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September 30, 2025

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via electronic delivery (email)

Re: DEQ Comments on the Gasco OU – IRAM ISS Prism Design Basis
Former Gasco Manufactured Gas Plant Operable Unit
Portland, Oregon
ECSI# 84 and # 183

Bob Wyatt:

The Oregon Department of Environmental Quality (DEQ) reviewed the *Interim Removal Action Measure Basis of Design Report*[1] (IRAM BODR) submitted by Anchor QEA on behalf of NW Natural. The IRAM BODR and Work Plans were prepared under the Voluntary Agreement for Remedial Investigation/Feasibility Study, as amended[2,3,4].

The IRAM BODR proposes design objectives, performance standards and design elements, and provides the basis of design for an interim removal action measure (IRAM) to be implemented at the former Gasco Manufactured Gas Plant (MGP) Operable Unit (OU). DEQ's IRAM decision letter[5] identifies the required IRAM elements, which include in-situ stabilization and solidification (ISS) of upland dense non-aqueous phase liquid (DNAPL) in a zone adjacent to the shoreline beneath the current hydraulic control and containment (HC&C) system alignment (herein referred to as the "nearshore upland ISS area of interest").

DEQ does not approve the IRAM BODR. Please revise and resubmit the IRAM BODR to address our comments provided herein. DEQ previously provided comments[6] on the *Segment 3 Well Installation Work Plan*[7] (Segment 3 Work Plan), *IRAM ISS Bench Scale Treatability Study Work Plan*[8] (IRAM TSWP), and *IRAM Data Gaps Investigation Work Plan*[9] (IRAM DGWP), which were submitted as Appendix C, D, and E to the IRAM BODR, respectively. NW Natural may revise and resubmit these work plans as appendices to the revised IRAM BODR or as standalone deliverables.

[1] Anchor QEA, Ede Environmental, LLC, and Sevenson Environmental Services, Inc. 2025. Interim Removal Action Measure Basis of Design Report. Prepared for NW Natural. May 9.
[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. 2025. Letter to Bob Wyatt (NW Natural), Regarding: DEQ Comments on the Segment 3 Well Installation Work Plan, IRAM ISS Bench Scale Treatability Study Work Plan, and IRAM Data Gaps Investigation Work Plan, Former Gasco Manufactured Gas Plant Operable Unit, Portland, Oregon, ECSI #84 and #183. August 26.
[7] Anchor QEA. 2025. Segment 3 Well Installation Work Plan. Prepared for NW Natural. May 9.
[8] Anchor QEA. 2025. IRAM ISS Bench Scale Treatability Study Work Plan. Prepared for NW Natural. May 9.
[9] Anchor QEA. 2025. IRAM Data Gaps Investigation Work Plan. Prepared for NW Natural. May 9.

General Comments

1) The IRAM BODR contains several statements that misconstrue the IRAM scope and objectives or incorrectly describe the relationship between the IRAM and the Gasco Sediments Site sediment remedy. DEQ has previously commented on many of these statements. Revise the IRAM BODR to address the following:

   a) Revise the description of the IRAM to match DEQ's *Gasco OU Interim Removal Action Decision*[10] (IRAM Decision letter) throughout the IRAM BODR. DEQ does not approve descriptions of the IRAM scope that do not match our IRAM Decision letter. Delete information that is not included in DEQ's IRAM Decision letter.

   b) The IRAM BODR states or implies that the *Source Control Interim Remedial Action Measure Concept and Agreement to Move into Design*[11] (IRAM Concept) letter documents the 'agreed-upon' revised source control elements, and/or that DEQ provided approval of the IRAM Concept letter. For clarification, the IRAM Concept letter does not represent an 'agreed-upon' approach. DEQ had several comments on the IRAM Concept letter, and DEQ never approved the IRAM Concept letter. DEQ's IRAM Decision documents the scope and objectives of the IRAM and supersedes all the information in the IRAM Concept letter. Revise the IRAM BODR to clarify that the IRAM design will include the elements described in DEQ's IRAM Decision letter and delete all statements that imply DEQ approved the IRAM Concept letter or that DEQ agreed to the IRAM scope as described in the IRAM Concept letter.

   c) The IRAM BODR states that the existing HC&C system "prevents" contaminants from discharging to the river. DEQ has commented on several occasions that such language is not approved. Revise all such statements to reflect the description provided in the first sentence of Section 2.6.1.1.

