to MW-3) for the following: total and dissolved metals, pentachlorophenol (PCP), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides, polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH) in the form of C10-12 aliphatics, and dioxins/furans. Sampling should be completed during low (fall 2019) and high (spring 2020) groundwater conditions. Data will be used, in conjunction with results from upcoming in-water sampling, to complete the groundwater source control evaluation and determine to what extent remedial action is necessary to address uncontrolled groundwater sources. DEQ expects that results to be documented in a *supplemental* Groundwater SCE/AA. If results of additional metals analysis for the East Parcel is not conclusive, additional sampling may be requested.

General Comment 4. Cost estimates for all remedial alternatives seem excessively high. For example, reportedly the estimated costs for a slurry-based cutoff wall at Arkema (up to 80 feet below ground surface and covering a linear distance of 1,650 feet) were considerably lower.

Section 2.0, Extent of Upland Facility. For the purposes of the Groundwater SCE/AA, it is acceptable to demark the lower bankline as “waterline” as is done here. EPA may prefer a different delineation as part of forthcoming in-water work.

Section 2.4, Potential Sources of Contamination. Please include any additional information regarding import fill in the former log pond area (e.g., location at Arkema from which material came and associated potential for contamination, depth and aerial extent of fill as determined from aerial photos or other, potential contaminants, date of filling, etc.). For all parcels, dioxins/furans *would* be considered (potential) associated contaminants, either through wood products manufacturing if wood-treatment chemicals were used, burning operations, PCBs, etc. In the Central Parcel, buried debris found during the 2015/2016 removal action included a large amount of what appeared to be kiln brick, suggesting burning operations that could create dioxins/furans.

Section 2.7, Regulatory History. DEQ has oversight for upland source control that includes not only sediment, but potential releases to surface water (via the groundwater pathway) exceeding Portland Harbor criteria that may result in sediment contamination (or recontamination following cleanup).

Section 3.2, Previous Investigations. Please include (brief) discussion of sample collection methods for both “grab” and monitoring well investigation work, including whether any field or laboratory filtering was completed other than for analysis for dissolved metals, or any other protocols that might have a bearing on interpretation of sampling results.

Also, discuss the *focus* of groundwater sampling. Unless otherwise noted, DEQ presumes that both grab and monitoring well samples from the upland site represent the uppermost portion of the shallow unconfined (water table) aquifer, rather than perched or other conditions. In contrast, samples collected from the Inner Cove beach and near tideline at the Wharf Road location may or may not represent groundwater. An additional consideration is distinguishing between upland-sourced groundwater contamination versus that associated with historical releases in the bankline area or over-water. Contaminants including sheen and/or product have been observed in the Inner Cove and Wharf Road, with no observed connection to the upland. DEQ presumes this contamination to be related to (extensive) historical industrial activity near or over water in this area.

Section 3.2.2, Remedial Investigation Groundwater Sampling. Identify the referenced monitoring wells (MW-1 to MW-7) in text.

Section 3.2.3, Additional Groundwater Sampling. Please identify the test pits and borings referenced in this section, including the locations of the various investigations vis-à-vis representing upland groundwater contaminant sources versus those that might located in the bankline or in-water.

Section 4.0, Identification of Migration Pathways. See comments above regarding how collected data fit in the conceptual site model for groundwater source control evaluation.

Section 5.0, Groundwater Conditions.

- See previous comments regarding the manner samples were collected (and analyzed), which could have a bearing on interpretation of results.
- Previously-referenced trench sampling is not cited in this section.
- It is unclear if “shoreline” samples from the Inner Cove and Wharf Road, which appear to be illustrated in Figure 4, are included in this section’s discussion.
- The third bullet references “WC” series samples from the Inner Cove, but none are shown in this area on Figure 3.

