EPA Comments on In Situ Stabilization and Solidification Field Pilot Study Work Plan, Gasco Sediments Project Area Dated June 9, 2023

Comments dated July 27, 2023

The following are the U.S. Environmental Protection Agency's (EPA's) comments on the In Situ Stabilization and Solidification Field Pilot Study Work Plan (FPSWP), prepared by Anchor QEA, LLC (Anchor), Sevenson Environmental Services, Inc and Hahn and Associates, Inc. on behalf of NW Natural and dated June 9, 2023. The FPSWP has been prepared under the Administrative Settlement Agreement and Order on Consent (ASAOC; Docket No. CERCLA 10-2009-0255) and Statement of Work – Gasco Sediments Site (EPA 2009).

General Comments on FPSWP:

1. **Barge load covering:** Revise the text to include a plan if birds are attracted to barge sediments and waters due to organic material therein for both CWA 404(b)(1) and Migratory Bird Treaty Act compliance. Also see specific comments on Sections 3.7.2 and 3.7.4 regarding barge and truck load covering.

2. **Green Remediation Practices:** Per ROD Section 14.2.12 revise the text to discuss how the ISS field pilot study (FPS) might demonstrate green remediation practices that could be used for full scale site cleanup.

3. **Fringe Cover:** Consistent with the 2005 tar body removal action, some fringe cover should be applied outside of the ISS FPS area to prevent direct exposure to residuals that may migrate outside of the work area. (See EPA letter to NW Natural dated July 20, 2005.)

4. **Pausing Before Moving to a New Area:** Consistent with the 2005 tar body removal action, work should pause before retracting the moon pool curtains and relocating the barge to a new work area to allow material to settle in the contained area. Information could also be gathered to determine the best length of time to pause work (if any) to be applied to full-scale ISS implementation. Revise the text accordingly.

5. **Fish Removal/Passage:** Revise the text to describe how fish will be encouraged to move away from the work area before the moon pool silt curtains are deployed or otherwise allowed to escape once the curtains are deployed (see Gasco Removal Action Biological Opinion dated August 19, 2005).

6. **Habitat and Residuals Management Layers:** The FPS should incorporate application of a habitat layer after ISS treatment and clarify whether a residuals management layer is required or not. The FPSWP text discusses monitoring in the "simulated habitat layer." Appendix E goes onto state that no habitat layer will be placed at ISS FPS completion due to "recontamination from adjacent sediments." While that potential is acknowledged, it is important to place a habitat layer to avoid assessment of compensatory mitigation for the intervening years (leaving a concrete treated surface unsuitable as benthic habitat for an extended period of time) before complete remedial action will take place. Even if only meant to serve as temporary habitat until remedial action, placement of a habitat layer at the completion of the FPS will also help inform the ability of this material to remain in place over the broader site for full-scale ISS

implementation. As noted in the Feasibility Study Appendix L 404(b)(1) analysis, "If monitoring or site-specific modeling demonstrate that a sand/gravel surface can be maintained long term, this may be considered by EPA when determining if the compensatory mitigation proposed during remedial design is adequate." Further, as noted in the ISS Remedial Technology Information for Portland Harbor Superfund Site Programmatic Biological Assessment dated February 22, 2023, "Placement of a habitat layer over the top of the ISS surface during construction would accelerate the recolonization process. Revise the FPSWP to include removal of swell to accommodate the elevation of a residuals management layer (if needed) and habitat layer at the conclusion of FPS work per ROD Section 14.2.3, 14.2.4, and 14.2.9.2 to avoid assessment of compensatory mitigation and to help evaluate the longevity of placed habitat layers in the project area. Also include design thicknesses and engineering basis for any residual management and/or habitat layers.

7. **Off-Site Rule Compliance:** It is recommended that off-site rule (OSR) checks be conducted as soon as possible to ensure all facilities that might be utilized be approved by EPA for usage per CERCLA Section 121(d)(3).

8. **Worker Health and Safety:** The document does not identify worker health and safety requirements found within the 2009 AOC (see specific comments on Sections 3.4.2.5 and 3.5 below for specific requested revisions).

9. **Approach for Post-Construction Field Pilot Study Sampling:** EPA's review of the post-construction sampling is focused on the limited discussion of the proposed sampling approach provide in Section 4 (see specific comments on Section 4). EPA expects to provide additional comments on the approach once the associated Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP) documents (intended to provide details regarding the sampling port design, porewater sampling procedures and timing, and laboratory analyses) are submitted for EPA review/approval.

10. **Performance of ISS next to Structures**: The FPSWP does not sufficiently address implementability uncertainty associated with applying ISS near, under, and within dock structures or other functional structures that will remain in-place and create equipment accessibility limitations. The FPS provides an opportunity to identify potential implementation or practicability limitations for ISS treatment of sediments near functional structures, and EPA recommends that the FPSWP be expanded to include this objective. Alternatively, supplemental information is needed in the FPSWP to demonstrate feasibility of ISS in the vicinity of structures.

11. **Schedule**: As described throughout the FPSWP, the schedule for completing the field pilot study this year depends on several factors, including advancing the laboratory bench scale treatability testing through Phase III, getting EPA approval on a grout mix design for the FPS, completing the depth of contamination (DOC) characterization sampling, and getting EPA approval on final treatment depths for the FPS. EPA recommends that the FPSWP be revised to include a schedule or timeline for completing or obtaining all of the necessary preceding activities and approvals. The schedule should provide more detail about the sequence, projected durations, and schedule critical path for FPS mobilization, baseline water quality monitoring and sampling, water quality control (i.e., best management practices [BMPs]) installation, bathymetry surveying, dolphin removal, debris removal, ISS treatment, swell management, material handling, transport and disposal, ISS cover/habitat layer placement, and demobilization. Additionally, EPA recommends that the schedule includes contingencies in case the in-water work is not completed by the closure of the in-water work window on October 31.

12. **Surveying FSP:** A detailed FSP for surveying techniques proposed in the FPSWP should be developed and provided for EPA review/approval.

Specific Comments on FPSWP:

1. **Section 1.1 Background and Summary of Project Area Remedy, page 1:** Remove or revise the second sentence which states that, "The preferred design includes an integrated deep ISS treatment barrier wall that will only be included if EPA approves the ISS technology in the design for the nearshore area." As noted by EPA during a meeting between EPA, Oregon Department of Environmental Quality (DEQ), and NW Natural on April 24, 2023, the ISS barrier wall is not considered an element of the in-water remedy and it is an upland remedial measure to be evaluated under DEQ's regulatory program.

2. **Section 2 Field Pilot Study Objectives, item No. 3, page 3:** Revise the text to include consideration of BMPs to address odor and air quality impacts.

