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May 9, 2022 *via electronic delivery*

Elliot Levin
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PO Box 190
Columbia City, OR 97018

Re: Draft Feasibility Study
Former Pope & Talbot Wood Treating Site, ECSI No. 959

Dear Mr. Levin:

The Oregon Department of Environmental Quality (DEQ) has reviewed the draft Feasibility Study (FS) dated December 14, 2021, prepared by GeoEngineers, LLC on behalf of the Oregon Port of Columbia County (POCC) for the former Pope and Talbot wood-treating facility located at 1550 Railroad Avenue in St. Helens, Oregon (Site). DEQ has the following comments on the draft FS and requests POCC revise the FS based on these comments.

General Comments

1. **Preference for removal or treatment of hot spots.** The draft FS recommends remedial action alternatives (RAAs) for each of five priority action areas (PAAs). These recommended RAAs include a mixture of limited removal action, capping, and natural recovery. The FS also outlines that the Site contains substantial quantities of non-aqueous phase liquid (NAPL). DEQ's *Guidance for Identification of Hot Spots*[1] states that NAPLs generally "produce 'highly concentrated,' 'highly mobile,' and 'not reliably containable' hot spots, assuming that the baseline risk exceeds the acceptable risk level." Oregon's administrative rule (OAR) states that one of the three primary criteria an FS must evaluate is "the extent to which the remedial action alternative provides for treatment or excavation of hot spots of contamination (OAR 340-122-0085(4)(c)). Furthermore, a higher threshold should be applied in evaluating the reasonableness of costs for treating hot spots of contamination, whether such treatment occurs onsite or in conjunction with excavation and off-site disposal (OAR 340-122-0090(4)(d)). DEQ observes that the RAAs recommended in the draft FS for several of the PAAs would not remove or treat existing NAPL hot spots. RAAs should be selected that more comprehensively demonstrate a preference for treatment or removal of NAPL to the extent feasible – as described in the comments below. Based on the information presented in the FS, DEQ recommends the following:

   a. **Upland PAA**. The draft FS recommends RAA 2 consisting of an impervious surface cap and monitored natural attenuation (MNA). DEQ has determined RAA 2 does not

[1] DEQ. 1998. Guidance for Identification of Hot Spots. April 23.

demonstrate a preference for treating hot spots. The draft FS states that NAPL in subsurface soil above and potentially within the basalt bedrock may be a source of ongoing hydrocarbon contamination to groundwater and ultimately to the in-water PAAs, through shallow groundwater and potentially deeper groundwater seeps (Section 2.4). Further, in the evaluation of the proposed RAAs for the Upland PAA, RAA 2 is given a ranking of 2 for protectiveness. As the protectiveness of the selected RAAs is central to the ability of the overall remedy to meet the RAOs, DEQ does not consider an upland cap alone to be a sufficient RAA for the Upland PAA. DEQ therefore anticipates selecting a different RAA for the upland area that will be more effective in meeting RAOs 1a, 1b, 1c, 3 and 4. DEQ specifically anticipates selecting RAA 4 consisting of an impervious surface cap and a permeable reactive barrier for the Upland PAA. While RAA 4 would not remove or wholly treat the NAPL hot spot in the upland, it would contain NAPL-impacted media inside a permeable reactive barrier, reducing NAPL mobility and treating groundwater as it migrates from the Upland PAA into the in-water Cove PAA. This outcome would be much more aligned with Oregon's preference for treatment or removal of hot spots, as well as RAOs 1a, 1b and 1c. Post-construction monitoring should be included to confirm whether the RAA for the Upland PAA meets upland RAOs after remedial action implementation is complete. POCC should revise the FS to select RAA 4 as the highest ranked RAA and the anticipated selected RAA.

b. **Cove Area PAA**. The draft FS recommends RAA 2 for the Cove Area PAA, which consists of installing an armored reactive cap. DEQ has determined RAA 2 does not demonstrate a preference for treating hot spots or that it would meet RAO 1a. Instead, DEQ anticipates selecting RAA 4 which consists of riverbank restoration, nearshore removal action, off-site disposal, and armored reactive capping of residuals for the Cove Area PAA. DEQ anticipates that additional sampling may be needed during remedial design (RD) to further delineate the vertical extent of contamination in subsurface sediment and to determine the most effective approach to remove and/or treat hot spots in this area. POCC should revise the FS to select RAA 4 as the highest ranked RAA and the anticipated selected RAA.

