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October 4, 2024

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via electronic delivery (email)

Re: DEQ Comments on the Gasco OU Segment 3 – Alluvium WBZs Source Control Evaluation
Former Gasco Manufactured Gas Plant Operable Unit
Portland, Oregon
ECSI# 84 and # 183

Bob Wyatt:

The Oregon Department of Environmental Quality (DEQ) reviewed the *Gasco OU Segment 3 – Alluvium WBZs Source Control Evaluation*[1] (Segment 3 SCE) submitted by Anchor QEA on behalf of NW Natural. The Segment 3 SCE was prepared under the Voluntary Agreement for Remedial Investigation/Feasibility Study, as amended[2,3,4]. The Segment 3 SCE summarizes and screens groundwater data for the Upper and Lower Alluvium water-bearing zones (WBZs) along the southeastern portion of the Former Gasco Manufactured Gas Plant Operable Unit (Gasco OU) shoreline.

DEQ previously approved[5] proceeding to the design of an interim removal action measure (IRAM) that includes the ISS barrier wall along the shoreline. The conceptual ISS barrier wall alignment described in our IRAM decision letter extends onto the adjacent Siltronic property to a location that coincides with the lateral extent of dense non-aqueous phase liquid (DNAPL) in the Alluvium WBZs along the shoreline. Our IRAM decision letter indicated that the specific layout and location of the conceptual IRAM elements, which include the ISS barrier wall, may be adjusted, with DEQ's approval, based on several factors, including IRAM data gaps investigation results, IRAM design evaluations, additional source control evaluation results, and the Gasco OU Feasibility Study (FS). The Segment 3 SCE is intended to support NW Natural's request to extend a planned in-situ stabilization and solidification (ISS) barrier wall further southeast along the shoreline.

The Gasco OU shoreline was previously[6] separated into the following three shoreline segments to facilitate groundwater source control evaluations and decision making:

[1] Anchor QEA. 2024. Gasco OU Segment 3 – Alluvium WBZs Source Control Evaluation, Gasco OU, ECSI No. 84. Prepared for NW Natural. August 13.
[2] DEQ. 1994. Voluntary Agreement for Remedial Investigation/Feasibility Study. DEQ No. WMCVC-NWR-94-13. August 8.
[3] DEQ. 2006. First Addendum to Voluntary Agreement for Remedial Investigation/Feasibility Study. DEQ No. WMCVC-NWR-94-13. July 19.
[4] DEQ. 2016. Second Addendum to Voluntary Agreement for Remedial Investigation/Feasibility Study. DEQ No. WMCVC-NWR-94-13. October 11.
[5] DEQ. 2024. Letter to Bob Wyatt (NW Natural), Regarding: Gasco OU Interim Removal Action Decision, Former Gasco Manufactured Gas Plant Operable Unit, Portland, Oregon, ECSI #84 and #183. July 3.
[6] DEQ. 2008. Letter to Robert J Wyatt (NW Natural), Subject: Groundwater/DNAPL Focused Feasibility Study, Shoreline Segments 1 and 2, NW Natural Property and the Northern Portion of the Siltronic Corporation Property, Northwest Natural Gas Company, Portland, Oregon, ECSI No. 183. March 21.

- Segment 1 is the portion of the shoreline that extends from downstream of the Former Tar Ponds on the NW Natural Property to upstream of the historical effluent pond overflow area on the Siltronic Property.
- Segment 2 includes the portion of shoreline between the Former Tar Ponds and NW Natural's downstream property boundary with US Moorings.
- Segment 3 begins at the upstream end of Segment 1 and extends to the upriver Siltronic property boundary.

The Segment 3 SCE illustrates the locations of these shoreline segments. For clarification, the Segment 3 SCE evaluates Alluvium WBZ groundwater data across a portion of Segment 1 where DNAPL is absent in the Alluvium WBZs along the shoreline, and the portion of Segment 3 within the Gasco OU. Siltronic is completing the groundwater source control evaluation for the remainder of Segment 3.

DEQ has the following comments on the Segment 3 SCE. Please revise and resubmit the Segment 3 SCE according to these comments.

General Comments

1) The Segment 3 SCE data screening does not incorporate the most recent groundwater sampling results; therefore, does not represent current conditions. Siltronic conducts semiannual groundwater sampling at 3 of the 5 of the permanent monitoring wells discussed in the Segment 3 SCE under the *Order Requiring Remedial Investigation and Source Control Measures*[7] (Joint Order). It appears that NW Natural has not incorporated recent groundwater sampling results from work conducted under the Joint Order into the Gasco OU database. DEQ requires the following:

   a) Revise the Segment 3 SCE to incorporate all relevant available groundwater sampling results generated under the Joint Order.

   b) Develop a process for regularly updating the Gasco OU groundwater database that NW Natural regularly submits to DEQ with groundwater sampling results generated under the Joint Order. The next version of the Gasco OU groundwater database submitted to DEQ should incorporate data generated under the Joint Order. DEQ also requests a revised version of the Gasco OU groundwater database, which was submitted on August 8, 2024 to support our review of the forthcoming Gasco OU FS.