3. **Section 3.1 Field Pilot Study Area and Volumes, pages 4-5:** EPA has the following comments on this section and the FPSWP should be revised accordingly:

    a. The phrase "presence of forms of product that do not achieve the Project Area-specific definition of PTW-NAPL" is confusing and should be revised consistent with Gasco SOW language related to substantial product or revised to include examples such as solid or semisolid tar. Revise similar text throughout the document for consistency.

    b. The last paragraph on page 4 states that, "fine-grained sediments were targeted because sediments with the greatest percent fines contain a higher potential for increased permeability (and thus increased chemical leachability) post-treatment". It is expected that sediments with greater fines content should have a relatively lower initial (pre-treatment) permeability. Therefore, it is unclear why permeability and leachability for sediments with greater fines content would 'increase' post-treatment. A potential for 'increased' permeability and leachability post-treatment as stated, indicates a potentially contrary outcome to the primary objective of stabilization/solidification. Clarify the intent of the statement and revise text as appropriate. Additionally, the text should clarify that the treatability samples include the range of grain sizes to be expected and not just relying on fine-grained samples.

    c. Revise the third line on page 5 to replace the phrase "relatively close proximity" with quantitative distance from the nearest structure. Also revise Table 3-1 to include a column with the distance to nearest structure and the type of structure and clarify how the presence of nearby structures was considered as a secondary line of evidence. From the figures and tables, it is not clear if that goal was met.

    d. Provide the assumptions used for sizing the FPS area to accommodate approximately 4 weeks of ISS work, including target depth, daily production rate, etc. This selection appears to be based solely on time constraints of the proposed schedule for the ISS treatment and disposal of swell material. Instead, the most appropriate size for a pilot study should be based on collecting the most informative data, which should then inform the duration of activity.

    e. This section identifies the size of the total Project Area as 23.2 acres. Revise the text to also specify the size of the ISS FPS area footprint.

4. **Section 3.2 Summary of ISS Bench Scale Treatability Study Results Completed to Date, page 6:** EPA has the following comments on this section and the FPSWP should be revised accordingly:

    a. A strength target of 50 pounds per square inch (psi) is stated for treated sediment and soil in the first paragraph but the associated curing time is not included. Revise the text to include the appropriate curing time (in days) when the stated strength target is intended to be achieved.

    b. The first paragraph indicates that the target strength will structurally support the minimal post-construction loading on top of the ISS-treated materials which is limited to cover or cap materials, as needed. Clarify whether NW Natural has considered potential requirements for cap armor layer in the evaluation of post-construction loading for areas subject to erosion.

    c. In addition to the placeholder text summarizing lab treatability study results in the last paragraph of Section 3.2, EPA expects that detailed results of Phases I, II, and III for each tested cylinder will be provided in the final FPSWP after treatability study results become available. Alternatively, this information can be provided as an addendum or similar standalone deliverable.

5. **Section 3.3 Summary of ISS Treatment Scope of Work, page 7:** EPA has the following comments on this section and the FPSWP should be revised accordingly:

    a. Revise the second bullet point to define what NW Natural considers to be the pre-construction, interim condition, and final condition, including the general schedule for associated mudline elevation surveys.

    b. Revise the text to include a complete list of pre-, during, and post-construction activities, including mobilization, installation of water quality controls (i.e., BMPs), baseline water quality monitoring and sampling, debris removal, demobilization, etc.

6. **Section 3.3 Summary of ISS Treatment Scope of Work, page 8:** Revise the text to clarify why FPS daily production rates are expected to be lower than full-scale implementation, especially if the same drill rig and equipment is expected to be used.

7. **Section 3.3.1 Timber Dolphin Removal, page 9:** EPA has the following comments on this section and the FPSWP should be revised accordingly:

    a. Provide additional clarification for retaining both the excavator method and crane extraction method and discuss potential considerations for the selection of one method over the other for piling removal.

    b. EPA recommends using a "variable drive" vibratory hammer which allows the contractor to have more control by dialing into specific frequencies. A clean sand cover should be applied over the pile extraction footprint for residuals management. The sand should be placed at a radius of 15 feet around each pile (or 15-foot buffer around a grouping of piles) at an approximate thickness of six inches above the mudline (bathymetric surveys are unnecessary).

8. **Section 3.3.2 Bathymetric Surveys, page 9:** EPA has the following comments on this section and the FPSWP should be revised accordingly:

a. Once the surveying contractor is finalized, EPA expects that a detailed FSP will be provided for the surveying techniques discussed in this section.

b. Revise the text to specify the anticipated timing of the Final As-Built Survey in relation to construction completion.

9. **Section 3.3.2.3 Acquisition of Multibeam Echosounder Data, page 10:** Revise the text to indicate what International Hydrographic Organization (IHO) classification is being targeted for the overall bathymetry data collection data quality objective.

10. **Section 3.3.5 ISS Equipment, page 12:** EPA has the following comments on this section and the FPSWP should be revised accordingly:

    a. The fourth paragraph states that, "This ensures the sediment mixed columns are installed within strict verticality tolerances." Instead of relying on qualitative descriptors (i.e., strict), revise this statement to specify the verticality tolerances provided by the manufacturer for the Bauer BG 28 drill rig.

    b. Revise the text to clarify that the drill parameter monitoring data will be logged during the FPS and reported to EPA as a quality assurance measure and that completion reporting will discuss observations or lessons learned regarding maintaining ISS equipment position and verticality, achieving the desired penetration depths, and amendment addition rates.

11. **Section 3.3.6 ISS Column Location Control, page 13:** Revise the last paragraph to provide the maximum allowable tolerance for control point verification.

12. **Section 3.3.7 ISS Column Layout, page 13:** EPA has the following comments on this section and the FPSWP should be revised accordingly:

    a. Text in the first paragraph states that columns will be completed with one downstroke and one upstroke, with planned grout injection during both downstroke and upstroke. The effectiveness of this approach in terms of achieving uniform grout spread and mixing and the need for additional mixing strokes should be evaluated based on observations and measurements conducted during the FPS. Revise text in this section to include evaluation of required injection/mixing strokes as an objective of the field pilot study. Also discuss how it will be verified that the auger advancement and withdrawal rate is providing consistent homogeneous blending.

    b. Revise text to clarify the depth of the top of ISS columns from the mudline and whether the injection/mixing stroke will extend to the mudline or be terminated at a specified depth below the mudline.

    c. This document proposes placing columns in a honeycomb pattern. Provide a more detailed explanation supporting the proposed spacing and pattern. For instance, if this is standard practice for ISS, state that and provide references.

