



# Oregon

Kate Brown, Governor

Department of Environmental Quality

Northwest Region

700 NE Multnomah Street, Suite 600

Portland, OR 97232

(503) 229-5263

FAX (503) 229-6945

TTY 711

January 24, 2018

*via electronic delivery*

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

RE: Combined Feasibility Study and Source Control Evaluation  
Willamette Cove Upland Facility  
ECSI# 2066

Dwight:

DEQ staff reviewed the ***Combined Feasibility Study and Source Control Evaluation, Willamette Cove Upland Facility*** (FS/SCE) prepared by Apex on behalf of the Port of Portland (Port) and dated September 18, 2017. The FS outlines remedial options to address contaminants present in the upland portion of the Willamette Cove site, including portions of the riverbank above mean high water (MHW).

There are a number of major deficiencies in the FS/SCE that prevent our accepting the document, as articulated in our comments below. Following review of DEQ and (appended) EPA and Metro comments, we would like to set up meeting or meetings to discuss: a) a general plan and schedule for completion of upland FS/SC work; and b) agree on a plan for addressing DEQ comments including, in particular, data screening and presentation.

## **GENERAL COMMENTS**

General Content. The document largely relies on discursive text when development of summary tables and figures would be more useful for illustrating risk information that supports remedial decision-making.

Basis for Revised FS/SCE Submission. There are a number of FS- and SCE-related documents that preceded submission of the September 2017 document. These include a February 2013 *Source Control Evaluation* and 2014 *Feasibility Study* for the site uplands, regulatory comments on the documents, and, in some cases, responses by the Port. The FS should present an overview of these submissions, and confirm that past comments by DEQ and EPA are addressed in the current FS/SCE. An appendix should be included that documents previous comments and indicates for each comment where in the document the comment is addressed

Contaminants of Concern. The conceptual site model, and associated discussion in the FS/SCE, need to be updated to reflect the exceptionally high concentrations of dioxins that have been detected at the site, the source(s) of which are unclear. Mercury is also notably elevated at the site, including at selected bankline locations. Discussion of these two COCs, in particular, is inadequate. DEQ is not expecting the site risk assessment to be redone. We *are* expecting the residual site risk in the upland site (including bankline) be conveyed in a sufficiently comprehensive and clear manner to support remedy selection.

Data Presentation, General. It is DEQ's expectation, as has been articulated both verbally and in written communication, that the results of recent site investigation and the 2015/2016 uplands hot spot removal action are to be incorporated in the final upland FS. For soil, what has been presented is a "data dump" that largely does not discriminate between pre- and post-removal sampling results, or outline the current risk profile for the site as necessary for remedial decision-making. Figures in the document illustrating excess risk and hot spots in the upland have likewise not been updated. Updated risk screening is performed for source control only (see additional discussion below). DEQ has provided specific recommendations on data presentation and screening, both for the upland and riverbank portions of the site, that are present as an attachment to this letter.

Risk Screening for Remedy Development and Selection. Data screening and presentation are confusing. In general, analysis of "upland" soil data for exceedance quotient and hot spot development, including human and ecological receptors, should encompass data from the eastern site perimeter to the MHW line of the riverbank. Source control screening for soil should encompass the top of bank area (we recommend within 50 feet of top-of-bank) to the waterline. Consistent with the Portland Harbor ROD, screening of erodible soil should include Table 17 Cleanup Levels, and Table 21 Remedial Action Levels and Principal Threat Waste thresholds. As with DEQ hotspots, there is an expectation by EPA that PTW will undergo active remedial measures to the extent feasible. Exceedances of CULs or RALs in potentially erodible soil are expected to require remedial measures that may include removal, capping, or other. Please consider. Independent of this letter, DEQ will provide recommendations on data presentation for the revised FS/SCE document.

Nature of Riverbanks. Most of the Willamette Cove riverbank is considered "EPA riverbank", being listed in Section 6.6.6 and shown on Figure 9 of the ROD, and adjoining in-water Sediment Management Areas. Please discuss and consider in data screening, presentation, and remedial alternative development.

Viability of Soil Removal/Consolidation Alternatives. For alternatives that involve contaminant consolidation or full removal, including recommended Alternative 5, there is an assumption that removal of soil across the site in the range of 2 to 3 feet below ground surface (bgs) will result in residual contaminant concentrations meeting cleanup standards for both human and ecological receptors. It is unclear that this is a safe assumption given that contaminants have been detected at significant depth in selected site areas, including the Central Parcel (dump area) and West Parcel (former log pond area). More data analysis/presentation is necessary to support this assumption.

Viability of Recommended Alternative 7. This alternative, one of two recommended remedies in the FS/SCE, relies on: a) a thin (1 foot) amended cap for protection of ecological receptors (including riverbank areas); and b) signage, engineering controls during construction work, and deed restrictions to protect human health. This remedy is unlikely to be protective on a long-term basis. Alternatives 3a, 4, and 7 rely on thin capping, but their long-term effectiveness/reliability is questioned in the FS. Inclusion of a demarcation layer would seem to be helpful for monitoring cap competency, but is not discussed.

Impediments to remedy implementation. There is no significant discussion of relict structures on the property, in the form of structural debris and foundations, dock remnants, etc. These would appear to be a major challenge, in some site areas, to both soil removal and capping (including the riverbank). A similar consideration would be variations in upland topography, in particular for a thin cap remedy.