   d) The IRAM BODR states in several ways that the IRAM will "prevent" groundwater transport of contaminants to the Willamette River and the adjacent EPA Final Project Area. DEQ does not approve the word "prevent" in this context, nor do we agree that the IRAM will remove the groundwater to surface water pathway. Revise all these statements to clarify that one objective of the IRAM is to "control" groundwater transport of contaminants to the Willamette River and the adjacent EPA Final Project Area. The effectiveness of the IRAM source control elements depends on 1) hot spot removal/treatment to the extent feasible throughout the Gasco OU uplands, and 2) the effectiveness and long-term reliability of engineering controls (e.g., the hydraulic control and containment [HC&C] system).

   e) The IRAM BODR states that the Gasco OU FS fully evaluates remedial alternatives that remove/treat hot spots to the extent feasible. Remove these statements from the IRAM BODR and refer to our comments on the draft Gasco OU FS.

   f) The IRAM BODR states or implies that the barrier wall is a component of the sediment remedy and the forthcoming U.S. Environmental Protection Agency (EPA)-managed Gasco Sediments Site Interim Design Report. The IRAM BODR also states the objective of expediting the barrier wall design to ensure that it can be integrated into the Gasco Sediments Site Interim Design

[10] 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.
[11] Ede Environmental, LLC. 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.

Report. For clarification, the barrier wall is an element of an upland action overseen by DEQ. While we understand that implementing the barrier wall as an IRAM may enable NW Natural to more efficiently construct the barrier wall concurrently with the Final Project Area sediment remedy, the purpose of the IRAM is not to incorporate the barrier wall design into the interim sediment remedy design. Delete all statements that imply the barrier wall is an element of the Final Project Area design overseen by EPA or the objective of incorporating the barrier wall design into the Gasco Sediments Site sediment remedy design.

g) The IRAM BODR describes the barrier wall as extending a "minimum" of 350 feet onto the Siltronic property. DEQ has not approved a set distance for the ISS barrier wall to extend onto the Siltronic property. Consistent with our IRAM Decision letter, the ISS barrier wall extends south onto the adjacent Siltronic property to a location that coincides with the lateral extent of DNAPL in the Alluvium water-bearing zone (WBZ). As we have commented before, NW Natural will refine the estimated DNAPL extent along the Siltronic shoreline using data collected during the IRAM pre-design investigation, and the barrier wall length on the Siltronic property may change accordingly. Revise all applicable sections accordingly.

h) The IRAM BODR states the assumption that the upriver extent of the barrier wall will coincide with the upriver extent of the EPA Final Project Area boundary. DEQ does not approve this assumption. Revise all applicable sections accordingly.

2) Consistent with our comments on the *Revised Source Control Addendum Report*[12] (provided as an attachment to the IRAM Decision letter), the implementability of the barrier wall remains uncertain. NW Natural's responses to these comments commits to resolving implementability uncertainty by incorporating an initial field trial phase to the IRAM construction. However, the IRAM BODR does not discuss or acknowledge the need for, or scope of, an initial field trial phase. Revise the IRAM BODR to discuss the field trial phase, and expand on the scope, objectives, and plans for the field trial phase in subsequent design deliverables.

3) The IRAM BODR proposes ISS performance standards for strength and hydraulic conductivity. DEQ believes that it is premature to establish performance standards for strength. Rather, DEQ recommends identifying preliminary performance goals that consider our comments on the IRAM TSWP. Final strength performance targets should be informed by the treatability testing results and additional geotechnical evaluations. Please revise the IRAM BODR accordingly.

4) Specific evaluations necessary for the IRAM BODR described by our comments herein will require use of an approved Gasco OU groundwater model. DEQ previously commented[13] on the Gasco OU groundwater model revisions presented in the *Feasibility Study Report*[14] (draft Gasco OU FS). Please revise the Gasco OU groundwater model according to our comments on the draft Gasco OU FS and resubmit the model to DEQ as soon as possible.