13. **Section 3.3.8 ISS Treatment of Sediment, page 14:** EPA has the following comments on this section and the FPSWP should be revised accordingly:

a. Revise the text to describe the BMPs that will be used in the uplands at the material storage and grout plant areas, including dust control, secondary containment for generators, etc.

b. It is recommended that real-time grout specific gravity measurements be collected as a quality assurance measure for demonstrating that the pre-measured grout plant weight scales accurately achieve the desired grout mix. EPA also recommends measuring other quality assurance parameters for grout, including slump, and including this information in daily reports.

14. **Section 3.3.8.1 Performance Objectives and Criteria, page 14:** This section addresses only the adequacy of mixing and the strength/permeability targets. Revise the text to include contaminant-related performance objectives/criteria.

15. **Section 3.3.8.2 Verification of Performance Objectives and Criteria, page 15:** EPA has the following comments on this section and the FPSWP should be revised accordingly:

    a. Revise text in second paragraph to clarify whether the post-treated ISS samples will be collected at the center of selected column(s) or near the perimeter of the column. Collection of verification samples at the perimeter of the column(s) within the overlap zone between columns is preferred to verify the extents of grout spread from the column centers and effectiveness of grout mixing in the overlap zones.

    b. The last sentence states that, "Once the performance criteria for strength (50 psi or greater) and permeability (10^{-6} cm per second or less) have been verified, testing at additional time steps will not be required." Strength testing should still be conducted at 28 days even if the strength and permeability targets have been achieved for earlier time steps. Since this is a field pilot, the 28-day strength testing results will provide direct comparison to laboratory treatability study results and useful information regarding potentially increased strength for the full-scale application.

    c. Revise this section to clarify whether samples will be collected for all of the ISS columns or a subset of columns.

16. **Section 3.4.1.1 Mechanical Swell Removal Control, page 16:** Revise the text to describe the frequency of control point checks (e.g. daily, twice daily) and how this supports overall data quality objectives. Also specify the allowable tolerance limit for control point checks.

17. **Section 3.4.2.1 Project Area-Specific Swell Material Disposal Suitability Framework and Construction Verification Requirements, page 19, and Table 3-2:** EPA has the following comments on this section and the FPSWP should be revised accordingly:

    a. Section 3.6.3.1 Material Disposal Requirements (page 33) of the SOW (EPA, 2009), requires that if TCE, 1,1-DCE or vinyl chloride are detected in dredged material at concentrations below the DEQ-approved risk-based concentrations (RBCs) but the material exceeds TCLP criteria for TCE, 1,1-DCE or vinyl chloride, the material shall be designated as characteristic Hazardous Waste. Revise the text and Table 3-2 to meet this requirement and clarify when waste is to be classified as F002 Hazardous Waste versus Characteristic Hazardous Waste.

    b. An exceedance of TCLP criteria for any chemical, other than those associated with MGP-related material or TCE and associated CVOCs, would result in the material being

designated as characteristic Hazardous Waste. Additionally, if the material meets definitions of characteristic waste of ignitability, corrosivity or reactivity, it shall be disposed of as a characteristic Hazardous Waste.

18. **Section 3.4.2.1 Project Area-Specific Swell Material Disposal Suitability Framework and Construction Verification Requirements, page 19 and Table 3-3 – Special Waste Classification Criteria:** Section 3.6.3.1 Material Disposal Requirements (page 32) of the SOW (EPA, 2009), includes phenols as a MGP-related constituent to be tested using TCLP to determine if the material should be managed as Special Waste; however, phenols are not included in Table 3.3. Revise Table 3-3 to include phenols. Additionally, revise the "Contained-In Concentration" header in Table 3-3, to clarify that these are Toxicity Characteristic Regulatory Levels, presented in milligrams per liter (mg/L).

19. **Section 3.4.2.1 Project Area-Specific Swell Material Disposal Suitability Framework and Construction Verification Requirements, page 19:** The SOW language preceding the excerpt from Section 3.6.3.1 of the SOW (EPA, 2009) also requires pre-construction disposal characterization samples to be collected from management units. The tiered approach is dependent on comparison with pre-testing determinations for management units. Revise the text to clarify this requirement and include a reference to Section 3.4.2.2 which discusses the pre-construction disposal characterization results.

20. **Section 3.4.2.3 Swell Material Disposal Suitability Characterization, page 21-** EPA has the following comments on this section and the FPSWP should be revised accordingly:

    a. Reactivity must be considered (along with ignitability and corrosivity) to determine if the material can be characterized as Cleanup Material. Revise the second and third paragraphs of this section to include reactivity.

    b. Revise this section to clarify when the waste is to be classified as Special Waste versus F002 Hazardous Waste versus Characteristic Hazardous Waste.

21. **Section 3.4.2.5 Waste Disposal Facility Evaluation, page 22 and Figure 3-8 – Waste Classification Decision Tree:** Though the interpretations of waste classification may be in line with the 2009 AOC (EPA, 2009), the text lacks a discussion of worker safety in light of the 2004 EPA dispute decision (EPA 12/17/2004) and Section 3.6.3.1 Material Disposal Requirements of the SOW, specifically **"**MGP waste may be handled using procedures similar to hazardous wastes to ensure health and safety" and "Where material is determined to not be Hazardous Waste or Special Waste, all health and safety procedures shall be at least consistent with handling of contaminated non-hazardous wastes. Due to its particular characteristics, MGP waste may be handled using procedures similar to hazardous wastes to ensure health and safety. Changes in these procedures shall be consistent with any changes in the status of the materials during the removal, handling, treatment, transport, and disposal process." Given this, revise the FPSWP to include health and safety procedures related to removal, handling, treatment, transport, and disposal for all possible waste designations (i.e., both hazardous/special waste and non-hazardous/special waste).

22. **Section 3.4.2.6 Removed Swell Dewatering, page 23:** Text in second paragraph states that cement amendment will be added to the removed swell material to pass the paint filter test. Revise the text in this section to clarify how strength requirements will be established for the swell material and how the strengths will be measured in the field if the receiving landfill has minimum bearing capacity requirements in addition to the paint filter criteria. EPA assumes that

the swell will be removed before the target strength is achieved which will allow mixing of amendment in bareges. Provide additional details for material processing in barges.

23. **Section 3.5 Decant Water Handling Transport and Disposal, page 26:** Revise the text to discuss worker safety issues in handling excess water including but not limited to measurement of airborne benzene levels that may occur during the exothermic dewatering process. (See also EPA letter to NW Natural dated 1/14/2005.) The FPS may be a useful opportunity to collect data to demonstrate that airborne levels are or are not problematic to streamline full-scale operations.