Section 5.2, Depth to Groundwater. This section should be expanded to include a more meaningful discussion of gradient, and include presentation of elevation data from wells. We recommend presentation and discussion of data from the four seasonal gauging events in 2016, including anomalous data from MW-2. If any data are available regarding vertical gradients, please discuss. In the absence of (deeper) bounding data, please discuss why collection of samples from only shallowest groundwater is adequate where contamination has been detected exceeding relevant screening criteria.

Section 5.3, Groundwater Sheen/NAPL Observations.

- Locations discussed in individual bullets should be tied to and consistent with Figure 4. For clarity, we recommend identifying sheen/NAPL locations along the lines of the following: “M&B petroleum seep (nearshore, in-water, etc.)”, “upland sheen (or NAPL) areas”, “shoreline sheen (or NAPL) areas”, etc. This should be presented in both text and Figure 4, with consistency between the two, and distinguish

between: a) upland sources that need to be evaluated as part of upland source control; and b) sources located within or below the riverbank that will be addressed in forthcoming riverbank/in-water work. To the extent that there are data gaps for each, please discuss.

- A number of sampling locations with sheen referenced in this section are not illustrated in Figure 4.
- To the extent possible, be consistent in describing NAPL and sheen. For NAPL, it is common to reference either “blebs or droplets” or a continuous layer that warrants a description of thickness. For sheen, “light or heavy” are commonly used with added discussion of any unusual features.

Section 6.0, Groundwater Data Screening. Please describe the data set subject to screening using Table 17 or Joint Source Control Strategy (JSCS) groundwater values. Was the data set confined to sampling locations in the upland site, or include data riverward of top of bank (TOB)? DEQ notes the inclusion of data from Trench-2 and Trench-4 from the Inner Cove beach, suggesting inclusion of data riverward of TOB. It is critical in evaluating beach/shoreline data to understand whether there is a “connection” to upland sources. Based on DEQ review of all data, we are comfortable in concluding that contamination detected in beach and shoreline areas in the Inner Cove and wharf road area are *not* connected to/sourced from the uplands, and are instead associated with releases near or over water. DEQ has previously recommended that upcoming pre-design investigation efforts for the riverbank/in-water include additional assessment in these areas.

Section 7.0, Source Control Evaluation.

- Dioxins/furans should be retained as contaminants of concern (COCs).
- Based on information presented in Table 5 (Groundwater Screening Summary), additional discussion is necessary to support exclusion of the following chemicals/elements as contaminants of concern in groundwater: aluminum, copper, lead, naphthalene, 2-methylnaphthlene, and TPH. Additional discussion should include the following: a) the location and magnitude of exceedances; b) contaminant trends (for wells); c) whether downgradient data are available to support delineation; and d) any other relevant factors supporting their exclusion. CUL exceedance figures should be presented similar to those generated for retained COC. In addition to retaining “PAHs”, please clarify whether this is cPAHs, total PAHs, or other. DEQ notes that screening values were found in Table 5 for cPAHs but not for total PAHs.
- As noted by the Five Tribes, elevated metals are present on the East Parcel and an expanded discussion is necessary to carry forward or eliminate these contaminants as COCs, including arsenic.
- Map exposure ratios for all COPCs to support COC selection.

Section 8.0, Nature and Extent of Contamination.

- In discussing the results of risk screening and potential impacts to the Willamette River, it would be worth repeating the list of Portland Harbor RM 6.5E COCs for sediment, presented in Section 2.5 of the Groundwater SCE/AA.
- The basis for designation of primary and secondary COCs is unclear and we recommend removal.
- See previous comment for Section 7.0 regarding the exclusion of aluminum, copper, lead, naphthalene, 2-methylnaphthalene, dioxins, and TPH as COCs.
- Given that log pond fill appears to be the primary source on groundwater contaminants in the West Parcel/log pond area, more discussion of the vertical and horizontal extent, source, etc., of this material is warranted (see comment for Section 2.4 above).

Section 9.1, Source Control Objectives.

- If groundwater sources associated with the upland are determined to present a contamination risk to the river, containment or treatment measures *will* be required.

