

August 27, 2024

Oregon Department of Environmental Quality (DEQ)  
Northwest Region Office  
700 NE Multnomah Street, Suite 600  
Portland, Oregon 97232

Attention: Kevin Dana, Cleanup Project Manager

Subject: Response to Comments on Groundwater Source Control Evaluation Addendum  
Crawford Street South Site  
Portland, Oregon  
ECSI No. 2363  
File No. 6209-010-01

This letter responds to comments on the Groundwater Source Control Evaluation (SCE) Addendum (Addendum) for the Crawford Street South site (ECSI #2363) located in Portland, Oregon (the Site) and transmits the revised Addendum. A draft Addendum was submitted to the Oregon Department of Environmental Quality (DEQ) on May 7, 2024. The DEQ provided comments in a letter dated July 31, 2024; the DEQ included comments prepared by the U.S. Environmental Protection Agency (EPA) and the Yakama Nation with its July 31, 2024 letter. The comments provided by each party are presented in italic font below, followed by our response in regular font.

## **RESPONSE TO DEQ COMMENT**

- 1. The Addendum, like the draft SCE before it, generally argues that Exceedance Quotients (EQs) of groundwater contaminants that are less than 10 are of little concern, without providing an explicit argument as to why an exceedance of a Cleanup Level (CUL) or Screening Level Value (SLV) should be considered acceptable.*

We disagree that the Addendum is generally arguing that EQs less than 10 are of little concern; Section 5 of the Addendum (Updated Weight of Evidence Evaluation) evaluates each suite of analytes and presents a multi-pronged evaluation to assess whether detected analytes that exceed Portland Harbor Superfund Site (PHSS) Cleanup Levels (CULs) will present an unacceptable recontamination risk to the Willamette River. We note that the confusion might arise in Section 6 of the Addendum (Conclusions and Recommendations) that presents the conclusions from the evaluation but does not re-detail the analysis. To bridge the gap, we have added more detail to Section 6, which summarizes the lines of evidence for each analyte suite and better demonstrates the overall conclusion that the contaminants of potential concern (COPCs) detected in groundwater do not present an unacceptable risk of recontamination to the river. A copy of this additional detail is presented below for reference.



**Dioxin/Furans.** Dioxin/furan compounds HxCDF, TCDD, PeCDD, PeCDF, and TCDF were analyzed for three of the five groundwater sampling events and were not detected in the groundwater samples with the exception of three estimated detected concentrations below the method reporting limit. No PHSS CULs are available for the detected dioxin/furan congeners. Method detection limits for TCDD were above the JSCS SLV but were within the goals of the approved QAPP. The calculated TEQs for both upland and riverbank wells exceed the JSCS SLV for TEQ due to the summation method use of  $\frac{1}{2}$  the detection limits, such that the non-detect values drive the summed result. There were too few detected concentrations to run the EPA Groundwater Statistics Tool, ProUCL, or any concentration trend analyses. Dioxin/furans have low solubility and a strong tendency to sorb to organics in soil, limiting their ability to migrate through the silty lithology that comprises the water bearing zone within the riverbank at the Site. Based on comparison of water elevation trends with concentrations, there is no apparent correlation between water levels and the estimated detections of dioxin/furans in groundwater, supporting that the fill is not acting as a source of soluble dioxin/furans to the groundwater. Based on the limited presence, low concentrations, and limited mobility of the detected dioxin/furans, they will not present an unacceptable risk of recontamination to the Willamette River.

**Pesticides.** Chlordane and dieldrin were detected in one well (MW-1) in a few of the early sampling events but were below JSCS SLVs by the final event. DDD, DDE, and DDT were detected sporadically in the riverbank well samples. The 95% UCL for DDD, DDE, and DDT concentrations in riverbank groundwater were 0.149 ng/L, 0.0386 ng/L, and 0.0683 ng/L, equating to PHSS CUL EQs of approximately 5, 2, and 4, respectively; these UCLs are likely skewed high due to the limited number of detections. Concentration trend plots are variable and do not indicate a consistent trend nor are they suggestive of the presence of an ongoing source of these constituents to groundwater. The pesticides detected in groundwater at the Site have low solubility and a high affinity for partitioning to soil, indicating limited mobility in the silty water bearing zone of the riverbank. Based on the limited presence, low concentrations, and limited mobility of the detected pesticide compounds in Site groundwater, they will not present an unacceptable risk of recontamination to the Willamette River.