24. **Section 3.7.1.1 Operational Controls, page 27:** Revise the BMP list to include the following operator controls:

    a. Precision information will be available to the operator to guide speed and accuracy determinations.

    b. Operator will ensure maximum bucket closure is achieved prior to lifting by maintaining positive hydraulic pressure on the closing cylinders of the bucket until release within the scow.

    c. Position bucket within scow before load is released.

    Additionally, revise the last bullet to indicate that if Willamette River currents exceed one foot per second, operations will stop until currents are below this velocity. Information could also be collected to inform EPA of possible variation to this requirement for full-scale implementation.

25. **Section 3.7.1.3 Sheen and Oil Control Measures, page 29:** Clarify if the oil booms will be deployed during operations regardless of sheen/NAPL observations, or only deployed if sheen/NAPL is observed in surface water. EPA recommends using oil booms during all ISS and swell removal operations due to the nature of the NAPL contamination at the Gasco Project Area. This section should also include visual monitoring of sheens for all operations.

26. **Section 3.7.2 Swell Barge Loading and Transport Best Management Practices, page 30 and 3.7.4 Transloading and Transport to Upland Disposal Facility Best Management Practices, page 31:** EPA has the following comments on these sections and the FPSWP should be revised accordingly:

    a. Revise the first Section 3.7.2 bullet as follows: "To minimize spillage between the bucket and the watertight swell removal barges, cantilevered spill aprons will be attached to the barges to direct spilled material back into the barges and ~~***out of***~~ ***away from*** the river. "

    b. Consistent with the Gasco Removal Action Biological Opinion dated August 19, 2005, revise the text to indicate that barges will not be filled beyond 85% capacity rather than the 90% stated.

    c. Revise the text to describe the possible need for barge covering on the way to the transload facility, discussing experiences from the 2005 tar body removal action. NW Natural may also want to consider measuring fugitive emissions in uncovered load(s) to demonstrate whether this is necessary at full-scale.

27. **Section 3.7.4 Transloading and Transport to Upland Disposal Facility Best Management Practices, pages 31-32:** EPA has the following comments on these sections and the FPSWP should be revised accordingly:

a. Revise this section to clarify that haul trucks transporting materials for upland disposal will be required to be covered whether the material being transported is wet or not.

b. Revise this section to include pre and post project material tracking ISS sampling for road shoulders proximate to the transload site to verify that material tracking measures were successful per the AOC SOW (EPA, 2009), "Pre and post sampling data shall be required for any transload facility and/or the site itself to ensure material loss or movement from non-designated areas has not occurred. Should significant increases in chemical concentrations occur, those areas represented by elevated samples shall have material removed and replaced (e.g. gravel shoulders, catchments)." See the Terminal 4 Phase I Removal Action Completion Report (RACR, June 2009) for additional performance standards to include (Section 8.3).

28. **Section 3.7.5 Decontamination of Construction Equipment, page 32:** EPA has the following comments on these sections and the FPSWP should be revised accordingly:

a. Revise this section to discuss how trucks will be decontaminated. Discuss how trucks might be dedicated to this project and then subsequently decontaminated at the end of Gasco transload operations per the above referenced EPA letter (dated December 14, 2004) and NMFS Biological Opinion (dated August 19, 05) and T4 phase I procedures documented in the RACR. The trucks must be decontaminated before moving to an area where hazardous wastes are not actively managed.

b. Revise the text to discuss how decontamination waters will be contained and treated with transload site engineered water management structures (refer to T4 phase I RACR sections 4.2.2, 6.4, 6.5, 7.1, 8.3 for examples). Revise the text to describe how dock curbing will be used to prevent any potential spill material and rainwater from entering the river.

29. **Section 3.8 Environmental Monitoring, page 32:** Revise this section to noise monitoring requirements and thresholds.

30. **Section 3.8.1 Water Quality Monitoring, page 32-33**: EPA has the following comments on this section and the FPSWP should be revised accordingly:

a. Revise the text to include water quality monitoring at the transload facility consistent with the 2005 tar body removal action.

b. Revise the text to reference the latest EPA Water Quality Monitoring (WQMP) Template.

c. Revise the text to shorten the COC list to ensure fastest sample turnaround, e.g. benzo(a) anthracene and benzo(a)pyrene were often detected during the 2005 removal action and may likely serve as adequate indicators of COC mobilization.

d. EPA's research indicates that 72-hour turnaround time for certain chemicals is achievable. Revise the text to note that the sample turnaround time is expected to be 72 hours from lab receipt to sample reporting to both EPA and NW Natural, or as otherwise approved by EPA.

e. Revise the text to note that field parameters will be reported to EPA the same day that they are collected, and any exceedances will involve immediate notification to EPA.

f. Revise the text to consider usage of data sondes for both upstream and downstream compliance points as well as the early warning station. A data sonde would require far less staff maintenance to provide required monitoring data but would also avail greater resolution in terms of the ability to make turbidity observations far more frequently. A data sonde would also be able to take a turbidity reading in low and no light conditions. This would allow better study of BMP effectiveness which could be applied to full-scale remedial action to further optimize the specific approach taken and demonstrate its effectiveness nearly in real time.

g. This section states, "Field parameter measurements will be collected during construction activities at two compliance stations 200 feet downstream from the Project Area, one early warning station 100 feet downstream from the Project Area, and one background station 300 feet upstream from the Project Area, as shown in Appendix A." Revise the descriptions of these distances to be consistent with the specific comment on Appendix C Section 3.3.1. In addition, revise the text to refer to Appendix C, not Appendix A.

31. **Section 3.8.2 Air Monitoring, pages 33-34**: EPA has the following comments on this section and the FPSWP should be revised accordingly:

    a. Revise the text to include relevant triggers for monitoring of particulates and volatile chemicals such as benzene and what response actions would be taken for exceedances of these trigger levels. Revise the text to include both on-site actions as well as the transload facility where exothermic dewatering activity may volatize benzene. Revise the FPSWP to provide benchmarks for perimeter air monitoring that would be applicable to the surrounding community, not just worker health and safety.

    b. Revise the text to consider storm events that result in wind that may mobilize dried sediments from the barge.

    c. Revise the text to include odor monitoring and odor suppression controls. Also revise the text to indicate what conditions would warrant odor suppression controls.

    d. Revise the last paragraph to state that EPA approval will be required before suspending monitoring due to excessive precipitation.