2) The groundwater data along the Segment 3 portion of the shoreline within the Gasco OU are limited and outdated. As discussed in Section 2 of the Segment 3 SCE, the only permanent monitoring wells used to support the Segment 3 SCE are in the downstream 100 feet of the Segment 3 evaluation area (and entirely within Segment 1). There are no permanent groundwater monitoring wells within Segment 3 on the Gasco OU, and data from temporary groundwater wells within the Segment 3 evaluation area were collected in 2001 and 2005. Section 4.2 briefly describes the enhanced in-situ bioremediation (EIB) program implemented by Siltronic. Information in the *Enhanced In Situ Bioremediation Performance Monitoring Program Progress Report*[8] (and data collected by Siltronic under the Joint Order) shows that the EIB program has significantly reduced trichloroethene (TCE) and vinyl chloride concentrations across portions of the shoreline since the temporary groundwater samples were collected. DEQ requires the following:

[7] DEQ. 2000. Order Requiring Remedial Investigation and Source Control Measures. DEQ No. ECVC-NWR-00-27. October 4.
[8] MFA. 2023. Enhanced In Situ Bioremediation Performance Monitoring Program Progress Report. Prepared for Siltronic Corporation. August 14.

a) DEQ does not consider TCE and vinyl chloride concentrations from temporary groundwater well points to represent current conditions. Please remove these data from the data screening, exceedance ratio maps, and isoconcentration maps presented in the Segment 3 SCE.

b) Provide additional evaluation of the adequacy of the temporary groundwater well point data for other contaminants of concern (COCs). The discussion should be supported by lines of evidence, including trend analyses for these COCs in nearby permanent monitoring wells using a complete dataset (i.e., have concentrations of these COCs increased, decreased, or remained stable since 2001/2005).

c) Additional permanent monitoring wells within the Segment 3 evaluation area are necessary. While DEQ does not necessary require NW Natural to install and sample new monitoring wells in this area before resubmitting the revised Segment 3 SCE, the monitoring wells should be installed and sampled to sufficiently characterize current conditions within the Fill WBZ, Upper Alluvium WBZ, and Lower Alluvium WBZ before IRAM implementation. DEQ requests that the forthcoming Basis of Design Report include monitoring well installation and sampling within the Segment 3 evaluation area as part of the IRAM pre-design investigation scope.

3) The Segment 3 SCE primarily includes a screening of maximum groundwater concentrations in wells located near the shoreline against *Record of Decision: Portland Harbor Superfund Site, Portland, Oregon*[9] (ROD) groundwater cleanup levels[10] (CULs). While DEQ agrees that this method provides a conservative approach for identifying groundwater COCs in the uplands with the potential to discharge to the Willamette River at concentrations above their respective CULs, the Segment 3 SCE should evaluate additional lines of evidence including, but not limited to:

   a) Available porewater or in-river groundwater data. The *Offshore Investigation Report*[11] and the *Revised Final Pre-Design Investigation Evaluation Report*[12] present porewater/in-river groundwater sample results collected where Segment 3 Alluvium WBZ groundwater may currently discharge to the river.

   b) The scope of the Gasco Sediments Site remedial action and COC mobility and fate and transport characteristics. It is DEQ's understanding that after NW Natural treats sediments within the Gasco Sediments Site sediment management area with ISS, the point of Alluvium WBZ groundwater discharge will be to the navigation channel. NW Natural should consider the potential for groundwater COCs to attenuate over the distance between the shoreline and navigation channel.

4) In addition to screening maximum groundwater concentrations against ROD CULs, DEQ requires the Segment 3 SCE to include the following:

   a) In addition to screening maximum groundwater concentrations, conduct the screening for estimated exposure point concentrations calculated using the DEQ-approved methodology presented in the *Remedial Investigation/Human Health and Ecological Risk Assessment Addendum for the Siltronic GSA*[13] (RI/HERA Addendum).