- In this section and elsewhere, “background” is cited as a potential off-ramp in contaminant screening. For anthropogenic contaminants, background would be considered non-detect. For metals, DEQ does not have approved background concentrations for groundwater and would typically rely on a site-specific background determination.

Section 10.1, Screening of General Approaches. Monitored Natural Attenuation (MNA) is not a form of passive treatment. We presume that MNA was retained for potential use in determining the effectiveness of in-situ treatment, rather than as a stand-alone remedy. Please confirm.

Section 11.0, Detailed Evaluation of Alternatives.

- See General Comment #4 above.
- One contributing factor to inflated remedial cost estimates are disproportionate contingencies (up to 100 percent for Alternative 2). Contingencies up to 50 percent are acceptable and should be consistent amongst remedial alternatives.
- Upland remedial alternatives focus on “treatment” in the former log pond area (e.g., cutoff wall), while COCs including arsenic and PCBs are elevated in the West Parcel outside of this area. Please clarify.
- A “steep groundwater gradient” is assumed but not supported empirically. To properly evaluate upland remedial alternatives, it will be necessary to install additional wells or piezometers in the upland to have adequate data to support remedy design. DEQ is not, however, requiring additional well installation at this time.

Section 12.0, Comparative Summary. In general, the comparative summary is incomplete. The No Action alternative is not protective; a rating of “Good” is therefore incorrect. DEQ would rate a permeable reactive wall as equal or better to other upland alternatives. Long term, the cost for a reactive cap (depending on its size) is likely to be equal to or better than containment pumping or a cutoff wall.

Section 13, Recommended Source Control Alternative.

- See General Comments #2 and #3 above.
- If an in-water cap is determined to be appropriate for addressing uncontrolled groundwater contamination, it may be necessary to increase both the footprint and thickness of cap elements.
- While only capping is discussed, DEQ notes that technology assignments outlined in the Portland Harbor ROD for offshore of the West Parcel includes both capping and dredging.

Table 4. It is unclear why “soil background concentrations” are referenced in both the title and notes to this table.

Figure 3. A number of sampling locations are shown riverward of TOB. Please confirm their use in data screening and see DEQ’s comments above about what data from these locations may represent (upland versus non-upland sources).

Figures 10 to 14. We concur with the Five Tribes assessment that isoconcentration contouring presented in these figures may not be grounded in reality.

Figure 15. This figure indicates that the former log pond, and presumably imported log pond fill, are located along the full length of the West Parcel, with the northernmost fill area confined to the area between top of bank and the -2 Columbia River Datum. Please confirm and discuss the basis for this determination (see comment for Section 8.0 above).

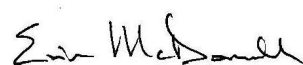
Appendix B. DEQ agrees with EPA's comments (see attached, Matters of Style #2) regarding this portion of the report, and are likewise concerned as to whether groundwater data for the site are tabulated and screened correctly.

### **Next Steps**

DEQ is requesting a revised Groundwater SCE/AA, which addresses comments received by DEQ and Partners. At the same time, DEQ will move forward with drafting a Staff Report with a recommended remedial actions for the upland and initial source control decision-making. After completion of additional upland and in-water investigation, DEQ will request a supplemental Groundwater SCE/AA, which will include a recommendation for additional source control measures as necessary.

Please contact me anytime at (503)229-6900 if you have questions or comments.

Sincerely,



Erin K. McDonnell, P.E.  
Project Manager/Engineer  
Northwest Region Cleanup Program

Att: Five Tribes Comments (July 26, 2019)  
EPA Comments (August 8, 2019)

Cc: Paul Seidel, DEQ  
Dan Hafley, DEQ  
Jennifer Peterson, DEQ  
Mike Poulsen, DEQ  
David Lacey, DEQ  
Katy Weil, Metro  
Herb Clough, Apex  
Carmen Owens, Apex  
Eva DeMaria, EPA  
Jim McKenna, State of Oregon  
Jennifer Hart, Industrial Economics  
Laura Shira, Yakama Nation

MEMORANDUM | July 26, 2019

**TO** Erin McDonnell, Oregon Department of Environmental Quality

**FROM** Peter Shanahan, HydroAnalysis, Inc.; Jennifer Hart, Gail Fricano, and Rachel DeVecchio, Industrial Economics, Inc.