c. **Area 1 Dock In-water PAA**. The draft FS recommends RAA 2, consisting of removing contaminated debris and installing an armored reactive cap over contaminated sediment. DEQ observes that POCC's recommended RAA for this PAA would leave NAPL-contaminated sediment in place below the proposed armored cap. DEQ acknowledges the implementation challenges associated with additional sediment removal in this PAA. DEQ therefore considers POCC's recommendation of RAA 2 appropriate for this PAA. However, POCC should provide additional rationale to justify the recommended RAA within the FS to ensure maximum efficacy of this RAA, including:
    i. The need for additional geotechnical investigation during pre-design investigation to ensure project engineers have sufficient data to design a constructable and implementable cap for this area of soft sediment and contaminated wood waste.
    ii. The need for cap modeling to be performed and based on the specific contaminant concentrations encountered in this area to ensure effectiveness and long-term reliability. DEQ anticipates that additional chemistry data collection will be required in this area during pre-design investigation to accomplish this objective.

iii. The requirement for a robust long-term monitoring program, which includes sediment and porewater sampling to ensure the cap is effectively containing sediment contamination.

d. **Lower Milton Creek and Other In-Water Areas Outside of PAAs.** DEQ observes that there are areas in Lower Milton Creek where petroleum sheen has been observed (Figures 2-8 and 2-9), and where samples have exceeded acceptable interstitial water toxic unit (∑IWTU) levels associated with narcotic effects in benthic organisms (Figure 2-11 – sample PWS-090617-2). The elevated ∑IWTU observed in surface sediment porewater in sample PWS-090617-2 was identified in the Supplemental RI as the only sediment porewater sampling location with an ∑IWTU greater than 1, indicating increased risk of toxicity to benthic invertebrates associated with PAHs (Section 5.6)[2]. However, a proposed in-water RAA for this area of Lower Milton Creek has not been included in draft FS (Figure 7-6). In DEQ's 2019 letter to POCC summarizing the status of the Remedial Investigation for the Site and developing the scope of the FS, Lower Milton Creek was listed as an example of an area outside of the PAAs that may "warrant an active remedy that is less invasive than removal or capping"; the letter states that the FS should evaluate if any such additional measures are necessary (Section 4.0).[3] Section 2.4.4.4 of the draft FS concludes that the dataset indicates intermittent discharges from Milton Creek, but associated impacts are not evaluated further in the FS. The revised FS should discuss how the proposed in-water RAAs will reduce ecological risk in this area of Lower Milton Creek to satisfy RAO 2.

   DEQ also observes additional areas where petroleum sheen has been observed outside of the PAAs and the draft FS proposes RAAs to address these areas (Figures 2-8, 2-9, 7-6). The revised FS should discuss how the proposed in-water RAAs will reduce ecological risk in areas outside of the PAAs to satisfy RAO 2. In the case that it is not feasible to fully treat or remove NAPL and/or sheen in a PAA, POCC should provide more comprehensive rationale demonstrating why it is not feasible. The final FS should also identify key elements of the long-term monitoring plan for this RAA.

2. **In-water PAA considerations.** The final FS should more comprehensively discuss how the recommended RAAs will address the following considerations for all in-water PAAs:
   a. How the proposed RAAs comply with St. Helens Municipal Code 17.46.050, provisions for flood hazard reduction.
   b. How the proposed RAAs will remain effective considering future climate change predictions for sea level rise at the Site, as stated in DEQ's November 2, 2020 letter[4].
   c. How NAPL encountered during in-water work activities will be managed. It is DEQ's expectation that NAPL encountered during remedial action activities (e.g., sediment removal, debris removal, bank sloping) will be removed. If NAPL or heavy sheen are encountered, excavation and/or separate interim actions may be necessary as a contingency measure to curtail potential releases.

[2] Cascadia Associates. 2020. Updated Supplemental Remedial Investigation Report – Former Pope & Talbot Wood-Treating Site. Prepared for the Port of Columbia County, by Cascadia Associates, LLC. January 17.
[3] DEQ. 2019. Letter to: Mr. Doug Hayes, Port of St. Helens. Re: Remedial Investigation Summary – DRAFT, Port of St. Helens/Former Creosote Site. January 15.
[4] DEQ. 2020. Letter to: Craig Allison, Port of Columbia County. Subject: *Draft Summary of Remedial Action Alternatives*, Former Pope & Talbot Wood Treating Site. November 2.

d. Post-construction monitoring should be included to assess whether RAAs for all in-water PAAs meet in-water RAOs after remedial action implementation is complete.