[9] EPA. 2017. Record of Decision: Portland Harbor Superfund Site, Portland, Oregon. January.
[10] EPA. 2020. Errata #2 for Portland Harbor Superfund Site Record of Decision ROD Table 17. January 14.
[11] Anchor Environmental. 2008. Offshore Investigation Report, NW Natural "GASCO" Site. Prepared for NW Natural. February.
[12] WSP USA. 2024. Revised Final Pre-Design Investigation Evaluation Report, Portland Harbor Superfund Site, RM7Wb Project Area. April.
[13] Anchor QEA. 2019. Remedial Investigation/Human Health and Ecological Risk Assessment Addendum for the Siltronic GSA, Gasco OU, ECSI No. 84. Prepared for NW Natural. November 22.

b) Calculate groundwater exceedance ratios against ROD CULs based on Portland Harbor remedial action objective (RAO) 4 and RAO 8 separately, as was presented in the *Deep Lower Alluvium WBZ Source Control Evaluation*[14] (DLA SCE).

c) Present and discuss the frequency of detection, frequency of ROD CULs exceedance (RAO 4 and RAO 8 separately), the date of the most recent sampling event, the date of the most recent ROD CUL exceedance, number of sampling events since the last ROD CUL exceedance (RAO 4 and RAO 8 separately), as was presented in the DLA SCE.

d) Discuss data recency and identify any significant gaps since the last groundwater sample was collected and/or in between the most recent 4 sampling events.

e) Evaluate groundwater COC trends/stability using Mann-Kendall analysis based on current data.

Specific Comments

1) **Section 1, Introduction**. DEQ has the following comments:

a) The first sentence states that the Segment 3 SCE provides the rational to support 'a final source control determination' for the Upper and Lower Alluvium WBZs within the Segment 3 evaluation area. DEQ clarifies that Segment 3 SCE is intended to provide the rationale and justification for extending the ISS barrier wall being designed as an IRAM. As we stated in our comments[15] on the draft *Source Control Addendum Report*[16] (draft SCA), DEQ does not plan on issuing a final source control decision until all necessary source control measures are in place, operational, and have been demonstrated to be effective. In addition, as we noted in our comments on the *Revised Source Control Addendum Report*[17] (provided in the IRAM Decision letter), the IRAM defers key elements to the final upland remedial action, including removal and/or treatment of upland hot spots to the extent feasible. Therefore, DEQ does not plan to issue a final source control decision until after we select an upland remedial action.

b) The second paragraph states that NW Natural and DEQ have agreed to an ISS barrier wall alignment that extends "a minimum of approximately 350 feet onto the Siltronic property." As we clarified in our comments on the *Source Control Interim Remedial Action Measure Concept and Agreement to Move into Design*[18] (IRAM Concept) letter, the ISS barrier wall will extend to a location that coincides with the southern extent of DNAPL along the shoreline in the Alluvium WBZ. We understand that NW Natural has estimated that distance to be approximately 350 feet onto the Siltronic property, and that NW Natural is currently revising DNAPL maps for the Gasco OU. The boundary corresponding with the extent of DNAPL within the Alluvium WBZ should be adjusted based on the revised DNAPL maps.

c) The fourth paragraph states that NW Natural and DEQ previously agreed to extend the ISS barrier wall alignment in the Fill WBZ to the upriver Gasco OU boundary. Our understanding is that the forthcoming Gasco OU Feasibility Study (FS) will evaluate Fill WBZ source control alternatives.

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[14] Anchor QEA. 2023. Deep Lower Alluvium WBZ Source Control Evaluation, Gasco OU, ECSI No. 84. Prepared for NW Natural. November 2.
[15] DEQ. 2022. Letter to Bob Wyatt (NW Natural), Regarding: DEQ Comments on the Source Control Addendum Report, Former Gasco Manufactured Gas Plant Operable Unit, Portland, Oregon, ECSI #84, ECSI #183. December 23.
[16] Anchor QEA. 2022. Source Control Addendum Report, NW Natural Gasco Site, ECSI No. 84. Prepared for NW Natural. November 10.
[17] Anchor QEA. 2023. Revised Source Control Addendum Report, NW Natural Gasco Site, ECSI No. 84. Prepared for NW Natural. November 2.
[18] Ede Environmental. 2024. Letter to Wes Thomas (DEQ), Subject: Source Control Interim Remedial Action Measure Concept and Agreement to Move into Design, NW Natural Gasco Site, 7900 NW St. Helens Road, Portland, Oregon. May 9.

d) One of the key factors identified in the fourth paragraph is uncertainty in distribution of DNAPL (and other contamination) in the fill and Upper Alluvium WBZ beneath the Fab 1 building. The Segment 3 SCE indicates that DNAPL below the Fab 1 building will remain an ongoing source of contamination to deeper groundwater zones for the foreseeable future. For clarification, the presence of Siltronic's Fab 1 building, while it remains in place, may limit accessibility for a subset of remedial technologies to remove and/or treat hot spots. DEQ understands that Siltronic is developing plans to remove Fab 1 in the next few years, which would remove the current accessibility constraints. DEQ requires NW Natural to clarify the nature of the uncertainty regarding the ability for the upland remedial action to address contamination under the Fab 1 building within the foreseeable future.