32. **Section 4 Post-Construction Field Pilot Study Sampling, pages 38-39:** EPA has the following comments on this section and the FPSWP should be revised accordingly:

    a. Revise the FPSWP to provide rationale for collecting samples at multiple depth intervals within the ISS cover/simulated habitat layer and/or explain how this information will be used.

    b. Revise the FPSWP to clarify how near-bottom surface water sample results will be used to adjust for 'background' or what information would be used to determine that adjusting for 'background' would be necessary.

    c. The near-bottom surface water sample cannot be considered representative of background because it will be collected within the FPS area. Remove the term "background".

    d. Clarify that the near-bottom surface water samples will be collected within 30 cm above mudline.

e. Revise the FPSWP to discuss how the sampling data will be used to supplement laboratory bench-scale treatability testing for informing cap design over ISS treated sediments. ISS Phase IV LEAF modified EPA Method 1315 testing should be considered the primary basis for the cap design.

f. Revise the FPSWP to explain how the Phase IV laboratory bench scale testing results will be used to evaluate the appropriate timing to commence post-ISS sampling activities. Clarify why FPS sampling would not commence promptly after initial curing of ISS treated sediments (e.g., 28 days after completing the ISS treatment or when strength requirements are met) or what influence Phase IV laboratory bench scale testing would have on the timing of field sampling.

g. Additional rounds of porewater sampling should be conducted to evaluate trends in decreasing concentrations. Two rounds of sampling will not provide statistically significant information regarding concentrations trends.

h. Three samples do not constitute a robust number and will be insufficient to characterize uncertainty in the results. Revise the FPSWP to include additional sample locations.

i. Revise this section to clarify how the sampling port "will be sealed to the ISS-treated surface to prevent a hydraulic connection to surface water underneath the port."

j. In accordance with the Programmatic Biological Assessment and forthcoming Programmatic Biological Opinion, the habitat layer should consist of rounded gravel typically 2.5 inches or less (or other appropriate native material as determined during project specific remedial design) that is resistant to erosion. Note that monitoring will be required to ensure the layer is 6 inches thick. The monitoring plan shall include response proposals to address shifting or loss of the habitat layer.

k. This section states that porewater samples will be analyzed for the full suite of Table 17 groundwater constituents, and in parentheses includes pesticides and herbicides and dioxins/furans. The section states that results will be compared to the groundwater cleanup levels. Table 17 does not have groundwater cleanup levels for dioxins/furans and for some pesticides such as aldrin, dieldrin, and lindane. Revise the text in this section to clarify what porewater sample results will be compared to for contaminants that do not have groundwater cleanup levels.

33. **Section 5.2 Section 404 of the Clean Water Act, Section 5.3 Endangered Species Act, page 41 and 42, and Table 5-2 - ROD Action-Specific ARARs for Remedial Action at the Portland Harbor Superfund Site—Application to the ISS Field Pilot Study at the Gasco Sediments Site:** Section 5.2 and Table 5-2 indicate that the CWA Section 404(b)(1) analysis presented in Appendix E documents substantive compliance with several ARARs including the Migratory Bird Treaty Act and the Marine Mammal Protection Act. However, Appendix E does not include an analysis of potential effects on migratory birds or marine mammals to comply with the identified ARARs. In addition, Section 5.3 and Table 5-2 indicate a site-specific report will document substantive compliance with the Endangered Species Act as well as most of the same ARARs mentioned in Section 5.2. Revise Appendix E to include an evaluation of potential effects on migratory birds and marine mammals and revise the text in these sections and in Table 5-2 for consistency.

34. **Section 5.5 FEMA Floodplain Regulations, pages 43-44:** Revise this section to note that a no-rise evaluation will be conducted for the full remedy in future design reports.

35. **Table 5-2 ROD Action-Specific ARARs for Remedial Action at the Portland Harbor Superfund Site—Application to the ISS Field Pilot Study at the Gasco Sediments Site, page 1 of 11 and 10 of 11:** Revise the table to note that Section 402 applies substantively and procedurally to activities at the transload facility due to any point source discharges there and that NW Natural will coordinate with DEQ regarding such requirements. EPA will coordinate with DEQ to ensure that any permits issued meet both State as well as ROD related cleanup requirements (see Programmatic Biological Assessment, Section 2.5.7.2 Transload Operations).

36. **Table 5-2 ROD Action-Specific ARARs for Remedial Action at the Portland Harbor Superfund Site—Application to the ISS Field Pilot Study at the Gasco Sediments Site, page 2 of 11:** As stated, the rivers and harbors act description is not completely accurate in that activities immediately outside of the navigation channel could impact the flow of marine traffic and be subject to Section 10 coordination with U.S. Army Corps of Engineers and U.S. Coast Guard. Revise the explanation to note that the FPS ISS work is both outside of the navigation channel ***and*** (if true) not anticipated to impact marine traffic.

37. **Table 5-2 ROD Action-Specific ARARs for Remedial Action at the Portland Harbor Superfund Site—Application to the ISS Field Pilot Study at the Gasco Sediments Site, page 3 of 11:** While it is reasonable to conclude that substantive portions of the Toxic Substances Control Act do not apply based on past site characterization, polychlorinated biphenyl levels at the site are elevated and must be characterized once generated (i.e., in the barge) to demonstrate compliance with this regulation. Revise the text accordingly.

38. **Table 5-2, ROD Action-Specific ARARs for Remedial Action at the Portland Harbor Superfund Site—Application to the ISS Field Pilot Study at the Gasco Sediments Site, page 3 of 11, page 4 of 11:** Discussion of air emissions requirements focuses on the ISS on-site activity itself, but not on the barge and later dewatering processes. Revise the text to note that these regulations do apply to both on and off-site activities and describe how fugitive emissions will be monitored for both.

39. **Figures 3-1a through 3-3:** Revise the figures to clearly identify the location of the timber dolphin structure to be removed.

40. **Figure 3-4 - ISS Approach and Configuration – Plan View:** Figure 3-4 shows row numbers but not column numbers. Revise the figure to also show column numbers for the ISS column layout shown to better identify the alphanumeric designation for each ISS column.

41. **Figures:** Revise the FPSWP to include a figure showing the locations and layouts of upland and in-water BMPs including include existing oil booms.

Editorial Comments on FPSWP:

1. **Section 3.7.1.3 Sheen and Oil Control Measures, first bullet, page 29:** Change "warm" to "warn" in the following sentence: "If the booms are left in place overnight, they will be lit to warm boaters."

2. **Figure 3-7 - Proposed Swell Removal Approach Profile View**: Correct the phrase "Existing Groud" to "Existing Ground".