5) DEQ agrees that a Materials Management Plan developed as part of the IRAM design is necessary, and we appreciate the example flow chart included as Figure 5-1. In concept, DEQ supports NW Natural's desire to manage waste streams generated as part of the IRAM, and other remedial actions, in a sustainable manner. However, the IRAM BODR does not provide enough information to

[12] Anchor QEA, LLC. 2023. Revised Source Control Addendum Report, Gasco OU, ECSI No. 84. Prepared for NW Natural. November 2.
[13] DEQ. 2025. Letter to Bob Wyatt (NW Natural), Re: DEQ Comments on the Gasco OU – Feasibility Study Report, Former Gasco Manufactured Gas Plant Operable Unit, Portland, Oregon, ECSI #84 and #183. June 5.
[14] Anchor QEA, Ede Environmental, Sevenson Environmental Services. 2024. Feasibility Study Report, Gasco OU, ECSI No. 84. Prepared for NW Natural. December 16.

determine the most appropriate manner for managing waste streams or adequately contemplate the requirements for long-term management of these waste streams. Please revise the IRAM BODR to better describe potential and feasible material management options, and the regulatory criteria and approval process for each option. The DEQ cleanup program can work with NW Natural and the DEQ materials management program to identify applicable waste management requirements. DEQ has the following general comments:

a) DEQ questions whether the waste streams discussed in the IRAM BODR can be managed under a Beneficial Use Determination. The IRAM BODR does not identify a beneficial use for material managed on-site. In addition, the waste streams proposed for a beneficial use determination would likely be identified as Tier 3 material, requiring further testing and evaluation. DEQ recommends setting up a meeting between NW Natural and DEQ's cleanup and materials management programs to discuss whether a Beneficial Use Determination may apply to any of the waste streams discussed in the IRAM BODR. Ultimately, NW Natural must submit a Beneficial Use Determination application to the DEQ materials management program to pursue this option.

b) Where material management constitutes solid waste disposal, DEQ cleanup can waive administrative permitting requirements (e.g., permit fees, land use compatibility statements). The design must incorporate applicable and relevant permit requirements (e.g., for solid waste: site characterization, liners and final cover, ongoing monitoring). Instead of providing specific comments on the example materials management approach provided in the IRAM BODR, we recommend setting up a meeting between NW Natural and DEQ's cleanup and materials management programs to discuss specific elements of the materials management approach.

c) DEQ cleanup is not able to waive DEQ-required permits necessary for on-site management of waste streams generated under the EPA-led cleanup action at the Gasco Sediments Site. Long-term on-site management of solid waste generated as part of the EPA-led cleanup action would require NW Natural to obtain a DEQ solid waste landfill permit designating an on-site area as a landfill. If NW Natural remains interested in pursuing on-site management of waste streams generated as part of the EPA-led cleanup action, DEQ recommends setting up a meeting between NW Natural, EPA, and DEQ to discuss potential approaches. Depending on the outcome of that meeting, further discussions between NW Natural and DEQ's cleanup and materials management programs to discuss specific requirements for the desired approach may be warranted.

Specific Comments

1) **Section 1.1, IRAM BODR Purpose and Objectives**. To better align with DEQ's boilerplate requirements for Remedial Design/Remedial Action Work Plans, please expand the bullet list provided in this section to include identifying offsite disposal facilities and requirements, and identifying access agreements needed to complete the work.

2) **Section 1.2, Integrated Sediment and Upland Remedy Approach**. DEQ has the following comments:

   a) The fourth paragraph references the *Administrative Settlement Agreement and Order on Consent for Removal Action*[15], U.S. Environmental Protection Agency Region 10 (EPA), CERCLA Docket No. 10-2009-0255 (ASAOC) Statement of Work (SOW) to support NW Natural's request

[15] EPA. 2009. Administrative Settlement Agreement and Order on Consent for Removal Action, U.S. Environmental Protection Agency Region 10, CERCLA Docket No. 10-2009-0255. September 9

that DEQ approve a barrier wall alignment that is contiguous with the Gasco Sediments Site boundary. DEQ requires the IRAM BODR to remove statements that the ASAOC SOW requires extension of the barrier wall beyond its currently approved alignment, and we note the following:

i) The ASAOC SOW references the barrier wall included in the DEQ approved[16] *Groundwater/ DNAPL Source Control Focused Feasibility Study*[17] (GWFFS). The barrier wall alignment in the GWFFS did not extend onto Siltronic's property.

ii) For clarification, NW Natural previously took the position that the vertical barrier wall described in the GWFFS was unnecessary to achieve source control objectives during a 2010 dispute (the dispute was after the ASAOC was executed). As a result of the dispute, DEQ agreed that NW Natural could postpone constructing a vertical barrier as part of a source control measure, and further evaluate the vertical barrier in the Gasco OU Feasibility Study. EPA agreed with the outcome of the dispute. It is misleading and unproductive for NW Natural to take the opposite position now and suggest that the ASAOC SOW requires a barrier wall along the entire Gasco Sediments Site boundary.