2) **Section 2, Background**. DEQ has the following comments:

a) The second paragraph discusses the existing hydraulic control and containment (HC&C) system performance criteria. For clarification, the HC&C system is operated to maintain upward vertical hydraulic gradients along portions of the shoreline where DNAPL is present. In addition, DEQ's IRAM decision letter provides revised source control and removal action objectives for the IRAM.

b) The last paragraph indicates that the Segment 3 SCE relies on total metals concentrations in groundwater collected from permanent monitoring wells and dissolved metals concentrations in groundwater collected from temporary monitoring well points. Please clarify whether dissolved metals concentrations are available for the permanent monitoring wells. If so, please include dissolved metals concentrations as an additional line of evidence and comparability between the permanent and temporary well groundwater datasets.

3) **Section 4.1, Metals**. This section concludes that groundwater from location P-05 had the most metals exceedances and that metals exceedances at nearby temporary well points were significantly lower. Please clarify whether multiple groundwater samples were collected from varying depths at the P-05 location. If so, then indicate whether metals concentrations were consistently high at multiple depth intervals at the P-05 location.

4) **Section 5, Upland Sources**. The first paragraph states that the chlorinated VOC source area beneath the Fab 1 building will continue to behave as sources of elevated COCs for the foreseeable future. The historical TCE source area is not located beneath the Fab 1 building. Further, the EIB program has significantly reduced the chlorinated VOC plume on the Siltronic property. EIB performance data indicate that the EIB program will likely continue to treat the chlorinated plume over time. DEQ does not necessarily agree that the chlorinated VOC source will continue to behave as a source of elevated COC's that pose a source control concern for the foreseeable future.

5) **Section 6, Hydraulic Containment of Groundwater in the Alluvium WBZs**. This section discusses the challenges associated with maintaining the necessary hydraulic gradients at the ends of the existing HC&C system extraction system array, and the benefit that extending the ISS barrier wall would provide to operating hydraulic controls behind the ISS barrier wall over the long term. Conceptually, DEQ understands that extending the ISS barrier wall to include a "buffer" area beyond the DNAPL extents within the Alluvium WBZs could improve the ability to achieve SC/RAOs. DEQ requests that NW Natural further support this concept with an evaluation of empirical horizontal gradient data at WS-08-59 collected as part of HC&C operational monitoring and groundwater modeling.

6) **Section 7, Conclusions**. The first paragraph concludes with three summary bullets related to ongoing sources of elevated groundwater concentrations discharging to sediments within the Gasco Sediments Site Final Project Area. DEQ has the following comments:

   a) The first bullet states that the highest concentration of benzene exceeding the ROD CUL occurs within the Segment 3 evaluation area. This statement is not consistent with our understanding of the nature of benzene contamination in the Alluvium WBZs within the Gasco OU. Please clarify this statement and re-assess the risk of benzene discharge to sediments after reviewing empirical porewater/in-river groundwater samples adjacent to the Segment 3 evaluation area (Refer to General Comment #3a).

   b) The last two bullets discuss the significance of chlorinated VOC exceedances along the shoreline and state an ongoing source control concern associated with chlorinated VOCs into the foreseeable future. However, these statements are not based on current data (Refer to General Comments #1 and 2) and ignore the ongoing performance of the EIB program. Please clarify these conclusions and re-assess the risk of ongoing chlorinated VOCs discharge to sediments.

   c) The last bullet identifies DNAPL as an ongoing source of groundwater contamination for the foreseeable future. Please clarify these conclusions consistent with Specific Comment #1d.

7) **Table 4-1, Segment 3 Alluvium WBZ Source Control Evaluation Results**. Please revise this table after incorporating current data (refer to General Comment #1) and review the table for QA/QC issues. DEQ notes that several cells labeled as "ND" are highlighted.

8) **Figures 5-1 and 5-2, Segment 3 Exceedance Rations and DNAPL Distribution (Fill and Alluvium, respectively).** Please clarify the relationship between DNAPL distribution and exceedance ratios for non-MGP COCs (i.e., TCE and Vinyl Chloride).

9) **Appendix B, Isoconcentration Maps**. DEQ has the following comments:

   a) DEQ recommends including isoconcentration maps for additional COCs (e.g., cyanide).

   b) DEQ finds the contouring bands to be unhelpful for understanding the nature and extent of groundwater COCs. DEQ requests separate contouring bands based on the ROD CULs for RAO 4 and RAO 8. For COCs with method detection limits below ROD CULs, isoconcentration maps should include a contouring band based on the method detection limit. It is important to understand where groundwater exceeds ROD CULs based on detected results, and to avoid overestimating the extent of groundwater contamination based on non-detect data.

   c) There are no data in the southern portion of the Segment 3 Evaluation Area for the Lower Alluvium WBZ and the contours shown are highly extrapolated. We recommend removing contours for this portion of the Lower Alluvium WBZ.

Please contact me at (971) 263-8822 or Wesley.Thomas@deq.oregon.gov if you have questions regarding this letter.

Sincerely,

Wesley A. Thomas

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