**SUBJECT** Comments on the *Groundwater Source Control Evaluation and Alternatives Analysis, Willamette Cove Upland Facility, Portland, Oregon*

---

This review of the Source Control Evaluation (SCE) and Alternatives Analysis for the Willamette Cove Upland Facility has been prepared on behalf of the Five Tribes.<sup>1</sup>

#### OVERALL EVALUATION

The SCE recommends that additional sampling be conducted to determine if contaminants are migrating to surface water and sediment via the groundwater pathway. If that sampling shows no contaminant migration, then the SCE recommends the no-action alternative. If migration is occurring, the SCE recommends an in-river reactive sediment cap.

We provide the following comments with respect to these recommendations:

1. The conclusion of the SCE is based entirely on the proposed groundwater and surface water sampling; however, details for the sampling design are not provided. We request that an outline of the sampling plan and its rationale, including the spatial distribution and number of samples, be provided along with a preliminary map of sampling locations and a schedule for completion of the sampling program. The SCE is incomplete without some description of this aspect of future source control at this site.
2. The no-action alternative should be approved only after a thorough and rigorous sampling program demonstrates no contaminant migration to the river and those findings are confirmed for future years by equally thorough and rigorous modeling. Selection of the no-action alternative is a drastic step and should only be considered with strong assurance that the site poses no future risk to the river. Furthermore, the SCE must provide clear justification for this decision. Page 35 indicates that sampling alone will justify a decision. Page 24 more appropriately but still not definitively says “sampling, modeling, etc.” We recommend the SCE include a more complete statement regarding decision making for the no-action alternative and clearly identify the data that will inform that decision.

---

<sup>1</sup> The five tribes are the Confederated Tribes of The Grand Ronde Community of Oregon, the Nez Perce Tribe, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Warm Springs Reservation of Oregon.

July 26, 2019

3. As discussed below under our specific comments, historic sampling on the East Parcel has shown a pattern of elevated concentrations of multiple metals. The individual metals are assessed in the SCE and each metal is then dismissed as not requiring further assessment. However, the previously observed pattern of consistent contamination by a suite of metals suggests a more serious groundwater contamination problem exists. We recommend that the East Parcel also be considered a Potential Groundwater Source Area and that it be included in any future pore-water sampling program. Metals should be included in the list of chemicals of potential concern (COPCs) for the groundwater source control pathway on page 21 and carried through in the discussion in Sections 8 through 11 of the report.

#### SPECIFIC COMMENTS

1. In Appendix B, the data tables are titled “Riverbank Soil Analytical Results.” These data appear to be groundwater analytical results.
2. On pages 16 through 18, most metals are not retained for further evaluation due to low numbers of CUL exceedances and other factors. Samples from SE/E-1, SE/E-2, SE/E-3, SE/E-4, SE/E-5, and SE/E-17 in the East Parcel show markedly higher concentrations of chromium, copper, lead, nickel, and zinc than seen elsewhere on site. These locations also show arsenic above CULs. In light of the observed pattern of contamination, we recommend these locations be further evaluated to consider all elevated metals.
3. On Figures 5 through 9, the first two items in the legend include symbols that indicate “Groundwater Concentrations Above CL.” Since the SCE consistently uses the acronym CUL rather than CL, these legends should be revised for consistency.
4. Figures 10 through 14 show isoconcentration contour lines for various contaminants exceeding CULs in groundwater. The text should provide more information on how these contours were drawn. Based on the data shown in the figures, it appears they were drawn using only concentrations measured at groundwater monitoring wells MW-1 through MW-9. If that is the case, the two-dimensional contour lines have virtually no validity since they are based on few data from an essentially one-dimensional array of monitoring wells. We recommend providing further clarification whether the contours were drawn based on monitoring well samples only and not data available from grab samples. While those grab samples are older, they provide additional spatial resolution unavailable from the monitoring wells. Further, the grab samples show that concentrations are highly variable over space—which is unsurprising given the likely heterogeneous character of the fill soils. The spatial variability is a further indication that the observed concentrations do not lend themselves to representation by contour lines.
5. On page 23, the text states with respect to PAHs that “Figure 12 shows the groundwater contours in a configuration that suggests the higher concentrations could be reaching surface water.” Given the limited validity of the contour lines,