iii) EPA and NW Natural[18] previously agreed that the HC&C system, without a barrier wall, met the source control requirements listed in the ASAOC SOW.

iv) DEQ recently received the *Revised Gasco OU Segment 3 – Alluvium WBZs Source Control Evaluation*[19] (Revised Segment 3 SCE). DEQ will review the Revised Segment 3 SCE and other decisions related to groundwater source control measures throughout Portland Harbor to inform our decision about extending the barrier wall. Until we have completed our review, NW Natural should not assume that we will approve the extension.

b) To the extent that NW Natural illustrates or discusses IRAM elements in Gasco Sediments Site deliverables, NW Natural should only present DEQ-approved information, consistent with EPA comments[20] on the *Final Revised Sediment Remedy Basis of Design Report*[21] (Final BODR).

3) **Section 2.3.1, Groundwater Occurrence**. The last sentence notes that the depth to groundwater in the Fill WBZ varies significantly with the seasons. Since historical Fill WBZ groundwater elevations will play an important role in establishing the HC&C system performance standards, DEQ requests a more detailed assessment of baseline Fill WBZ groundwater elevations, including a summary of available groundwater monitoring data, assessment of Fill WBZ seasonal fluctuations, the extent to which Willamette River surface water elevations influence groundwater elevations (during certain seasons), the frequency that the Fill WBZ dewaters or where groundwater elevations approach the top of the upper silt layer, etc.

4) **Section 2.3.4, Basalt Water-Bearing Zone**. Delete the second sentence in the first paragraph.

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[16] DEQ. 2008. Letter to Robert J. Wyatt (NW Natural). Regarding: Groundwater/DNAPL Focused Feasibility Study Shoreline Segments 1 and 2, NW Natural Property and Northern Portion of Siltronic Corporation Property, NW Natural Gas Company, Portland, Oregon, ECSI No. 183. March 21.
[17] Anchor Environmental, LLC. 2007. Groundwater/DNAPL Source Control Focused Feasibility Study, NW Natural 'Gasco' Site. Prepared for NW Natural. November.
[18] Anchor QEA, LLC. 2021. Final Gasco Sediments Site Sufficiency Assessment, Gasco Sediments Cleanup Acton, Prepared on behalf of NW Natural. March 1.
[19] Anchor QEA. 2025. Revised Gasco OU Segment 3 – Alluvium WBZs Source Control Evaluation. Prepared for NW Natural. July 28.
[20] EPA. 2024. EPA Comments and Responses on Revised Sediment Remedy Basis of Design Report (dated December 7, 2023) and Final Revised Sediment Remedy Basis of Design Report (dated May 2, 2024), Gasco Sediments Project Area. June 6.
[21] Anchor QEA, LLC. 2024. Final Revised Sediment Remedy Basis of Design Report. Gasco Sediments Project Area. May 2.

5) **Section 2.4, Subsurface Contamination Within IRAM Project Area**. Expand this section to discuss the distribution of all MGP residuals within the IRAM project area, and not just DNAPL.

6) **Section 2.6.1, Groundwater and DNAPL**. As DEQ has commented on several occasions, the Fill WBZ interceptor trench system is not a source control measure. Please delete statements that source control for the Fill WBZ is currently partially met by the existing Fill WBZ interceptor trench system.

7) **Section 2.6.1.2, Fill WBZ Interceptor Trench System**. Since the Fill WBZ interceptor trench system is not a source control measure, it should be discussed in a section dedicated to non-source control removal actions. Other non-source control removal actions within the Gasco OU should also be discussed (e.g., the Siltronic enhanced in-situ bioremediation removal action).

8) **Section 3, Conceptual Design of IRAM Elements**. This section organizes IRAM elements into source control elements and removal action elements. DEQ finds this organization confusing and unnecessary. All the IRAM elements work together to accomplish the source control and removal action objectives (SC/RAOs).

9) **Section 3.1.1, IRAM ISS Barrier Wall**. The second sentence states that the barrier wall will be created by treating soils to have a low permeability, resulting in a highly effective barrier to DNAPL and groundwater migration. Either delete the last part of the sentence or clarify that the barrier's effectiveness depends on additional hot spot treatment (to the extent feasible) throughout the Gasco OU and the effectiveness and long-term reliability of other engineering controls.