3. **Discrepancies in Conceptual Designs**. There are several discrepancies that have been identified in the FS between the conceptual designs presented in the text, the information presented in the figures and the supporting calculations presented in Appendices. These discrepancies may result in notable changes in the volumes of soil/material, RAA implementability, and the overall cost for the RAAs evaluated. DEQ has identified the following questions and comments that affect each of the in-water PAA RAAs. The final FS should address each of these points for the proposed RAAs:
   a. How were the extents of the amended cap layer/armoring determined and why isn't the armoring consistently brought up to ordinary high water (OHW)? Furthermore, if annual flooding occurs at a consistent frequency, why isn't the armoring brought up to an elevation protective of flooding, (i.e., top of bank)?
   b. Clarify how a silty clay amendment layer fill differs from the amended fill, as shown in several of the remedy cross sections. The material proposed for the cap should reflect the material (and equivalent percentage of total organic carbon) used in the CapSim Model (i.e., Organoclay).
   c. The rock mix armoring design that is identified in the Appendix F indicates the material will be placed on a slope of 4:1. Several cross-sections show different slopes. Is the armor size/thickness protective and stable along the slopes shown in the cross sections for the in-water alternatives?
   d. Several cross-sections show a 12-inch layer of armor rock; however, the calculations included in Appendix F indicate the recommended armor stone thickness is 24 inches. The final volumes should be calculated based on the recommended armor stone thickness identified in Appendix F.

4. **Data and Engineering Gaps.** Data related to the nature and extent of contamination and Site subsurface conditions are sufficient for the purposes of completing the FS and for DEQ to issue a Record of Decision for the Site. However, additional data collection will be required to inform the RD, including but not limited to geotechnical investigation, additional chemical contamination characterization, and investigation to minimize the potential for residual wood debris decomposing beneath the cap(s) to adversely impact their long-term reliability.

Specific Comments

5. Section 1, Introduction, p. 2. The last sentence of this section states, "DEQ's September and November 2020 comments have been incorporated into this FS report." However, several of the comments have not been addressed in the FS. The final FS should address these outstanding comments as further described in the comments herein. As an example, the FS should provide additional information related to the impacts of climate change on the selected RAAs for each PAA.

6. Section 2.4, Nature, Extent and Fate of Contamination, p. 10. DEQ notes that the Site's history and documented creosote contamination may be associated with dioxin and furan contamination in environmental media in the upland and in-water portions of the Site. The 2020 Supplemental RI notes that the human health risk assessment identified unacceptable risks for Scappoose Bay sport fishers based on consuming fish exposed to Site-related dioxins and furans (Section 10.1.3)[2]. Please add a discussion of how the proposed RAAs

will mitigate human and ecological receptors' exposure to Site-related dioxin and furan contamination to the final FS.

7. Section 7.1, Description of Remedial Action Alternatives for the Upland Priority Action Area, p. 37.
   a. Institutional controls, in the form of an Easement and Equitable Servitudes, should be included as common elements among all RAAs for the Upland PAA.
   b. This section includes "the construction of an impervious cap (e.g., concrete or asphalt pavement)" as a common element of each RAA for the Upland PAA. It is not clear from the FS that an impervious cap constructed of concrete or asphalt (referenced as "asphalt/concrete cap" below) would be effective and reliable as it is proposed. Please provide discussion addressing the following comments and questions:
      i. Clarify how the impervious cap would reduce groundwater flow through the NAPL body in the Upland PAA to provide source control for the direct connection between the residual contamination within the Former Operations Area and Scappoose Bay in the vicinity of the Cove to meet RAO 3. What is the estimated reduction in groundwater flux to the Cove and to Milton Creek associated with the impervious cap?
      ii. How effective is the cap considering the following?:
         1. Ongoing stormwater infiltration and seasonal flooding in the upland.
         2. Asphalt/concrete caps lower permeability and limit surface water infiltration. However, asphalt/concrete caps are porous and generally have a higher permeability (near $1x10^{-4}$ cm/sec) than that of appropriately designed RCRA caps (as stated in the November 2020 comments letter)[4].
         3. Asphalt/concrete caps require ongoing maintenance as they are subject to cracks and failure related to heat/cold stress. They require replacement on an average frequency of 15 years and require annual inspections. These costs should be included in Appendix D-1.

8. Section 7.1.2, Upland PAA Alternative 2: Impervious Surface Cap and Monitored Natural Attenuation, p. 39. Please see comments related to asphalt/concrete cap above. It is not clear that the groundwater flux is primarily driven by stormwater infiltration, as the groundwater contours show flow from the railroad tracks along the northern side of the property towards the river.

   As indicated in DEQ's November 2020 letter[4], an evaluation of historical Site data will need to be completed to demonstrate the effectiveness of MNA at the Site; currently the text does not provide sufficient evidence that MNA is occurring or will occur in groundwater. At a minimum, using literature values for half-lives for the constituents identified, please provide an estimated number of years for the existing concentrations to meet RAOs using MNA as a Site remedial strategy within the FS for this RAA.

9. Section 7.2.3, Description of Remedial Action Alternatives for In-Water Priority Action Areas – Area 1 Dock In-Water PAA, p. 52. This section should discuss how POCC will address City of St. Helens Municipal Code 17.46.050 (provisions for flood hazard reduction). RAA 2 would consist of installing a 3-ft cap, which may result in a water level rise above the threshold allowed by the City, thereby requiring additional material offset to assure the flood-carrying capacity is maintained within the altered waterway.