To Be Considered Comments on FPSWP:

1. **General Comment**: Contaminant sampling is proposed only after treatment and only in the treated area. This is an insufficient basis on which to understand the efficacy of treatment. Instead, a before-after-control-impact (BACI) design is strongly recommended and is accepted scientific practice. (Smokorowski et al. (2017) for instance state that their work "demonstrate[s] that a well-designed BACI remains one of the best models for environmental effects monitoring programs.") In short, in addition to sampling within the treated area post-treatment, samples must also be collected before treatment within the FPS area and should be collected in untreated (but otherwise similar) locations. The field-based efficacy of treatment cannot be adequately understood without such sampling.

2. **Section 3.3 Summary of ISS Treatment Scope of Work, page 8:** It is recommended the pre-construction bathymetry survey be conducted before the timber dolphin removal.

General Comments on FPSWP, Appendix B, Example Equipment and Material Specification Sheets:

1. Add specifications sheets for the following to Appendix B:

    - Vibratory hammer, preferably variable speed
    - Mobile moon pool silt curtain containment system
    - Moisture resistant silos (for Portland cement [PC] and blast furnace slag cement [BFSC] storage)
    - Grout pump
    - Generators
    - Quicklime

General Comments on Appendix C, In Situ Stabilization and Solidification Field Pilot Study Water Quality Monitoring and Quality Assurance Plan (WQMQAP):

1. **Transloading of ISS-Treated Swell Material:** The WQMQAP is lacking any discussion of BMPs and monitoring of water quality at the transload facility, which requires substantive compliance with the Clean Water Act Section and applicable Oregon Revised Statutes and Oregon Administrative Rules. Revise Appendix C to describe these requirements, which are presented in the PHSS Programmatic Biological Assessment.

2. **Draft WQMP Template:** Revise the text to reference EPA's Draft WQMP Template as the applicable guidance for this appendix.

Specific Comments on Appendix C, In Situ Stabilization and Solidification Field Pilot Study Water Quality Monitoring and Quality Assurance Plan:

1. **Section 1.1 Project Overview, page 1:** Instead of referencing Sections 1 and 2 of the FPSWP, revise this section to provide a summary of the information required by Section 1.1 of the Draft EPA WQMP Template to ensure that Appendix C could function as a standalone document.

2. **Section 1.2 Willamette River Water Quality, pages 1-2:** Revise this section to reflect the content required in Section 1.2 of the Draft EPA WQMP Template.

3. **Section 3.1 Monitoring Parameters, page 5:** See FSPWP specific comment on Section 3.8.1 regarding limiting the number of COCs monitored to a key COC list if possible (1 to 3 parameters). Revise the text accordingly.

4. **Section 3.2 Baseline Survey, page 6:** EPA has the following comments on this section and Appendix C should be revised accordingly:

    a. Revise the text to note that the baseline monitoring will help to inform regulators about the day-to-day context of water quality at the site but that upcurrent sampling during activities will be used to gauge overall compliance.

    b. Revise the sentence that states, "Baseline survey criteria will be established as the 90th percentile concentration of the baseline survey dataset." As follows: "The baseline concentration will be established as the 90th percentile concentration of the baseline survey dataset."

    c. Revise the text in the last paragraph of this section from "pre-construction background" and "90th percentile background" to "pre-construction baseline" and "90th percentile baseline", respectively, to differentiate between "background" and "baseline" consistent with the definitions in EPA's Draft WQMP Template. In addition, make this revision in Section 3.6 accordingly.

5. **Section 3.3.1 Compliance Boundary, page 7:** Revise the text to note that the compliance points are measured from the edge of the moon pool for clarity.

6. **Section 3.3.1 Compliance Boundary, Section 3.3.2 Field Parameters, page 7, and Table 1 – Summary of Monitoring Stations and Locations for the Pilot Study by Tidal Stage:** The point of compliance for water quality monitoring of field parameters and COCs is 150 feet from the outer containment barrier. Revise the text in these sections, Table 1, and throughout the document accordingly. Also, the early warning location should be established at 100 ft from the activities consistent with DEQ 401's standard monitoring conditions.

7. **Section 3.3.2 Field Parameters, page 8:** Revise the text (number 1 in the list following Table 1) to state field parameters will be collected within 1 foot of the river surface, consistent with the EPA Draft WQMP Template.

8. **Section 3.3.3 Water Chemistry Parameters, page 8:** EPA has the following comments on this section and Appendix C should be revised accordingly:

    a. Revise the text to indicate the water sample for laboratory analysis will be collected from the depth with the highest turbidity reading (i.e., not composited over the three depths) at the downcurrent compliance station with the highest turbidity readings. Similarly, collect the contemporaneous water chemistry sample at the background station from the depth that corresponds to where the compliance station sample was collected. Revise the text throughout as applicable wherever water chemistry sampling is described, including field forms.

    b. Revise the text to indicate that samples for many analytes (e.g., BTEX and others) will be field preserved.

c. See FPSWP specific comment on Section 3.8.1 Water Quality Monitoring regarding sampling frequency and required turnaround time and revise this section accordingly.

9. **Section 3.4.1 Visual Observations, pages 8 and 9:** EPA has the following comments on this section and Appendix C should be revised accordingly:

    a. Revise the text to include visual observation of river tidal phase.

    b. Revise the text to indicate that river velocity will be monitored to ensure the velocity does not exceed the capacity of the containment barrier to contain turbidity and contaminants potentially dispersed during project activities.

    c. Revise the text to note that any sheens detected at the site require EPA, NRC Environmental Services (NRC), and Oregon Emergency Response System (OERS) notification. Regardless of source, any observations of turbidity, sheen, or distressed/dead fish should be recorded, and notes related to the presumed source can be included if there are indications that the source(s) are not from FPS operations.

10. **Section 3.4.2.2 Temperature, page 9:** Revise the text to note that ISS includes an exothermic reaction (heat of hydration) and possible impacts will be monitored accordingly. Revise later sections with possible response action(s) if temperature changes in the river are observed, e.g. slowing the work.

11. **Section 3.5.1 Visual Monitoring, page 12:** Clarify in the text how visual monitoring would be effective during nighttime (e.g., dark hours) work.

12. **Section 3.5.2 Field Parameter Monitoring, pages 12 - 13:** EPA has the following comments on this section and Appendix C should be revised accordingly:

    a. EPA does not approve of the proposed "intensive" and "routine" monitoring tiers for field parameter monitoring. Revise this section and other sections that mention this tiered monitoring approach to indicate field parameter monitoring will occur every two hours each day during all sediment-disturbing activities.

    b. Revise this section to indicate that if sediment-disturbing activities occur during dark hours, remote sensing stations (i.e., sondes deployed at fixed stations at three water depths with capability of collecting the field parameter data on a regular, frequent basis day or night) will be used. If this type of remote monitoring is not conducted, no work would be allowed during dark hours. Also revise the text to define dark hours, for example after sundown.