Future Site Use/Access Restrictions. Proposed remedies assume that human access to the upland site will be limited (trails, benches, viewing sites, etc.) and that access to site riverbanks and beaches will not be limited. Restrictions to access will be implemented with "...a combination of signs, paved trails, and physical barriers such as railings and fencing."

To date, limiting access to the site has proven challenging at best, and trespass commonly occurs. Given the size and location of the site, it is unclear whether access can be restricted as suggested. The FS should discuss how these restrictions might be maintained, and whether they would be the responsibility of current site owner Metro. Costs associated with long-term site management, in particular for recommended Alternatives 5 and 7, need to be included in the cost estimates and the balancing factor discussion.

As a corollary to this first point, further discussion should be presented as to whether access restrictions are necessary under the recommended remedy, notably Alternative 7. Assuming that removal of contamination above the designated human health cleanup levels is successfully completed, restrictions on access may not be necessary. More discussion/analysis is warranted.

More information should be provided on likely future site use as envisioned by site owner Metro. A figure should be included in the document showing the location of the proposed bike path through the site, and any other development features.

Riverbank Remediation. In the FS, the site riverbank has been included in the recommended upland remedy, with the upland delineated by MHW. The site riverbank is contaminated in many areas, with ongoing erosion to the river a known or potential concern. In other words, source control has not been achieved. EPA acknowledged the presence of riverbank contamination in their 2017 Portland Harbor Record of Decision (ROD). Remediation of riverbank contamination, notably in the East and Central Parcel, will need to be completed in such a manner as to support adjacent in-water work. The FS needs to discuss how remediation of bankline soil, and associated layback and capping, might impact the proposed upland remedy. Laying back the riverbank slope to 3H:1V as proposed, particularly in areas where the bankline is steep, will have an impact on the final configuration of both the upland and the Greenway, and potentially the area proposed for soil consolidation and capping under Alternative 5. Also, thin capping (1 foot) of the riverbank is unlikely to be considered sufficiently projective on a long-term basis and approved by DEQ.

Alternative 7 Details. More detailed information is necessary on the recommended remedy. The following items as well as any other factors that will impact remedy design should be discussed: a) estimated volume of soil to be consolidated; b) area and thickness of the consolidation area (including cap) with appropriate sloping; c) buffer between the consolidation area and bankline; and d) Greenway considerations.

Sustainability. Recommended Alternatives 5 and 7, as outlined in the (Table 25) Soil Alternative Evaluation Summary, would require 6,600 and 5,100 truck trips, respectively, along with tens-of-thousands of truck miles. Given the scope/scale of recommended remedial work, and the proximity of residential and commercial communities that would be impacted, a more formal analysis of the sustainability of the remedial alternatives is necessary. Sections 10 and 11 of the document should include a formal analysis of the sustainability of remedial action alternatives, including recommended alternatives. Elements to be considered in the remedy sustainability analysis include: energy and water requirements, air emissions, land and ecosystem impacts, material consumption and waste generation, and long-term stewardship actions. Please see EPA's *Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites* as a starting point.

Consideration must be given in the FS to alternative means of transport, including rail and barge, for removal of contaminated and clean media to and from the site.

### Bankline Stabilization.

- DEQ (and EPA) recommend that the Bank Assessment for Non-Point Source Consequences of Sediment (BANCS) model, developed by Dave Rosgen, be used to assess the potential for erosion of the WC bankline. The BANCS model includes estimation of a Bank Erosion Hazard Index (BEHI) and the Near Bank Stress (NBS). The BEHI considers factors including the amount of surface protection, bank angle, bank height, and root depth and density in identifying erosion risk. We recommend that index “ratings” be applied at a maximum resolution of 100 feet. The NBS can be estimated using several different methods. We recommend using available site information to select and evaluate the most applicable method(s).
- Given the manner in which information is presented in Figures 29-32, it is difficult to envision what bankline remedy will be applied to what portions of the bankline. Please include detailed figures showing the expected bankline remedy for Alternatives 5 and 7.
- DEQ is concerned that laying back and remediating the upper bankline (above MHW) alone could present logistical problems for in-water remediation. On a steep riverbank slope, laying back only the riverbank above MHW could result in an unnatural grade-break at the MHW line that could be logistically difficult and technically impractical to address as part of the in-water remediation.
- The Port previously discussed laying back the site riverbank, perhaps to a slope of up to 5H:1V for the purpose of gaining restoration credits. To the extent that this is being considered for any portion of the bankline it should be discussed in the FS.
- The riverbank FS should include a baseline Habitat Equivalency Analysis and evaluate the remedial alternatives on habitat quality. The purpose of this is to determine if mitigation will be required, as if so, identify the costs. This will also help to ensure that the selected remedial alternative can be permitted.

Data Uncertainty, Riverbank. There is considerable uncertainty as to contaminant conditions in subsurface riverbank soil given a general absence of data. Recommended remedies include soil removal and layback of the upper riverbank to achieve a grade of 3H:1V in the Central and East Parcel areas. Depending on the results of post-layback sampling, additional soil removal or more robust capping may be necessary.

Consistency of Upland and Riverbank Remedies with Portland Harbor. DEQ recommends that a section be added to the report discusses the consistency of both risk screening remedial decision-making with the 2017 Portland Harbor Superfund Site Record of Decision. This would include both the relevance of CL, RALs, and PTW thresholds presented in Tables 17 and 21 of the ROD, and remedial requirements outlined in Section 14 of the EPA document.