10) **Section 3.1.2.3, HC&C System Expansion – Fill WBZ**. This section includes the assumption that a site-wide impermeable cap will be an element of the final remedial action. DEQ does not approve this assumption.

11) **Section 3.2, Source Control Evaluation for Deep Lower Alluvium WBZ.** The second sentence states that "The COCs that are present in the Deep Lower Alluvium WBZ are relatively immobile and do not pose a risk to the Willamette River." The IRAM design objectives should include protection of the Deep Lower Alluvium WBZ from further contamination.

12) **Section 3.3, Source Control Evaluation for Ustream Segment 3 Shoreline Area**. As we indicated in our comments on the draft Gasco OU FS and in *DEQ's Reply to NW Natural's Topics for Discussion to Resolve DEQ Comments on the Gasco OU – Feasibility Study Report*[22], Siltronic has notified[23] both DEQ and NW Natural of their plans to demolish the Fab 1 building, and we consider it reasonably likely that the Fab 1 building will be demolished. Therefore, we do not agree that the Fab 1 building represents an inaccessible area for the foreseeable future. The revised IRAM BODR should reflect this understanding.

13) **Section 3.4, Removal Action Measures to Treat Nearshore Upland DNAPL**. DEQ has the following comments:

    a) Delete the word "select" from the second sentence of this section.

    b) Delete the last sentence of the first paragraph. All DNAPL observations are hot spots.

[22] DEQ. 2025. Letter to Bob Wyatt (NW Natural), Re: DEQ's Reply to NW Natural's Topics for Discussion to Resolve DEQ Comments on the Gasco OU – Feasibility Study Report, Former Gasco Manufactured Gas Plant Operable Unit, Portland, Oregon, ECSI #84 and #183. July 30.
[23] Maul Foster Alongi. 2025. Letter to Wes Thomas (DEQ) and Bob Wyatt (NW Natural), Re: Siltronic Corporation Comments in Response to NWN's GOU Feasibility Study. March 14.

c) The second paragraph incorrectly describes the requirements of our IRAM Decision letter. The IRAM Decision letter did not request NW Natural to evaluate the inclusion of residual DNAPL observations within the ISS prisms. DEQ's IRAM Decision letter requires ISS treatment of all DNAPL (residential and potentially mobile). DEQ will allow NW Natural to present a lines-of-evidence evaluation to justify excluding specific DNAPL observations, subject to DEQ approval. Revise this section accordingly.

14) **Section 4.2, Permitting Requirements**. The list of potential permits that may apply to the IRAM appears incomplete. Additional permitting requirements include the National Pollutant Discharge Elimination System permit for the groundwater treatment plant and permits or authorizations that apply to on-site disposal of remediation wastes.

15) **Section 5, Future Remedial Design Technical Evaluations**. Please consider streamlining the discussion of design evaluations that are common to the barrier wall and bulk ISS treatment to reduce unnecessary repetition. These common elements potentially include grout design, construction methods and equipment, utilities and infrastructure, waste materials management, geotechnical design, and vibration considerations. Note that many of our comments on the barrier wall design basis also apply to the bulk ISS treatment design basis, and vice versa.

16) **Section 5.1.1, Design Objectives**. DEQ has the following comments:

a) The third stated objective is to minimize off-site disposal and maximize beneficial reuse of materials. DEQ recognizes NW Natural's desire to minimize off-site transport and disposal of remediation wastes. This objective must not interfere with achievement of SC/RAOs or limit the scope of future upland cleanup work.

b) The fifth statement objective is integration with the final upland remedy. The last sentence describing this objective expresses the intent to integrate the IRAM into remedial alternatives contemplated for the Gasco OU, including any contamination in the nearshore upland ISS area of interest not addressed by the IRAM. To accomplish this objective, the IRAM BODR and subsequent deliverables should clearly identify all contamination within the nearshore upland ISS area of interest that is not addressed by the IRAM.

17) **Section 5.1.3.1, IRAM ISS Barrier Wall Lateral and Vertical Boundaries**. This section states that the barrier wall is physically integrated <u>into</u> the adjacent ISS-treated riverbank. DEQ does not approve this statement. Revise this statement to state that the barrier wall will be constructed contiguous with the adjacent ISS-treated riverbank.

18) **Section 5.1.3.1.1, Method of Analysis.** The second bullet should also include evaluation of barrier wall depths in locations where the Lower Silt Unit is absent. As noted in Section 3.1.1.1, "In the few locations where the Lower Silt Unit is absent, the wall will extend to elevations necessary to achieve the IRAM source control and removal action objectives."