13. **Section 3.5.3 Water Chemistry Monitoring, page 16:** EPA has the following comments on this section and Appendix C should be revised accordingly:

    a. Revise the text to include a monitoring frequency for COCs consistent with the EPA WQMP Template. Revise the text consistent with the FPSWP Section 3.8.1 Water Quality Monitoring comment regarding sample turnaround time.

    b. Revise the intensive water chemistry monitoring schedule to monitor water chemistry on days 2, 4, and 6 from the start of each project activity (debris removal, timber dolphin removal, ISS sediment treatment, ISS post-treatment swell material removal). If the

activity takes less than 1 week to perform, collect at least 2 representative samples. If there are no exceedances of any acute water quality criteria, initiate the proposed routine schedule of 1 sample per week for the remainder of work unless a water quality exceedance occurs to reestablish intensive monitoring.

c. If there is an exceedance of any acute water quality criteria at the compliance point, notify EPA. Evaluate conditions (e.g., turbidity, BMPs, site activities/operations, background concentrations) at the time the sample was collected and implement additional BMPs that focus on the cause of the exceedance. Conduct daily water chemistry monitoring until at least 3 consecutive water chemistry samples are below all acute water quality criteria, at which point weekly routine monitoring may resume. If both the compliance point and the background station water chemistry samples exceed water quality criteria, consult with EPA to determine the necessary water chemistry monitoring schedule.

d. Note that EPA may require additional water quality samples be collected outside of this schedule (i.e., spot checks).

14. **Section 3.6.1 Exceedance of Visual Monitoring Criteria, page 17:** Clarify where the turbidity monitoring for an observed turbidity plume would be conducted (e.g., within the plume itself).

15. **Section 3.6.3 Exceedance of Water Chemistry Parameters, page 19:** EPA has the following comments on this section and Appendix C should be revised accordingly:

    a. Revise the text to include a monitoring frequency for COCs consistent with the EPA WQMP Template.

    b. Revise the text consistent with the FPSWP Section 3.8.1 Water Quality Monitoring comment regarding sample turnaround time.

    c. Revise the text to indicate EPA will be notified if exceedances of chronic (based on a 4-day average) water quality criteria occur.

    d. Revise the text to note that BMP actions may be taken if chronic values are exceeded persistently for more than 4 days if it is known that this is not a baseline condition using contemporary and historical (e.g. RI/FS) data.

16. **Section 4.1.1 Field Parameter and Water Chemistry Sample Collection, page 21:** Revise this section in accordance with the EPA comments on Appendix C Section 3.3.3 (i.e., water sample for laboratory analysis will be collected from the depth with the highest turbidity reading and not composited over the three depths, and some analytes will be field preserved).

17. **Section 4.1.2 Sample Location/Depth Determination, page 21:** Revise the text to note that due to possible inaccuracy in depth sounding that the bottom sample will be taken by encountering the bottom then moving back into the water column to the EPA WQMP Template prescribed depth.

18. **Section 5.1 Daily Reporting, page 27:** Revise the text to note that field parameters will be reported to EPA each day and the COC results will be reported to EPA as they are received from the lab.

19. **Section 5.3 Final Reporting, page 27:** Revise the text to include a new bullet for figures. These figures should depict field parameters and COCs on the Y axis with time on the X axis and callouts for any BMP or work area/work type changes similar to the Removal Action Completion Report prepared by EPA (Parametrix, 2006) such that trends can be applied to future remedial action work.

20. **Section 6.1 Field Quality Assurance and Quality Control, first paragraph on page 30:** Clarify whether preservative be added after the container is filled. If containers with preservative appropriate for the analysis will be used for sample collection it should be stated that the samples will be placed in containers with preservative appropriate for the specific analyses.

21. **Section 6.1.2 Matrix Spike/Matrix Spike Duplicate, second sentence:** Additional volume should be collected for samples with MS/MSD, not additional samples.

22. **Section 6.2 Analytical Laboratory Quality Assurance and Quality Control, second paragraph, last sentence:** Revise the word "method" to another word such as "approach" to make it clear that the analytical method will not be modified to enable quality control to be met.

23. **Section 6.2.5 Laboratory Control Samples, second sentence:** It is not clear what is meant by "matrix-dependent" for the laboratory control samples. A laboratory control sample would be a clean matrix such as a method blank that is spiked with target analytes. Clarify the use of the term "matrix-dependent."

24. **Section 6.3.1, Analytical Laboratory Data Deliverable, Last Bullet, Original Data:** Add "as applicable" to items listed under this bullet where it is appropriate.

25. **Section 6.4.1, Precision: First full paragraph on page 36, third sentence:** This statement conflicts with the statement in Section 6.1.1 Field Duplicates, which states "No data will be qualified based solely on field duplicate precision" by stating that "Data qualification based on field duplicate precision will be at the discretion of the data validator." Reconcile this discrepancy and be consistent throughout the document.

26. **Section 6.4.7 Sensitivity, page 39:** Revise the text to note that if ROD cleanup levels (CULs) cannot be met that information will be provided to EPA for review and approval of various labs surveyed to demonstrate NW Natural's due diligence in trying to achieve MDLs at the CULs or lower.

27. **Table 2 – Acute and Chronic Chemical Water Quality Criteria:** Revise the acute and chronic criteria consistent with the EPA Draft WQMP Template, as shown in the table below:

Analyte	Acute (ug/L)	Chronic (ug/L)
2-Methylnaphthalene	8.7	2.1
Acenaphthene	96	23
Anthracene	13	0.73
Benzo(a)anthracene	0.49	0.027
Benzo(a)pyrene	0.24	0.014
Fluoranthene	3980	6.16
Naphthalene	190	12
Phenanthrene	26	6.3
Arsenic	340	150

Note the Draft WQMP Template is being revised; however, the acute and chronic criteria remain the same from the version sent in March 2023.

28. **Table 3 – Water Quality Parameter Triggers:** EPA has the following comments on this table and the table should be revised accordingly:

    a. Revise the table to indicate if a turbidity plume is observed extending beyond the compliance boundary for more than one hour, the work restriction would include implementing additional BMPs and the action triggered would entail inspecting construction and adding/modifying BMPs that focus on the cause of the turbidity. If the turbidity is observed to continue after new BMPs are implemented, all in-water activities would cease, and EPA would be notified.

    b. Revise the table to indicate that response to either a minor or substantial oil/sheen would require stopping work, notifying EPA, OERS, and NRC within the first hour, recording the color, source, size, and any other characteristics of the sheen, and inspecting construction and adding/modifying BMPs.

    c. Add a row for tide phase/flow reversal monitoring.

    d. Note 1 indicates field parameter exceedances would need to be confirmed within 30 minutes via a repeat measurement. Revise to clarify any second measurement would be conducted if there is reason to believe the monitoring equipment is not accurate/needs to be re-calibrated, and that any repeat measurement would be performed immediately.

    e. Note 2 indicates an exceedance is defined relative to both the event-specific background measurement and the preconstruction background survey. Revise to indicate the compliance measurement would be an exceedance relative to the event-specific background measurement only.