Coordination of Remedy Implementation with In-Water Work. DEQ, Metro, and the Port all acknowledge that upland and in-water remediation work needs to be coordinated in such a way as to: a) efficiently export contaminated materials and import clean fill for both in-water and upland remediation; and b) allow for a “seamless” construction of upland and in-water remedial elements. This would include, ideally, layback and remediation of the entire bankline in one construction event.

## **SPECIFIC COMMENTS**

Section 2.1. Related to the topographic information presented here: it would be helpful to include a few (generalized) bankline cross-sectional figures illustrating the elevations and relative position of: top of bank, MHW, MLW, OHW, OLV, and toe of bank. Consider preparing figures for at least two representative bankline sections with differing character where remedial action is contemplated, for example the East Parcel inner cove and Central Parcel. This will be helpful in showing what portion of

the bankline will be “addressed” (or not addressed) by recommended remediation measures. OHW is an important datum as it triggers the need for USCOE 404 permitting and consultation.

Under “Topography” on Page 3, text indicates that the upland elevation is typically 30-45’ (NAVD88), but as high as 55’ in the West Parcel. The river elevation is indicated as “typically less than 10 feet,” and the riverbank a generally steep “20- to 3-foot slope down to the river.” It is unclear if the math adds up; the cross-sectional figures will be helpful.

Section 2.2. Please update this section to include discussion of potential/known sources of dioxins at the site, which have been detected at exceptionally high concentrations in the Central Parcel and represent the most significant site-wide risk. Include discussion of the “dump area” that was discovered during the 2015/2016 removal action, the surmised source of this material (an on- or off-site foundry?), and other information pertinent to sources in this area. The surmised source of mercury, which is notably elevated at the site, should be discussed.

Section 2.8.4. It does not appear that identified COPCs include consideration of source control criteria and the results of recent upland investigation and confirmation sampling. Please discuss/confirm. For source control, any contaminant exceeding EPA ROD Table 17 cleanup levels would be considered a COPC, as would any residual contamination in the uplands or riverbank exceeding human or ecological PRGs (presented in Tables 1 and 2 of the report) for “terrestrial” receptors. It is unclear how a number of compounds, including mercury, are not considered COPCs for human health. At the least, riverbank detections exceeding 0.085 mg/kg mercury would exceed EPA’s Table 17 cleanup level and warrant discussion.

Section 2.8.6. It is DEQ’s expectation that the FS/SCE include a robust discussion of “new” sampling results. For groundwater, this would include both re-development and sampling of existing wells MW-1 to -7, and additional groundwater characterization in the West Parcel. Both are described only briefly in this section. For West Parcel work, please include discussion of the basis for DEQ’s request for additional characterization, which includes the detection of contaminants, including PCBs, in existing wells and information presented to DEQ on the source of fill material in the former log pond area.

Section 2.9. We understand the use of MHW as a historical point of “delineation” for the upland portion of the site, but question its use for risk screening (see Tables 3 through 8). It is unclear, for example, how distinguishing soil data as either “within 100 feet of Mean High Water” or “Greater than 100 feet from Mean High Water” is useful in comparing data to Portland Harbor riverbank/sediment screening values, nor why soil data from the site interior are screened against these values.

Section 3.0 – Summary of baseline risk. See DEQ General Comments above related to presentation of residual risk data. Please consider focusing report revisions on illustration of residual risk data, representing both hot spots and exceedance quotients (EQs) for relevant exposure pathways. Please be sure that all relevant COCs and exposure pathways are included in presentation of residual risk analysis. To the extent that “indicator compounds” are used, please justify. DEQ is willing to consider the use of maximum EQs for the purpose of data illustration.

Please also identify any COCs, identified in recent incremental sampling and removal action confirmatory sampling, not presented in Tables 1 or 2, and include as appropriate. Conclusions of acceptable risk to populations using COC detection frequencies as the primary line of evidence should be balanced with characterization data. COC such as antimony and PCBs were analyzed infrequently and thus detected infrequently. The distinction between the two is important.

Section 3.2, third bullet. The statement that recreational use is assumed to occur over a lifetime is incorrect. The exposure time frame is assumed to be the same as residential exposure (now 26 years).

Section 4.2.

- Discussion here primarily relies on older bankline assessments, including an assessment completed by Hart Crowser in 2003. There is limited discussion of the observations from a 2017 assessment completed at the request of DEQ, which was initiated following significant bankline erosion during the winter of 2016/2017. Observations in Section 4.2.1.2 that bankline conditions were “unchanged” are presumably in reference to the 2012 inspection event. This characterization appears qualitative at best as it is not grounded empirically.
- A more formal assessment of bankline conditions and the potential for erosion should be completed using the BANCS model (see general comment above).
- Riverbank in the vicinity of Station 5+00 to 7+00 in the East Parcel is of particular concern to DEQ based on the presence of elevated metals, steepness of slope, and the position of this area below the BNRR rail line. Soil in this area is only partially covered, and options appear to be limited regarding bank stabilization.
- Please see DEQ general comments above regarding data screening, COCs, etc.

Section 4.2.2.4.1. In this and other sections of the report, there are numerous references to “concentrations that only slightly exceed screening levels,” “relatively high ER,” “highest relative ER,” “relatively frequent detection,” etc. which do not convey site information in a meaningful way. A more quantitative discussion is requested; DEQ prefers that risk screening results be presented in (easy-to-read) tables and figures, and *summarized* in text.