**PAHs.** PAHs were identified as COPCs because the detection limits, while low and consistent with the QAPP, were often above the PHSS CULs for several of the PAH compounds. However, the detection limits were consistently below the JSCS SLVs. Due to the limited detections, trend plots and UCLs could not be prepared or calculated. The fate and transport evaluation identified that degradation combined with the affinity of PAHs to adsorb to soil will limit the mobility of PAHs. Given the limited presence and the limited mobility of PAHs in groundwater at the Site, PAHs will not present an unacceptable risk of recontamination to the Willamette River.

- **Metals.** Arsenic, cadmium, copper, and zinc were identified as COPCs in riverbank groundwater.
  - The calculated 95% UCL of 6.5  $\mu\text{g/L}$  for arsenic in riverbank groundwater supports that the arsenic concentrations are within background levels and arsenic is not a COC.



- Cadmium concentrations decreased in all the riverbank wells from the first event to the last, and the EQs were 4.3 or less by the final event; the 95% UCL for the riverbank groundwater was 0.302 µg/L equating to an EQ of 3.2.
- Copper exceeded the PHSS CUL in one well (MW-2) in all five sampling events, but the EQ for the total concentration decreased from 13.6 to 5.3 (8 to 3.2 for dissolved) from the first to last event demonstrating improved groundwater quality once the wells equilibrated with the surrounding formation. The EQ for the 95% UCL for the riverbank groundwater was 2.4 and 1.5 for total and dissolved copper, respectively. If the first sampling event is removed from the UCL calculation because the wells had better equilibrated with the surrounding formation following this event, the EQs drop to 1.7 and 1.2, respectively.
- Zinc only exceeded the PHSS CUL in one well (MW-2) with an EQ below 2 in all events. The 95% UCL for total zinc in riverbank groundwater was 18.29 µg/L, which is below the PHSS CUL of 36.5 µg/L.

Due to the low concentrations and limited occurrence and magnitude of exceedances of cadmium, copper, and zinc in the riverbank groundwater, these metals are not anticipated to present an unacceptable recontamination risk to the Willamette River.

## RESPONSE TO EPA COMMENTS

The EPA comments were categorized by EPA as “To Be Considered,” and responses to these comments are provided below.

### To Be Considered

1. *EPA suggests a more holistic evaluation of the groundwater contamination near or within the riverbank and its fate and transport at a scale that pulls in existing groundwater information (both level and concentration) from the properties bordering the Site. Additionally, including the river stage would help to inform whether groundwater contamination found within the Site wells, particularly the slightly elevated arsenic and pesticide concentrations found near the riverbank to evaluate if there is the potential to recontaminate the in-water remedy. EPA believes there is a low groundwater recontamination risk.*

*The adjacent properties and the river appear to influence the groundwater gradients conditions observed within the Site based on Figures 6 to 12 in the GW SCE Addendum. Groundwater concentrations are generally higher at the wells closer to the riverbank along the property boundaries upstream and downstream. EPA recommends the findings from the July 2022 Revised Additional Riverbank Soil Data (GeoEngineers, 2022b) and any available groundwater and porewater investigation information within, or immediately adjacent to, the Crawford Street property (e.g. in-water work at Willamette Cove) be incorporated to strengthen the evaluation and support conclusions under a multiple lines of evidence approach and conceptual site model basis of the groundwater source control evaluation. EPA notes that fund-lead porewater data will not be publicly available until approximately Q2 2025.*



The river stage at the time of each of the monitoring events is included on Table 1 (Groundwater Elevation Measurements) of the Addendum and we have incorporated analytical data from the three closest wells on the Willamette Cove upland site (Willamette Cove monitoring wells MW-1, MW-2, and MW-3, located on the West Parcel of the Willamette Cove property) onto Table 3 (Dioxin and Furans), Table 4 (Organochlorine Pesticides), Table 5 (Metals), Table 6-1 (PCB Aroclors), and Table 7 (PAHs) of the Addendum. The locations of these wells have been added to Figure 2 (Site Plan) of the Addendum. We note that we have added “WC-“ to the Willamette Cove well identifiers on the tables and figure to distinguish them from Crawford Street wells with the same identifiers. The analytical data for the Willamette Cove wells was obtained from the *Willamette Cove Groundwater Source Control Evaluation Report* prepared by Apex Companies and submitted to the DEQ in December 2023 on behalf of the Port of Portland.