it is inappropriate to use the contours as a basis to draw technical conclusions such as this. That is not to say that the inference is wrong; the observed concentrations in wells near the river and the fact that groundwater flows towards the river support the conclusion that PAHs could be reaching the river, but that conclusion should be drawn without reference to the contour maps.

6. Figure 15 indicates that only the West Parcel is considered to have potential adverse effects on sediment and surface water. Based on the consistent patterns of contamination by multiple metals on the East Parcel, the East Parcel also has the potential to have adverse effects on sediment and surface water. We recommend that the East Parcel be considered further for potential effects on sediment and surface water and should be designated as such in Figure 15.
7. On page 29, the discussion of the cutoff wall is inconsistent with the physics of groundwater flow. A linear wall cannot prevent groundwater from flowing from the higher heads inland to the lower heads at the river. Absent extraction wells, a linear wall can only delay that flow. We suspect that supplemental pumping of groundwater will be necessary unless the combined effects of longer travel times and high adsorption coefficients lead to very long contaminant travel times.



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10**


1200 Sixth Avenue, Suite 155  
Seattle, WA 98101-3123

OFFICE OF  
ENVIRONMENTAL  
CLEANUP

**MEMORANDUM**

**DATE:** August 8, 2019

**SUBJECT:** Groundwater Source Control Evaluation and Alternatives Analysis  
Willamette Cove Upland Facility  
ECSI # 2066  
June 21, 2019

**FROM:** Eva DeMaria, Remedial Project Manager 

**TO:** Erin McDonnell, Project Manager  
Oregon Department of Environmental Quality (DEQ)

Following are the U.S. Environmental Protection Agency (EPA) revised comments that supersede EPA comments dated July 31, 2019 on the June 2019 document titled, *Groundwater Source Control Evaluation and Alternatives Analysis, Willamette Cove Upland Facility, Portland, Oregon* (SCE/SCAE Report). This document was prepared by APEX companies, LLC on behalf of Port of Portland. The Willamette Cove Upland Facility (site) is located between River Miles 6 and 7 East of the Portland Harbor Superfund Site (PHSS). The site is listed in the Oregon Department of Environmental Quality (DEQ) Environmental Cleanup Site Information (ECSI) as #2066.

EPA understands the objectives of the SCE/SCAE Report are to identify and characterize sources of groundwater contamination and to evaluate alternatives to address contaminated groundwater that could impact the PHSS. EPA's review focuses on assessing the data and evidence presented in the report to evaluate the groundwater characterization and remedial alternatives.

EPA comments are presented in the following sections. Comments are separated as: "Primary," which identify concerns that must be resolved to achieve the assessment's objective; "To Be Considered," which, if addressed or resolved, would reduce uncertainty, improve confidence in the document's conclusions, and/or best support the assessment's objectives; and "Matters of Style," which substantially or adversely affect the presentation of the technical information provided in the report.