One line of evidence used in the riverbank source control evaluation is descriptions of sediment COIs. The starting point for COIs in sediment adjacent to the facility is the upland COI list, but additional COIs may be identified based on sediment and surface water characterization. Please consider.

Section 4.2.2.4.3.1. It should be noted that riverbank soil samples are not available in the West Parcel.

Section 4.2.2.4.3.3. The first paragraph concludes that the sheen and NAPL addressed in the removal action originated from an over water activity. The basis for this conclusion is not clear, either here or in the referenced section 2.9.2.

4.2.2.4.3. As is noted elsewhere, DEQ is having trouble understanding the manner in which screening was completed to assess potential adverse impacts on sediments. Tables 3 through 8 present screening of soil data against EPA riverbank/sediment criteria (Table 17 and JSCS), including data that are not anywhere in the riverbank vicinity. These tables are presumably the basis of discussion presented in this and following sections. The report should clearly identify soils/sampling locations that have the potential for erosion to the river, identify EQs, and summarize and present this information in a concise, readable fashion. For riverbank soil, one option would be to present a figure identifying the maximum EQ at each location, along with some representation of the number of exceedances for individual COCs (see attached recommendations). To the extent that upland hot spots are present, these should also be identified.

Also, there is varying language in this and ensuing sections of the report regarding COPCs, COIs, and COCs. It is perhaps worth a reminder that chemicals detected at the site which have not been screened should be designated as “Chemicals of Interest” (COIs), while those that have been screened-in should be designated as “Chemicals of Potential Concern” (COPCs). Chemicals that do not meet acceptable risk levels should be designated as “Chemicals of Concern” (COCs).

Section 4.3. With exception of a single (simple) figure, groundwater data are not illustrated, nor does there appear to be any data analysis beyond the baseline screening presented in Tables 9 through 15 of the report. Exceedance quotients (referred to as ERs in the report) and frequencies are liberally cited in text, but do not appear to have been included. Tables and figures should be included in the report *summarizing* sampling results and identifying where exceedances occur (to complement/clarify text). DEQ is inclined to agree that upland groundwater is not a significant concern outside of the West Parcel area, but clear and focused presentation is necessary to support this conclusion.

Section 4.3.1. NAPL and sheen observations are included here, but there are also sample results that go along with these observations, including: a) Inner Cove test pits and samples; and b) Wharf Road sediment sampling results completed by the Lower Willamette Group. It would be useful if these results were also described, as they are included in the baseline risk assessment.

Section 4.3.4.1. See comment above for Section 4.2.2.4.1 in reference to nomenclature, including use of “infrequent”.

Section 4.3.4.2. DEQ is not comfortable that a suspended solids concentration of 1,590 mg/L is consistent with what could be expected for unfiltered groundwater as derived based on arsenic concentration distribution. Further information would be necessary to support this conclusion on a site-specific basis. We agree, in general, that dissolved-phase concentrations of contaminants are likely more representative of the “transportable” contaminant fraction. This is particularly true for contaminants such as PCBs, high molecular weight PAHs, metals, and dioxins given their affinity for organic carbon.

Section 5.1.1, Vertical Extent. The supposition that soil contamination is generally shallow would be better supported by figures presenting subsurface sampling results. For example, as a supplement to figures showing maximum EQs in surface soil in the upland (non-riverbank area) site, a complementary figure could be presented for subsurface soil, including the results of post-removal confirmatory sampling. As has been noted elsewhere, we believe that *illustration* of data is ultimately more useful than long narrative discussion. There are significant contaminant detections in the subsurface, notably in the Central Parcel (TPH) and the West Parcel fill area. As soil consolidation and capping (Alternative 5) is one of two recommended cleanup alternatives, presentation of subsurface data must necessarily be robust to judge its suitability as a final upland remedy.

Section 5.1.2.2. The lateral extent of dioxin/furan TEQ at the west and eastern ends of the Central Parcel have not been delineated.

Section 5.2. Portions of the site have large relic foundation structures or debris, which might be a significant impediment to either upland or riverbank remedy implementation. DEQ recommends a more comprehensive discussion of relic structures/debris, and suggests that a survey of this material be included with the FS and considered in remedy evaluation. Also, consideration should be given to whether State Historic Preservation Office (SHPO) consultation is necessary, to the extent that Native American relics may be present.

Section 5.3. Restrictions on site use are typically considered as part of remedial action alternatives, not as a basis for developing them. Based on information provided by Metro (site owner) and assuming that site ownership does not change, DEQ agrees with evaluating recreational and transient use scenarios for the site upland. We are less comfortable with the supposition that restrictions on human use of the site could be implemented with a combination of “signs, paved trails, and physical barriers such as railings and fencing.” Provided that residual contamination in the upland is below recreational/trespasser risk-based values, however, access restrictions would not be necessary.

Section 6.1.2 bullets and Figure 25.

- It is not clear that the RAOs for human health match all the receptors shown in Figure 25. In particular, the RAO should include transient trespasser (TT on the figure). Perhaps it is assumed that this exposure scenario is covered by recreational exposure; if so, that should be stated. The site residual risk assessment shows acceptable transient trespasser risk in all three parcels. However, after recalculation (see comment on Table 27), the residual risk (without cap or other controls) to trespassers in DU-6 is unacceptable. Also, please discuss why construction workers are considered for the Central and East Parcels only. Excavation worker is not discussed; please explain.
- As noted in our general comments, analysis is necessary to confirm that all relevant site COCs are included in Tables 1 and 2 for residual contaminants that remain present at the site. DEQ is willing to consider the use of “indicator compounds” for the purposes of data illustration provided that their use has been shown to fully capture contaminant risk.