19) **Section 5.1.3.2, Work Platform Location and Elevation**. The IRAM BODR does not discuss plans to restore elevations or grades within the proposed work platform footprint. Revise the IRAM BODR to include restoration of the work platform as a design element.

20) **Section 5.1.3.3, Potential for Future Breaching of Lateral and Vertical Boundaries**. Delete the proposed conditions for future breaching of the barrier wall. Consistent with our comments on the draft Gasco OU FS, conditions for breaching the barrier wall will be based on restoration of the beneficial use of groundwater and will consider the measured effectiveness of natural attenuation

following hot spot treatment during the upland remedial action. DEQ may require or approve breaching the barrier wall in areas with *Portland Harbor Superfund Site Record of Decision*[24,25,26] (ROD) Table 17 cleanup level exceedances in upland monitoring wells. For example, where groundwater quality is similar to the Deep Lower Alluvium WBZ.

21) **Section 5.1.3.3.1, Methods of Analysis**. DEQ has the following comments:

    a) The first sentence states that the barrier wall can be breached when DEQ determines that groundwater in the Upper and Lower Alluvium WBZs can be freely discharged to the river. For clarification, DEQ may allow or require breaching the barrier wall when groundwater can be freely discharged to the river or can be equally or more effectively and reliably treated and/or managed without the barrier wall. DEQ may also allow or require breaching the barrier wall in the Fill WBZ (i.e., not just the Upper and Lower Alluvium WBZs). Revise the IRAM BODR accordingly.

    b) The first section indicates that a standard slurry clamshell bucket can be used to breach the barrier wall. Please indicate whether there are depth limitations for this approach or how ISS strength that may affect the equipment necessary to breach the barrier wall.

22) **Section 5.1.3.4.2, Data Requirements and Data Gaps**. Revise the performance standards and footnote in this section based on our comments on the IRAM TSWP.

23) **Section 5.1.3.2.1, Method of Analysis.** This section discusses work platform construction near the Centerline tank farm, including the assumption that the tank farm will not be present at the time of construction. Please clarify the plan and timeframe for removing the tank farm.

24) **Section 5.1.3.5, Construction Methods and Equipment**. DEQ has the following comments:

    a) Delete "permanent effective" from the last sentence of the first paragraph. The permanence and effectiveness of the barrier wall will depend on many factors, including but not limited to the effects of long-term environmental attack, seismic activity, changes in site-use, removing and/or treating hot spots across the Gasco OU to the extent feasible, and the long-term reliability of other engineering controls.

    b) This section suggests that the cutter soil mixing technology can grind though subsurface debris with relative ease. However, based on the DEQ-team's experience, debris can pose a more significant challenge to ISS implementability, particularly if it is more widespread. The IRAM design should include several measures for removing subsurface debris that can be implemented if debris presents a more significant challenge to the cutter soil mixing tooling.

25) **Section 5.1.3.10, Potential Implementation Risks**. The design should identify a comprehensive list of potential implementation risks and include plans to mitigate those risks. The implementation risks should include the potential to mobilize DNAPL during ISS implementation.

26) **Section 5.1.3.11.1, Method of Analysis**. The first two bullets describe evaluations intended to identify potential restrictions to future upland remediation due to either the presence of the HC&C

[24] EPA. 2017. Record of Decision, Portland Harbor Superfund Site, Portland, Oregon. United States Environmental Protection Agency Region 10, Seattle Washington. January.
[25] EPA. 2020. Errata #2 for Portland Harbor Superfund Site Record of Decision ROD, Table 17. Memorandum from Sean Sheldrake to Portland Harbor Site File. January 14.
[26] EPA. 2022. Errata #3 for Portland Harbor Superfund Site Record of Decision ROD, Table 6 and Table 21. Memorandum from Hunter Young to Portland Harbor Site File. September 7.

system or other access limitations. These conditions are unacceptable to DEQ. The IRAM must not impose any restrictions to future upland remediation. Revise the IRAM BODR accordingly.

27) **Section 5.2.1, Design Objectives.** The second bullet lists a design objective to eliminate or minimize impacts to existing utilities and infrastructure. DEQ generally agrees with this design objective but notes that meeting performance standards may necessitate impacts to existing utilities and infrastructure, such as temporary disruption or permanent utility relocation.