**Primary Comments**

1. EPA agrees that DEQ could proceed with a source control decision that would provide information that supports a sufficiency assessment and identifies source control measures that are consistent with the Record of Decision (ROD) (EPA 2017) and protective of remedial action objectives (RAOs). Pre-design data should address data gaps identified in the SCE/SCAA report, which include characterization of groundwater contaminants, hydraulic gradient, and attenuation factors.
2. Figure 10 and Figure 12 identify areas in the central and east parcels with groundwater COCs that have the potential to reach surface water at concentrations greater than the cleanup levels (CULs). The fate and transport of groundwater contaminants of concern (COCs) and data gaps for the central and east parcels should be refined to support an evaluation of whether source control is needed in these areas of the site. Figure 15 identifies the west parcel as a potential groundwater source control area where further data are

needed to support remedial alternative evaluations and remedial design. As stated in the SCAE report Section 8, “*Additional sampling from the monitoring wells and/or pore water sampling would be required to better understand the concentrations that are actually reaching surface water.*” The transport of COCs in groundwater and potential current or future impact to river banks, sediment, pore water, and surface water should be further evaluated to inform remedial alternatives and design.

3. Section 7.0: Dioxins/furans (D/F) should be retained for further evaluation and listed as a secondary COC in Section 8. This is based on D/F being a focused COCs in the sediment adjacent to the site, the frequency of criteria exceedances in the limited analytical results for groundwater, and the bioaccumulative properties of D/F. Additional data to characterize D/F is needed to assess the groundwater to surface water pathway and to inform the remedial design of the remedy.
4. Section 9.1: The objective of groundwater source control cannot be sufficiently achieved based only on surface water CULs in the transition zone to surface water. The surface water CULs should be achieved in groundwater that discharges to the river to meet the protectiveness criteria established in the ROD.
5. Section 13: Recommendations. At minimum, this section should identify the objectives for future groundwater data collection, describe the COCs, include D/F, and that the data be collected through groundwater and/or porewater sampling and used to inform evaluation of remedial alternatives, including pre-design data for modeling COC breakthrough to determine the cap thickness and the type and quantity of the reactive substance.

#### **To Be Considered**

1. Section 8.0: The sub-heading arsenic should include a discussion that the mobilization of arsenic in groundwater could also be related to a change in redox conditions of the groundwater as a result of degradation of petroleum hydrocarbons and NAPL historically confirmed to be present at various locations around the site.
2. Section 8.0: The statement under the sub-heading for total polychlorinated biphenyls (PCBs) regarding dissolved PCBs at concentrations less than the CULs suggesting that PCBs in groundwater may not be reaching surface water or sediments at adverse concentrations is not valid and should be removed. There is no way to make a direct comparison of dissolved PCBs to the CULs. Figure 9 shows the locations exceeding the groundwater CULs and is more representative than using an average concentration. As noted in the report, additional data are needed and could include use of the surface water CUL, which is appropriate to use in evaluating characteristics of groundwater and evaluating a potential source control measure to protect surface water.
3. Section 11.2: Information should be provided to describe how the estimated number and depth of wells to achieve hydraulic containment was obtained. To accurately assess this alternative, an estimate of pumping rates should also be provided.
4. Section 12.4: EPA does not agree with the overall “Good” rating for the No Action alternative. As shown in the comparative summary, the effectiveness of No Action is rated as “Bad.” Unless there is conclusive data and analysis that demonstrate COCs will not impact river banks, sediment, and surface water, an overall rating of “Good” is inappropriate.

## **Matters of Style**

1. PDFs of reports should include working bookmark links to assist in the readability of the report and would help improve efficiency of the review process.
2. The SCE/SCAE document downloaded initially comprised 115 pages with significant errors in Appendix B. After review and comment on the initial Appendix B EPA has little confidence in the content and this data appendix warrants further quality control in subsequently reports. A second download of the document produced a report comprising 136 page that included a significant change to Appendix B. The second version of Appendix B has errors that include those below.
  - a. Appendix B is described as “Groundwater Data Screening Summary Tables and Database,” but all the tables are labeled as Riverbank Soil Analytical Data.
  - b. Rows cut off text throughout the table. See rows containing screening levels and date.

## **References**

EPA 2017. *Record of Decision, Portland Harbor Superfund Site, Portland Oregon.*