Section 6.2. Text (and tables) should be updated to discuss the 2017 Portland Harbor ROD, Table 17 cleanup levels, and Table 21 RALs and PTW values with respect to source control.

Section 6.2.3. Two types of “hot spots” are potentially in play at the site: a) those outlined in Oregon Administrative Rule, and b) PTW values presented in the Portland Harbor ROD. DEQ hot spot rules apply to any contamination in the site upland (including riverbank) as it relates to “terrestrial” human or ecological exposure scenarios. To the extent that contamination is present in the riverbank and adjoining upland that has the potential to migrate to the Willamette River, PTW thresholds presented in Table 21 of the Portland Harbor ROD are applicable (from a source control standpoint). With respect to residual contamination present at the site, both hot spots and PTW need to be identified.

Section 7.0.

- See DEQ’s general and specific comments regarding presentation of *residual* site data. Impacted area/volume estimates should be updated accordingly, along with those for hot spots and PTW.
- It is unclear to what extent contaminant “estimates” take into account the results of 2015/2016 soil removal activities. Please clarify update as necessary.
- As noted elsewhere, the “practical remediation level” of 1,000 ng/kg for dioxins was prepared for removal work that has been completed; its value in remedy selection for residual contamination is questionable. We recommend removal of the “practicability evaluation” except as it relates to documenting the 2015/2016 removal action. It is unclear if a focus on dioxins and furans will cover other COCs such as metals, as dioxin and furan analysis is limited to large ISM samples and the Central Parcel removal action area.
- The remedial action area and extent should be focused on relevant upland source control PRGs. Removal of Appendix F is recommended unless its context is better clarified.

Section 7.2. The Central parcel is divided into West End and East End soil; DEQ could not find a figure illustrating the dividing line. The text references the areas corresponding to DU-6 and DU-5, which aren’t clearly shown in any of the figures (e.g., Figure 26).

Section 8.1.

- A more in-depth and nuanced evaluation of remedial technologies is necessary for both soil and groundwater. See the following comments.
- Discussion of technology screening, a very important element of the development of remedial action alternatives, is very short (one paragraph). The results of screening presented in Tables 16a and 16b of the report should be summarized, including the basis for excluding technologies. It is typical for a *range* of (potentially applicable) remedial technologies to be carried forward for



detailed screening and analysis prior to assembly of remedial action alternatives. This is generally absent.

- Most technologies are screened out in what appears to be a “primary screening” presented in Tables 16a and 16b. In the case of groundwater, only “monitoring” has been retained. Treatment walls/caps are indicated as being retained by shading, however accompanying Screening Comments indicate that these are not applicable. Please clarify.

Section 9.0. Please update discussion as necessary based on comments presented elsewhere in this letter.

Section 9.2.

- Text indicates that trees would be removed under this alternative, presumably to allow for a continuous 2-foot clean capping layer over the site upland and riverbank above MHW. Please discuss why tree removal is necessary.
- Please indicate whether a demarcation layer will be placed below clean fill.
- Please discuss the extent to which relic structures at the site would be an impediment to effective capping.
- DEQ infers that layback to 3H:1V and capping is planned for the Central and East Parcels only. Please clarify.
- Text indicates that capping would “extend down the slope” and “would be conducted as part of the in-water remediation and/or habitat restoration.” Referenced Figure 29 shows the riverbank cap extending to MHW only. Please discuss whether capping of the full riverbank is contemplated.
- In addition to not addressing hot spots, this remedy does not appear to address PTW that may be present within riverbank soil. Note that Figure 28 of the Harbor ROD requires removal/capping of riverbank PTW within an SMA regardless of the erosion potential.

Section 9.3.1.

- Please clarify that this alternative involves the excavation and off-site disposal of *all* near-surface soil exceeding relevant human health or ecological PRGs. As noted elsewhere, DEQ is not confident that removal of surface soil to a maximum depth of 3 feet will result in an “acceptable” leave surface.
- See comments for Section 9.2.

Section 9.3.2. As noted in Page 79 text, it seems unlikely that thin capping would prove an effective long-term remedy. See also comments for Section 9.2.

Section 9.4.

- Alternative 4 and 5 contemplate excavation and on-site consolidation of soil from the West and Central Parcels, as illustrated in Figure 30. Text indicates that a 2-foot cap will cover this material, which is also illustrated in Figure 29. What is not clear for either alternative is the thickness of consolidated soil that is contemplated (post-compaction), and whether based on 3H:1V side-sloping there is adequate “room” for the constructed containment cell. An added consideration is the extent to which layback of riverbank might reduce the upland area available for containment.
- See comments for Section 9.2.

Sections 9.5 through 9.8. See previous comments for Alternatives 2 through 5.

Section 9.7. The third paragraph states that over time burrowing animals would reduce overall concentrations of the existing surface soil. Over time, we expect burrowing to *increase* concentrations in

the existing surface soil (the cap) and reduce concentrations in the previous surface soil on which the cap was placed.

#### Sections 10.2 to 10.6.

- It would help to include a brief description of each alternative so that the reader does not have to refer back to previous sections for alternative descriptions.
- The number of truck trips and associated impacts on neighborhood and greenhouse gas generation is a significant weighting factor for implementability and implementation risk. The movement of thousands of truckloads of soil through local neighborhood is considered untenable by DEQ. More evaluation of alternative methods (rail, barge) is necessary. Individual alternatives should be modified, or separate alternatives presented that incorporate these transport methods.