The river stage elevations were obtained from the stilling well installed at the Willamette Cove In-water Project Area which is located approximately 1,000 feet upstream from the Crawford Street South Site. This data was shared with us by the Willamette Cove In-water Group and was presented in the *Willamette Cove Supplemental Preliminary Design Investigation Evaluation Report, Willamette Cove Project Area* submitted to the EPA in July 2024.

There are no monitoring wells on the adjacent property to the west (downstream) of the Crawford Street South Site.

2. *EPA recommends adding a description of the contouring method and a reassessment of the contouring and gradient relationships that incorporates the river elevation at the time the synoptic water level data were obtained for each of the gradient conditions<sup>1</sup>. [footnote omitted] Because the groundwater source control evaluation relies heavily on the groundwater elevation contours and resulting gradients, a reassessment of the contouring and potential influences to the water levels measured in the wells is recommended.*

*EPA also recommends adding the surface water stage on Figure 6 through 12 for the given time period to allow for comparison between groundwater and Willamette River stage to evaluate the potential recontamination pathway towards the river).*

The groundwater elevation contours were developed manually using three-point triangulation and linear interpolation; this information has been added into Section 3.2 (Groundwater Elevations and Gradient) of the Addendum. The river surface water elevation at the time of the measurements for each monitoring event has been added to Figures 6 through 12. As noted above, the river stage elevation data was obtained from the stilling well installed at the upstream Willamette Cove In-water Project Area; the elevation presented on each map and shown on Table 1 is the river stage elevation averaged over the duration of the groundwater elevation monitoring event. Figure 7 (December 2021 Groundwater Elevations) and Figure 12 (December 2023) were modified slightly to illustrate the apparent presence of a groundwater elevation mound originating at the West Parcel of the Willamette Cove Upland site. Based on groundwater elevation data presented in the was obtained from the *Willamette Cove Groundwater Source Control Evaluation Report (Apex, 2024)*, a groundwater elevation mound is consistently present in the West Parcel of the Willamette Cove upland site, directly upstream of the Crawford Street South Site and appears to influence groundwater elevations on the upstream end of the Site.



## RESPONSE TO YAKAMA NATION COMMENTS

Yakama Nation comments on the Addendum were provided in an email from Laura Shira (Yakama Nation) to Kevin Dana (DEQ) dated May 21, 2024.

1. *Figures - The figures only contain potentiometric surface mapping, but not contaminant concentration mapping. Have any maps of contaminant distributions been produced for any of these groundwater sampling events that you could share? Also, are there any maps of soil contaminant concentrations available that you could share? If not, this would be helpful for visualizing contaminant distribution and exceedances and I recommend adding it to this report prior to finalizing.*

Figures of COPCs in groundwater were not produced for the SCE as the variability in the analytes detected during each monitoring event and the generally low concentrations supported that production of COPC figure maps would not materially assist in the evaluation of the data. Figures illustrating concentrations of COCs in riverbank soil were prepared and included in the Basis of Design Report (BODR; GeoEngineers, 2022)<sup>1</sup> and the Preliminary (30%) Design Report (GeoEngineers, 2023)<sup>2</sup>.

2. *Figure 2 - What were the structures used for in each of these time periods? A dedicated upfront site history summary section would be a very helpful addition (instead of the limited summary in 4.2 that's easy to miss).*

A detailed site history was included in the SCE Work Plan (Cascadia, 2021)<sup>3</sup> and summarized in the Groundwater SCE report (GeoEngineers, 2022)<sup>4</sup>. Text to this effect has been added to Section 2.0 of the Addendum. Because the Addendum is an addendum to the Groundwater SCE report, the site history was not re-copied. The building structures shapes have been removed from Figure 2 of the Addendum to avoid confusion.