10. Section 7.2.3, Description of Remedial Action Alternatives for In-Water Priority Action Areas – Area 1 Dock In-Water PAA, p. 53. The descriptions of RAAs 2, 3, and 4 for this PAA list monitored natural recovery (MNR) as a component of these RAAs for the Area 1 Dock In-Water PAA. DEQ does not expect MNR to have a meaningful impact on reducing NAPL concentrations in this PAA. Please remove MNR as a component of the RAAs for this PAA in the final FS.

11. Section 9.3, Evaluation of Alternatives for Cove Area – Implementability, p. 73. *Editorial note:* This section should be renumbered to be part of section 9.2 (Evaluation of Alternatives for Cove Area). Subsequent sections in Section 9 should be renumbered accordingly.

12. Section 9.4.3, Evaluation of Alternatives for Area 1 Dock – Long-Term Reliability, p. 78. This section states "a significant component to the long-term reliability of all remedial action alternatives within the Dock Area 1 [PAA] is the removal of remnant timber piles and large pieces of wood debris," points out that many of the contaminated piles may break at or near the mudline during removal attempts due to the age of piles, and states that pilings and other woody debris would therefore need to be removed to the current mudline. Residual wood debris decomposing beneath the cap could adversely impact the long-term reliability of the cap by allowing NAPL to migrate through the isolation layer or spread laterally beyond edges of the cap. While DEQ understands that it may be impossible to avoid contaminated debris remaining in place due to the logistical difficulty of complete removal, DEQ expects POCC to thoroughly evaluate this potential during pre-design investigation and to take steps during RD to address this concern and to maximize the long-term reliability of the RAA in the Area 1 Dock PAA. Revise the FS to clarify that additional investigation to maximize the efficacy and long-term reliability of the cap will be prioritized during RD.

13. Appendix A. In-Place Physical/Chemical Treatment, p. 3. DEQ recommends retaining an oleophilic bio-barrier as a remedial option to be considered during RD, along with other carbon-based amendments and a reticulated clay mat, for management of the petroleum sheens within the waterway along with other amended cap technologies.

14. Appendices C and D. Costs. The costs should be revised to address the following:
    a. Cost estimates should include DEQ oversight costs.
    b. Appendix D-1. Annual cap inspections are required along with periodic Operation and Maintenance (O&M) for asphalt/concrete repair and replacement for Upland RAA 2.
    c. Appendix D-2. What is the "Barrier Wall Install" cost of $11,512.00 related to? Annual cap maintenance and periodic repair/replacement of cap should be included.
    d. Appendix D-3. Annual cap inspections and periodic O&M costs for the cap are needed.
    e. Appendix D-4. Groundwater management, in addition to stormwater management, would be required behind the impermeable barrier. This would likely require treatment of the pumped groundwater; associated costs should be included.
    f. Please check in-water costs related to assumptions presented in Appendices E and F, specifically including thickness of armoring and stable slope assumption for the riverbank. Please also consider specific costs for the active media as reflected in the CapSim model.
    g. All costs should include necessary requirements to meet the St. Helens Municipal Code 17.46.050, provisions for flood hazard reduction.

15. Appendix E. For the purposes of the FS, the CapSim Model results provide information related to the required cap thickness and breakthrough time estimates. DEQ will accept the conceptual model presented; however, additional effort will be required to refine the required cap thickness and breakthrough time estimates as a component of RD. Specifically, DEQ does not agree that the results represent a conservative estimate of the potential breakthrough time for the following reasons:
    a. The highest porewater concentrations may not represent the (reasonable) worst case scenario; a better representation of the worst case would be NAPL concentrations in the upland directly impacting seeps.
    b. A layer of rock fill armoring does not likely result in lower concentrations as the rock material is inert and generally has high permeability, with direct pathways to the surface water.
    c. A sensitivity analysis is required to understand differences between the selected site-specific values and literature values.

16. Appendix F.
    a. The elevation terminology differs between the FS main text and this Appendix, which makes it difficult to check for input consistency. At a minimum, the conversion between the local datum and the NAVD88 datum should be presented in the FS and associated cross-sections.
    b. The information recommends a maximum stone size of 12-inches resulting in a total minimum cap thickness of 2-feet. It is unclear whether a safety factor was included in the rock sizing calculations. Please review the drawings and calculations for volume in the costs to ensure an adequate armor layer has been considered where necessary.
    c. Please provide a reference for the statement: "velocities along the Site shoreline above 9.8 fps are not expected under any conditions."

Next Steps

Please revise the FS based on the comments provided in this letter and submit it to DEQ within 90 days of the date of this letter.

Please contact me at 971-295-1345 or blair.paulik@deq.oregon.gov if you have questions or comments.

Respectfully,

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