28) **Section 5.2.3.1.1, Methods of Analysis**. DEQ has the following comments:

    a) NW Natural should continue revising/updating the 3-dimensional (3D) model to reflect new information obtained during IRAM pre-design investigations and revisions to IRAM layouts/configurations (e.g., barrier wall dimensions, ISS prisms) during each design deliverable milestone. Revise the IRAM BODR accordingly.

    b) The last paragraph states NW Natural's hope that ongoing refinements of the ISS prisms based on both new and existing DNAPL data will not affect the schedule for submitting the Sediment Remedy Interim Design Report. The ISS prism layout or configuration is not related to the sediment remedy design, nor is the barrier wall an element of the sediment remedy design. Further, it is not likely that NW Natural will have completed the DNAPL data gaps pre-design investigation before submitting the Gasco Sediments Site Interim Design Report. Therefore, DEQ does not understand why ISS prism refinement would, in any way, affect the Gasco Sediments Site Interim Design Report delivery to EPA. All such statements should be removed from the IRAM BODR.

29) **Section 5.2.3.1.2, Data Requirements and Data Gaps**. This section incorrectly describes the process for finalizing ISS prisms. For clarification, DNAPL within the nearshore upland ISS area of interest is not adequately delineated to support the IRAM design. DEQ requires a DNAPL pre-design investigation that fully delineates DNAPL within the nearshore upland ISS area of interest and we anticipate a work plan proposing an approach to fill these data gaps. As we indicated during the July 22, 2025 meeting to discuss NW Natural's proposed lines-of-evidence approach, DEQ does not believe that algorithmic decision logic that focuses entirely on observations in individual boring locations will provide the information necessary to justify excluding DNAPL observations from ISS treatment. Further, DEQ does not agree with NW Natural's assessment of risk reduction presented during our June 9, 2025 meeting. At this point, the DNAPL delineation investigation must be completed before DEQ can revisit any specific lines-of-evidence approach for excluding individual DNAPL observations from ISS treatment.

30) **Section 5.2.3.2.2, Data Requirements and Data Gaps**. The first sentence states that treatability testing will be conducted with sample locations along the barrier wall alignment. Clarify if this sentence intends to refer to the ISS prisms (instead of the barrier wall alignment).

31) **Section 5.3.1, Design Objectives**. DEQ agrees that avoiding changes in water table elevations that could affect existing infrastructure is an important consideration. We believe that the IRAM BODR would benefit from a detailed evaluation of baseline Fill WBZ groundwater elevations relative to the base of the fill to provide the necessary context for future design evaluations (e.g., to what extent does the Fill WBZ seasonally dewater, or nearly dewater, near existing infrastructure). Design evaluations should also consider Siltronic's plans to demolish the Fab 1 building.

32) **Section 5.3.2, Performance Standards**. DEQ has the following comments:

a) DEQ considers the bullets presented within this section to be design objectives, and they should be moved to Section 5.3.1. The IRAM BODR should be revised to include more specific and measurable performance standards for ensuring that these objectives are achieved and/or describe when and how these performance standards will be derived during the IRAM design.

b) The proposed performance standards for the HC&C system appear significantly different compared to those proposed in the Revised Source Control Addendum Report. Revise the IRAM BODR to explain the proposed changes to these performance standards.

c) Better define what is meant by "temporal average data" in the second bullet.

d) Clarify that vertical hydraulic gradients must be sufficient to prevent all downward or lateral DNAPL migration. Delete "to the extent practicable" from the third bullet, as achieving and maintaining vertical gradients is a requirement.

33) **Section 5.3.3.4.1, Method of Analysis**. DEQ has the following comments:

a) Groundwater mounding behind the barrier needs to be assessed by an approved Gasco OU groundwater model with particle tracking. The modeling needs to assess the potential for groundwater underflow through gaps in the bottom of the barrier wall if mounding occurs and determine the required extraction rates to mitigate underflow. At minimum, the IRAM BODR should include a revised water balance with the barrier wall in-place under average and seasonal maximum discharge conditions to establish the range of potential pumping rates necessary to prevent groundwater mounding.

b) DEQ expects more detailed modeling, incorporating particle tracking in both horizontal and vertical flow paths, to be presented in subsequent design reports. This is necessary to demonstrate complete and effective groundwater capture needed to achieve the SC/RAOs. DEQ also notes that the pumping rates and system configuration needed to achieve the SC/RAOs during the IRAM implementation may not be adequate for the final upland remedial action.

c) The revised HC&C system design does not appear to include the DNAPL evaluation requested in General Comment #4e on the Revised Source Control Addendum Report. This evaluation is critical for determining the hydraulic gradient requirements for achieving the SC/RAOs. In addition, the presence, configuration, depth, and gaps between ISS monoliths will alter the groundwater flow paths and need to be included in a 3D groundwater flow model to assess increases in localized velocity and changes in lateral and vertical flow direction that could affect DNAPL body stability and enhance DNAPL body migration.