3. *Figure 4&5- What is the suspected source of and COCs associated with the Black Sand fill deposit around MW-2?*

The origin of the black sand is not definitively known; however, it is reported to include sand blast grit from the former lumber mill previously located adjacent and to the west of the Site. The lumber mill extended onto the western portion of the Site, and the black sand was reportedly used as backfill to bring the riverbank back to grade when the former mill structures were demolished (Cascadia, 2021)<sup>5</sup>. PCBs, PAHs, and metals were identified in the black sand and a removal action

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<sup>1</sup> Basis of Design Report for Crawford Street South site dated November 17, 2022.

<sup>2</sup> Preliminary (30%) Design Report for Crawford Street South site dated November 29, 2023.

<sup>3</sup> Source Control Evaluation Work Plan for Crawford Street South site dated October 18, 2021.

<sup>4</sup> Groundwater Source Control Evaluation Report for Crawford Street South site dated December 16, 2022.

<sup>5</sup> Source Control Evaluation Work Plan dated October 18, 2021.



was conducted in 2001 that removed 381 tons of black sand from the areas shown on Figure 2 of the Addendum.

4. *Table 16 and 17 - Exceedance Quotients (EQs) in riverbank wells for copper and zinc, D/F, cPAH, arsenic exceed 10 and in some cases exceed 100 or 1,000 (especially arsenic).*

- a. *How do DEQ Hot Spot guidelines apply here for groundwater?*

It is our understanding that groundwater source control evaluations are guided by the Joint Source Control Strategy (JSCS) document, a joint EPA and DEQ document dated December 2005 and updated in 2009, and that Hot Spot guidelines are incorporated into the JSCS to the extent applicable. As identified above, arsenic concentrations, while above the PHSS CUL, are within regional background concentrations. Additionally, dioxin/furans and PAHs are predominantly non-detect in groundwater at the Site and the EQs for the dioxin/furans TEQ and cPAHs are driven by the summation methodology, which requires the use of  $\frac{1}{2}$  the detection limit in the calculation, which artificially drives up the calculated sum. Finally, copper and zinc have limited occurrence in Site wells; the 95% UCLs for copper in riverbank groundwater show an EQ of 2.4 or less and the 95% UCL for zinc is below the PHSS CUL.

- b. *Does soil in any of these areas also exceed an EQ of 10 when compared with Portland Harbor ROD riverbank soil/sediment CULs and/or DEQ upland soil screening levels/CULs?*

Riverbank soil data are tabulated and included in the BODR.

- c. *With these high EQs, I'm failing to see how these EQ results comport with Section 6.0 conclusions. "There is no evidence at the Site of an ongoing source...With the exception of the dioxin/furan TEQ, most of the EQs for the organic COPCs are less than 5...organic COPCs are anticipated to attenuate to concentrations below the CULs prior to discharge (to surface water)...no source control measures for groundwater are needed." If I am reading tables incorrectly, I would appreciate your help in clarifying data interpretations.*

Section 5 of the report provides a weight of evidence evaluation of the data that supports the conclusions of the report. As identified in the response to DEQ's comment above, to assist the reader, additional detail of the weight of evidence analysis is summarized in the conclusions section of the Addendum.

- d. *What conclusions can be drawn about metals attenuation?*

Section 5 discusses the weight of evidence that supports that metals concentrations in the monitoring wells do not present an unacceptable risk of recontamination to river.

- e. *Has discharge to the river been evaluated (ex. porewater or TZW sampling) to confirm assumptions of contaminant attenuation prior to discharge to surface water? If so, this should be included in the SCE report discussion, tables and figures.*



Porewater sampling was not conducted. It is our opinion that the weight of evidence is sufficient to support the conclusion that groundwater presents a low and acceptable risk of recontamination of the river.

If you have any questions regarding this response to comments or the project in general, please do not hesitate to contact me at 503.577.1535 or [aspencer@geoengineers.com](mailto:aspencer@geoengineers.com).

Sincerely,  
GeoEngineers, Inc.



Amanda Spencer, PE, RG  
Principal Hydrogeologist

AS:mls:jm

cc (electronically): Mat Cusma, SSI (pdf)  
Tom Leaptrott, Steel Hammer Properties, LLC (pdf)  
Paul Seidel, DEQ NWR (pdf)  
Erin McDonnell, DEQ NWR (pdf)  
Dave Lacey, DEQ NWR (pdf)  
Laura Hanna, EPA (pdf)

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