Section 10.7. A revised hot spot discussion should be presented: a) focused on residual contaminants; and b) considering the full range of site COCs in soil and groundwater. A separate section should be added discussing PTW, to the extent present, in riverbank soil and/or West Parcel groundwater.

#### Section 11.0.

- **Alternative 7** is presented as one of two recommended upland remedies, but the effectiveness and long-term reliability of a thin (1-foot) cap is acknowledged here. It is suggested in report text that its suitability might be demonstrated through “extensive literature reviews and/or bench studies.” If this alternative remains in the “recommended” category, additional information should be presented in the FS to show that it is likely to be an effective remedy with acceptable long-term reliability. It is more likely that a standard (minimum 2 feet thick) will be required. A few comments to consider:
  - Use of a thin cap in the upland would necessitate incorporation of a visual barrier between contaminated soil and clean cover to provide for effective, reliable inspection. Typically this would consist of a water-permeable demarcation layer with good visual warning properties.
  - Thin capping is unlikely to be allowed on sloped surfaces where erosion is more likely to occur, including riverbank areas.
  - In the event that thin capping was approved for some site areas, contingency measures would be necessary and effectiveness monitoring more robust than for a standard upland cap. This may significantly impact the cost-effectiveness of this alternative.
- **Alternative 5** is, at present, the remedial action that is viewed most favorably by DEQ. However, we have a number of concerns about this remedy (as articulated elsewhere in this letter) including the following:
  - It is unclear whether the underlying premise of this remedy, namely that soil below 2-3 bgs at this site meets relevant PRGs, is well founded. While some capping of excavated areas is contemplated in the FS, DEQ is concerned that this could be necessary over a larger area, undermining the “consolidate and cap” concept. Subsurface data should be presented to support this alternative, and deficiencies in the data set noted.
  - It remains unclear whether there is adequate space in the upland for contaminated soil consolidation when riverbank layback, consolidation cell sloping, etc. are considered.
  - It is unclear to what extent restrictions on (human) site access will be necessary, and can be effectively maintained.
- **Groundwater.** As noted in our comments for Section 7 of the report, technologies other than “monitoring” have been eliminated prematurely. Greater consideration needs to be given to upland alternatives before “deferral” to the in-water remedy can be supported. We agree that

additional data are needed to better determine whether upland groundwater contaminants are discharging to the river, and recommend that the Port develop a work plan to address this.

Section 11.2. A residual risk assessment consists of two elements: 1) a quantitative assessment of the risk resulting from concentrations of chemicals remaining on the site at the conclusion of any treatment or removal; and 2) a qualitative or quantitative assessment of the adequacy and reliability of any institutional or engineering controls to be used to control chemicals remaining on the site. OAR 340-122-0084(4).

Residual ecological risk to bird and mammalian receptors using exposure unit sized ISM results would require a revision of Table 1 PRGs to represent baseline conditions in order to ensure appropriate scale consideration of all relevant PRGs. For example, mercury concentrations detected in ISM and removal action samples are above bird and mammal PRGs and necessitates inclusion in the table presented on Page 103. Surrogate concentrations should not be limited to the removal action goal. See also comment on Section 3.0, Summary of Baseline Risk.

For ecological residual risk to plants and invertebrates point-by-point, residual risk maximum risk ratios should be presented for all COCs prior to capping, including antimony, chromium, nickel, and PCBs. For some COCs, such as antimony and PCBs, data availability limits this evaluation, and this uncertainty should be described.

## FIGURES

Figures, general. It is unclear to what extent data presented in Figures 12 through 16 include riverbank data. Please clarify and identify the datum represented by the dashed line in figures.

Figures 3 through 7. These figures are difficult to read/interpret, in part due to the inclusion of the DU-series sample locations, and dotted lines which represent the boundaries of ISM decision units. Also, it is unclear why incremental sampling locations are illustrated in some (large) figures, and not in others (e.g., Figure 5). The FS should illustrate *current* contaminant conditions to support remedy selection.

Figure 8. The figure appears to represent debris, sheen, or NAPL observations *in the riverbank portion of the site only*. For example, sheen has been observed in both upland wells and borings. All observations should be presented.

Figures 9 and 10. Only nearshore sediment data are shown. It is unclear whether data presentation is confined, for example, to within 200 feet of the bankline. The dashed line demarking riverbank from river should be identified – ordinary low water? Also, figures are labeled as identifying the extent of COIs exceeding EPA CLs (PH ROD Table 17 values for sediment, presumably), but are expressed in concentration ranges. It might be better to illustrate data in the form of EQs.

Figures 13 through 16. It is unclear whether presented figures represent pre- or post-2016 removal conditions. Please clarify. As noted in General Comment #1 above, it is DEQ's expectation that the results of the large hot spot removal action be fully incorporated into this FS/SCE.

Figures 17 through 19. DEQ is appreciative of the reconnaissance observations, but feel that the presentation does not fully capture the extent to which bankline erosion is occurring. During site visits in 2017, DEQ personnel observed sections of bankline (notably in the Central Parcel) where mass wasting was evident in the form of large down-dropped slump blocks. Elsewhere, exposed debris, tree roots, etc. are indicative of ongoing erosion of portions of the site bankline. Figures should clarify whether inspection of the West Parcel bankline was completed, and present results if they are available. See comments above on BANCS model.