29. **Table 6 – Field and Lab Quality Control Sample Analysis Summary:** Clarify that a method blank and LCS/SRM would be performed per analytical batch, which would consist of up to 20 field samples.

Editorial Comments on Appendix C, In Situ Stabilization and Solidification Field Pilot Study Water Quality Monitoring and Quality Assurance Plan (WQMQAP):

1. **Section 3.3.2 Field Parameters, page 7, Table 1 - Summary of Monitoring Stations and Locations for the Pilot Study by Tidal Stage, Figure 3 – Ebb Tide Water Quality Monitoring Stations, and Figure 4 – Flood Tide Water Quality Monitoring Stations:** Correct the text, table, and figures to consistently label the background stations as “BG-1N” and “BG-1S”.

2. **Table 3 – Water Quality Parameter Triggers:** Correct Note 4 to remove duplicative text.

3. **Attachment A Water Quality Monitoring Field Form (Part B):** Revise “Background Station” at the top of the form to “Compliance Station” and “Early Warning Station” at the bottom of the form to “Compliance Station.”

Specific Comments on Appendix D Spill Control Plan

1. **Section 3.2 Equipment and Hazardous Materials, Page 3:** Update Table 4-1 to include the vibratory hammer that will be used for the timber dolphin removal.

2. **Section 3.2.1 Diesel Fuel, Page 3:** Update this section to cover diesel fuel used for the upland batch plant.

3. **Section 3.3 Spill Prevention Measures:** Update this section to cover a spill from a hose rupture during operation of the vibratory hammer while the crane is suspended over water and/or land.

4. **Section 3.4 Spill Response, Page 6:** This section indicates that if a spill occurs, the Anchor Construction Quality Assurance Officer (CQAO) shall be notified. The section goes on to provide the Construction Managers contact information. Clarify (in the line where contact information is provided) if the Construction Manager is also the CQAO or provide the CQAO's contact information.

5. **Section 3.4 Spill Response, First bullet on page 7:** The text states "if the spill is reportable." All spills must be reported. Revise the text accordingly.

To Be Considered Comments on Appendix D, Spill Control Plan:

1. **Section 2.0 Environmental Protection Organization and Personnel:** EPA has the following comments on this section and Appendix D should be revised accordingly:

    a. Update Figure 2-1 (Project Organization) to show personnel from NW Natural and Anchor who must be notified in the event of a spill.

    b. Recommend developing a single table that contains all contact information included in the Spill Control Plan, for ease of finding this information quickly.

Specific Comments on Appendix E, CWA 404(b)(1) Analysis:

1. **Section 3.1 Pilot Area Location, Description, and Timing, page 4:** Revise the text to include the acreage of the FPS area and whether any of the area is in the shallow or intermediate zones as defined by the Portland Harbor ROD.

2. **Section 3.2.2 ISS Post-Treatment Swell Management, pages 6-9:** EPA has the following comments on this section and Appendix E should be revised accordingly:

    a. The second paragraph states, "Dewatering of the material will occur on the water-tight barge and be collected and pumped to the swell material barge." This seems to indicate there would be a second barge located within the moon pool curtain to receive the dewatering fluids, contrary to the description in the FPSWP Section 3.4. Revise Appendix E Section 3.2.2 to clarify.

    b. Revise the text to note that post project elevations will remain unchanged accounting for both a residuals management layer (if habitat layer is not immediately placed) and habitat layer to avoid assessment of compensatory mitigation.

3. **Section 3.2.2.1 Transport and Disposal of ISS-Treated Swell Material, page 6:** Revise this section to describe the requirements for water quality monitoring at the transload facility.

4. **Section 4.2 Water Quality, page 10:** Revise this section to discuss possible impacts of the project on temperature or lack thereof. See also the comment on FPSWP Section 3.4.2.2.

5. **Section 5.1 Threatened and Endangered Species, pages 16-17:** EPA has the following comments on this section and Appendix E should be revised accordingly:

    a. Revise the text to note that some pilings will be removed using machinery that could produce noise and how this will be mitigated, as needed.

    b. The text "these effects will be short term" in the last paragraph is incompatible with the premise that no habitat layer will be placed after pilot study completion. Impacts to benthic species will last years if no habitat layer is placed. See also General Comment 6 to the FPSWP.

    c. This section indicates the moon pool containment system will be used, in part, to exclude fish during ISS treatment and post-treatment swell material removal. Clarify how fish would be excluded and how fish exclusion would be monitored.

6. **Section 11.1.1 Substrate, page 31:** See General Comment 6 to the FPSWP regarding compensatory mitigation needed lacking placement of a habitat layer.

7. **Section 11.1.2 Water Quality, page 31-32:** See the Section 4.2 Water Quality comment above regarding temperature and revise this appendix accordingly.

8. **Section 12.1 Availability of Practicable Alternatives, page 35:** Revise the text to include the observation that conducting the FPS is likely to make the full-scale remedy more effective at meeting RAOs and ARARs, as well as optimize the effectiveness of BMPs in reducing short-term impacts.

Editorial Comments on Appendix E CWA 404(b)(1) Analysis:

1. Revise the incorrect references throughout to "WQMQAP; Appendix B" to Appendix C.

2. Revise the incorrect references to "Attachment 2".

3. Revise the incorrect reference to the Inadvertent Discovery Plan as Appendix C. It is Appendix F.

General Comments on Appendix F, Inadvertent Discovery Plan:

1. **Inadvertent Discovery Plan:** More specific details and procedures are needed so that a trained nonprofessional understands what to look for; otherwise EPA recommends having an archaeologist on-site to monitor work activities.

References

EPA, 2009. Statement of Work – Gasco Sediments Site. U.S. Environmental Protection Agency Region 10. September 9, 2009.

Parametrix, 2006. Final Early Action, Construction Oversight Report, Northwest Natural (GASCO) Facility Site, Portland, Oregon. November 16, 2006

Smokorowski, K. E., R. G. Randall, and B. Favaro. 2017. Cautions on Using the Before-After-Control-Impact Design in Environmental Effects Monitoring Programs. Facets 2(1): 212-232. doi: 10.1139/facets-2016-0058.