34) **Section 5.3.3.5.1, Methods of Analysis**. Pumps should also be designed to overcome head loss and transfer NAPL through the conveyance system.

35) **Section 5.3.3.8.1, Method of Analysis**. The second paragraph describes evaluating consolidation during mild and severe groundwater level reductions. The IRAM BODR should review seasonal groundwater elevation fluctuations in the Fill WBZ under baseline conditions to determine the appropriate groundwater reduction ranges. For example, groundwater elevations in the Fill WBZ may seasonally lower to elevations equal to or only a few feet above the base of the fill, and simulating groundwater level reductions below the base of the fill is likely unnecessary.

36) **Section 5.3.3.10.1, Methods of Analysis**. This section references the potential for permanent building designs. Any permanent structure must be approved by DEQ and must not limit the accessibility of future remedial actions.

37) **Section 5.3.3.11, HC&C System Corridor Alignment and Integration with Final Upland Remedy**. DEQ acknowledges NW Natural's goal of establishing a permanent HC&C system corridor; however, given the distribution of upland hot spots, this goal is likely impracticable.

38) **Section 5.3.3.13, HC&C Treatment System Loading**. DEQ has the following comments:

    a) The last sentence of this section states that the IRAM design will confirm that the existing treatment system is capable of treating the anticipated contaminant load. Please clarify that if design evaluations indicate that contaminant loading will exceed the existing groundwater treatment system capacity, that the IRAM design will include the necessary system upgrades.

    b) Please describe the status of the current discharge permit.

39) **Section 5.3.3.14, Long-Term Monitoring and Maintenance**. Revise this section to clarify that the IRAM design will also include installation of monitoring wells and piezometers necessary to monitor HC&C system performance. The DNAPL removed from the system should also be consistently recorded.

40) **Section 6.3 IRAM ISS Barrier Wall and Nearshore upland ISS Area of Interest**. The CQAP should also describe other monitoring that should be performed during construction include groundwater monitoring for mounding, surface swell, and additive formula mixtures.

41) **Section 7.2, Preliminary Schedule**. Except for the first sentence of the second paragraph, none of the statements included in this section are approved, and they should be deleted.

42) **Appendix A, Response to Comments.** DEQ has the following comments.

    a) **General**. DEQ has reviewed NW Natural's responses to our comments on the IRAM Concept letter and Revised Source Control Addendum Report. NW Natural's responses do not resolve some of our comments. Rather than reply to each of NW Natural's comment responses, our comments provided in this comment letter repeat or rephrase unaddressed comments.

    b) **Table A-1, Comment 2h**. DEQ does not approve NW Natural's response.

    c) **Table A-2, General Comment 4e.** The IRAM BODR does not discuss the requested evaluation or include development of contingency actions that will be implemented if there is evidence of ongoing downward contaminant transport toward the Deep Lower Alluvium WBZ. Revise the IRAM BODR accordingly.

    d) **Table A-2, Specific Comment 1c**. While DEQ acknowledged the Framework Document, DEQ never approved it, and some of our margin comments on the draft version were unaddressed.

    e) **Table A-2, Specific Comment 4a**. It remains unclear why a barrier wall is necessary to accomplish treatment of riverbank soils with Portland Harbor ROD remedial action level and/or principal threat waste threshold exceedances. Direct treatment of riverbank soils will accomplish this objective. While we understand that constructing the barrier wall concurrent with implementing EPA's riverbank remedy would be most efficient, DEQ disagrees that implementing the barrier wall concurrently would necessarily result in greater remedy effectiveness. DEQ maintains our position that physical connection between a barrier wall and the

in-water remedy is not necessary to accomplish effective integration between upland source control and the in-water remedy, nor that the physical or structural connection between the upland and in-water remedies guarantee that they are effectively integrated. If our IRAM BODR General Comments are addressed, we do not require further response to this comment.

f) **Table A-2, Specific Comments 12a and 12b**. DEQ could not find where the IRAM BODR discusses these topics.

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

Sincerely,

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