Figure 21. The illustration of bankline areas with a slope of 1H:1V or steeper, denoted by a circled “A,” is incomplete. DEQ notes, for example, that there is a prominent over steepened bankline at the downstream end of the inner cove, and beneath the elevated BNRR rail line facing the cove. Again, it is unclear whether the West Parcel bankline was included.

Figure 22. DEQ would identify portions of the bankline below the BNRR line as “showing clear signs of erosion”.

Figure 23. The presented figure is over-simplified, and termination of the exceedance area at shoreline speculative. It would be better to include a more detailed figure showing well and boring locations.

Figures 24 and 25. What is the distinction between ecological risk areas and subareas? DEQ assumes that oval-shaped subareas represent additional risk (e.g., for PCBs) beyond that identified in blue for the larger areas.

Figure 26. As noted in our General Comments above, the final FS/SCE document should represent *current* site conditions. Hot spot areas that were removed during recent upland work should not be included, for the most part, in data discussion and presentation. Please clarify if presented hot spots are confined to the upland (non-riverbank) site. If so, consider presentation of a separate figure illustrating riverbank hot spots.

Figure 28. Typical section G is shown in Figure 30 as being in the upland interior site, but appears to include a bankline component. Please clarify.

Figures 27 through 32. DEQ finds this presentation confusing (see General Comment above). In addition to making the presentation clearer, separate figures should be provided illustrating bankline remedial measures in greater detail for recommended Alternatives 5 and 7. See comments on individual figures also.

Figures 28. A cross-sectional figure is not presented for recommended Alternative 7 bankline. It is shown in Figure 29 without a thickness indicated. See comment below for Figure 29.

Figure 29.

- Riverbank sections show “typical” bankline configuration as being 2H:1V. In fact, portions of the riverbank area are significantly steeper (some near-vertical), including in areas where hot spot-level contamination is present. Cross section figures should illustrate the *range* of riverbank conditions at the site, and illustrate how a partial layback of the riverbank (above MHW) might work. In the East Parcel below the BNRR tracks, excavation of hot spot soil, along with layback and capping as necessary, would appear to be impractical. Please discuss.
- For typical section H, remediation is indicated to OHW rather than MHW as in other sections. Please resolve.
- Based on the existing site data set, DEQ expects capping to be necessary in most bankline areas where soil is exposed, either currently or through layback. Cap thickness is not presented in Figure 29, but is shown as 2 feet in typical section G in Figure 28 in the site interior. Note that a minimum of 2 feet of clean material will be necessary for capping, following layback, in residual contamination areas, with armoring as necessary.

Figure 30. Use of “typical section” signifiers appears to indicate that the West Parcel bankline would be repaired and/or augmented with up to 6 inches of 2-inch minus rock in the West Parcel, and the remaining site bankline would be managed per typical section E. Typical section E, however, shows excavation of 1

to 3 feet but no capping. To the extent that residual contamination is present in the bankline, either removal or capping will be necessary. Please clarify/resolve.

Figures 30 and 31. These figures illustrate actions for more than one alternative, which is confusing. Separate figures are recommended for each remedial alternative.

Figures 31 and 32. Presented information is unnecessarily convoluted, referring to notes which in turn refer to cross-sectional diagrams. Also, nearly all riverbank remedial actions outside of the West Parcel are couched as “repairs,” but can vary from modest addition of 2-inch minus rock to full layback and capping. Clarity is necessary, in particular for recommended remedial Alternatives 5 and 7.

## **TABLES**

Tables, General. Data tables 3 through 15 of the document are focused on source control screening only (riverbank and groundwater), yet they seem to include data from throughout the upland site. The data set also seems to include confirmatory soil sampling results from the 2016 removal action, although these are not “called out. The inclusion of upland soil data that do not present a source control concern is not appropriate/necessary, unless one is considering the potential for leaching-to-groundwater. On the other hand, DEQ expects tables and figures in the report to “illustrate” residual risk for upland receptors. Also, please label table inserted in text (e.g., Section 11).

Tables 1 and 2. Tables 1 and 2. This appears to present an incomplete set of COCs and receptor pathways considering an updated baseline risk analysis. DEQ notes, for example, that cleanup values are not presented for mercury, which is significantly elevated at the site. All COCs with exceedances of either human health or eco risk criteria should be presented in the tables, and hot spots identified as appropriate. Exceedance areas and hot spots should be presented on updated figures.

Tables 3 through 8. These tables present contaminant data for “riverbank soil”, grouped by their location relative to mean high water (MHW). Results are screened against riverbank soil/sediment cleanup values presented in Table 17 of the PHSS ROD (of JSCS SLVs, as needed) with exceedances highlighted. It is appropriate to compare bankline data, particularly for soil/sediment that is potentially mobile or exposed, to EPA’s cleanup levels for the PHSS. It is unclear whether this is necessary for detections “greater than 100 feet from mean high water”, nor is it clear how far the presented data set extends into the site upland. Are all updated data included in these tables? Please clarify.

Tables 9 through 15. The tables present contaminant data for upland groundwater and, as with soil/sediment, are grouped by their location relative to MHW. Results are screened against groundwater cleanup values presented in Table 17 of the PHSS ROD (or JSCS SLVs, as needed) with exceedances highlighted. As with soil/sediment, data are grouped based on their proximity to/distance from MHW. Two comments: a) “Breaking up” the data based on distance from MHW is of questionable utility for groundwater. The concern with groundwater contamination in the upland, from a source control concern, is the potential for contaminants to migrate to and impact Willamette River receptors; and b) from a source control standpoint, the focus of screening should be on groundwater data in closest proximity to the river.

Table 16a and relevant text. Initial screening of remedial options for soil should include a discussion of the potential for contaminants to be leachable, and represent an ongoing source to groundwater.

Table 16b. Initial screening for groundwater eliminates all technologies other than monitoring and MNA. The “Passive/Reactive Treatment Walls/Reactive Caps” technology is not highlighted and presumably

retained, but screening comments indicate that it is neither applicable nor cost-effective. We presume it was meant to be highlighted as “eliminated. DEQ is not comfortable with the manner in which the groundwater screening and upland alternatives were eliminated; potential treatment options should have been retained for more detailed analysis.

Table 17 through 24. See General Comments above concerning the likely reliability of cost estimates. For capping remedies, cap inspection and maintenance costs are presented for 5 years, and inspections for 25 years. Two comments as they pertain to the recommended alternatives (5 and 7): 1) long-term monitoring and maintenance associated with Alternative 7 (site-wide thin capping) are likely to be significantly higher than for Alternative 5, as inspection, maintenance, and analytical testing will be required by DEQ to confirm that the (thin) cap is not compromised over time, and 2) the cap footprint for Alternative 7 is much larger, encompassing the entire site. Also, inspection *and* maintenance costs should be calculated for at least 25 years (and will in reality, be required in perpetuity) for any long-term capping remedy.

Cost estimates should account for measures that will be necessary to restrict access to the site envisioned in the remedial alternatives. For Alternative 7, it appears to be assumed that human access will be restricted for most of the site, while for Alternative 5 measures will be necessary to limit access to, at a minimum, the East Parcel capped area.

Table 25. An important element of this table is transport of contaminated material off of the site for disposal, relocation of soil within the site for capping, and import of clean material onto the site for capping. These are important from the standpoint of cost, carbon-footprint, and the potential for impacting nearby residents and businesses. More detailed information is necessary on the “truck miles” and “truck trips” presented in this table, in particular for recommended Alternatives 5 and 7. For example, the 5,100 truck trips in the alternative are presumably associated with both off-site disposal of higher-concentration soil, and the import of clean material for on-site capping. Clarification is needed. For Alternative 5, a large part of the 6,600 truck trips is presumably associated with consolidation of soil on the East Parcel for capping.

As noted in our General Comments above, much more serious consideration needs to be given to alternative methods for (contaminated and clean) soil movement, including rail and barge transport. In the same vein, more discussion is necessary in the FS regarding the sustainability of remedial alternatives, including recommended Alternatives 5 and 7.

Table 26. The scoring presented here is very simplistic and not particularly useful.

Table 27. From Table 2, the dioxin TEQ PRG for transient trespasser is 208 ng/kg, not 2080 ng/kg. This changes the DU-7 transient trespasser residual risk from below 1E-6 to 5E-6.

## **APPENDICES**

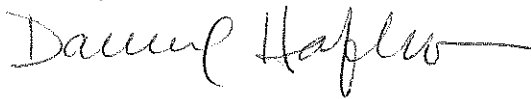
Appendix B. Tables B-1 to B-10 appear to be similar to Tables 3 through 8 of the “Tables” but encompassing a broader set of analytes. Similarly, Tables B-11 through B-23 present groundwater data similar to that in the “Tables” portion of the report. As with the Tables, data sets are divided in reference to MHW, and screened against PHSS Table 17 cleanup levels and JSCS values. Nowhere in the report is there a (separate) presentation of the most recent upland sampling results, including confirmatory data from the large 2016 upland removal action, compared to relevant upland PRGs for human health and terrestrial ecological receptors.

Appendix D. Data here are identified as “adjacent to Willamette Cove”, the meaning of which is unclear. It appears the summary includes a mixture of beach and riverbank sample composites previously evaluated in the Willamette Cove HERA (e.g. BT and 6R series), in addition to surface and subsurface in water sediment samples (e.g. G and C series). Please clarify the definition of sediment and soil datasets, as DEQ notes many of the LWG beach samples were collected at the same elevation (greater than MHW) as the erodible soil samples presented in Appendix B. The data presentation also appears to be limited in COI presentation. Please identify the scope of the presented data (within 100 feet of bankline, for example?) and include a figure identifying the sample locations.

Appendix E. The analysis presented in this appendix was developed prior to the 2016 dioxin removal action, during which the highest concentrations of dioxin were removed from the site. It’s relevance to the final FS/SCE is unclear.

We look forward to discussing these comments and attendant changes to the Upland FS/SCE that will support upcoming remedy selection. I can be reached at (503) 229-5417 if you have questions or comments.

Sincerely,



Daniel Hafley, Project Manager/Hydrogeologist  
NWR Cleanup Section

Attachments: EPA comments  
Metro comments

Ec: Paul Seidel, DEQ  
Matt McClincy, DEQ  
Sarah Greenfield, DEQ  
Jennifer Peterson, DEQ  
Mike Poulsen, DEQ  
Jennifer Sutter, DEQ  
Herb Clough, Apex  
Carmen Owens, Apex  
Katy Weil, Metro  
Eva DeMaria, EPA  
Sean Sheldrake, EPA  
Jim McKenna, State of Oregon  
Rita Cabral, Industrial Economics  
Rose Longoria, Yakima Nation

Cc: ECSI# 2066