



Oregon

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July 29, 2025

via email delivery

Thierry Razat
Legacy Site Services, LLC
1201 Louisiana St., Suite 1800
Houston, TX 77002

Subject: *In Situ Stabilization Pre-Final Design Report*
Arkema Facility, ECSI No. 398

Dear Thierry Razat:

The Oregon Department of Environmental Quality received and reviewed the June 16, 2025 *In Situ Stabilization Pre-Final Design Report* (PFDR), prepared by Environmental Resources Management, Inc. for Legacy Site Services LLC. The ISS PFDR presents the design for the implementation of an interim remedial action measure to address the monochlorobenzene source area originating from the former acid plant area using a combination of excavation and ISS and/or in situ chemical oxidation technologies.

DEQ has the following comments on the ISS PFDR report.

General Comments

- 1) **Treatment (GWET) System.** Sections 6.2 and 6.3 and ERM's responses to comments on an earlier design document imply that the system will be abandoned, at least temporarily. Section 6.13 fails to mention the GWET System when discussing site restoration. A plan detailing actions with respect to groundwater extraction and treatment during and after the IRAM is required to be submitted to DEQ. This plan should include a discussion why the GWET System will be shut down during construction, monitoring of groundwater conditions during the shut down, and the process that will be used to determine if the GWET System should be restarted post IRAM.
- 2) DEQ recognizes the extensive and comprehensive investigation work utilized to define the extent of the plume which leads the design plans to present the ISS areas as known and certain. DEQ recommends the plans and specifications include a provision for ISS treatment of dense nonaqueous phase liquid (DNAPL) that has not previously been identified in the event something unexpected is encountered during construction.

Specific Comments

- 1) **Response to Agency Comments, DEQ Specific Comment 6b.** The response to DEQ's comment requiring the Pre-Final Design Report to discuss hot spot thresholds is misleading. While the pre-design investigation (PDI) may not have identified direct contact hot spots in overburden soils, the PDI excluded analysis for a full suite of contaminants of concern (COCs) except in specific circumstances. Previous investigations have identified direct hot

spots in overburden soil, and these hot spots must be considered in the IRAM 1 design. Refer to DEQ's July 1, 2025 comments¹ on the Contaminated Material Management Plan.

- 2) **Section 3.1, DNAPL Conceptual Site Model.** The second to last bullet states that shallow DNAPL in near PDI-01, PDI-13, PDI-55, PDI-55a, and PDI-55b does not appear to connect with the main DNAPL plume. However, cross-section 3-3' (Figure 14) suggests that DNAPL observations in PDI-13 may be contiguous with DNAPL observations in AS-20 and MWA-11D. Viewing the interpolated DNAPL plume in a 3-dimensional viewer format may better illustrate the nature of DNAPL in this area.
- 3) **Section 4.1, Treatability Study Phase 1 Results.** Section 4.1 states "The TS [Treatability Study] Phase 1 report is included as Appendix F." However, Appendix F is titled, *Treatability Study Initial Results*, which includes tables and figures with no written narrative to explain the content of the tables and figures. Revise Section 4.1 for accuracy.
- 4) **Section 6.5, Treatment Areas and Volumes.** Subsections 6.5.1 through 6.5.3 describe ISS treatment zone elevations for ISS Treatment Areas A through C, respectively. DEQ requests that these subsections include other relevant information, including the basis for these elevations, highest and lowest elevations of DNAPL observations in each treatment area, the elevations of the deep zone surface. Viewing the ISS prisms overlaid onto the interpolated DNAPL plume and various hydrogeologic strata in a 3-dimensional viewer format may better illustrate the basis for the ISS treatment zone elevations in each treatment area.
- 5) **Section 6.11, Backfill and Grading.** The IRAM design should better explain the backfill and grading design basis and sequence and how the grading plan will direct stormwater that infiltrates the densely graded aggregate towards the existing stormwater swales. The grading plan should avoid creating a zone of perched groundwater within backfill materials above the ISS swell.
- 6) **Section 7.3, Construction Specifications.** DEQ requests courtesy copies of the remedial contractors work plans that provide additional information related to construction means and methods and quality assurance/quality control procedures.
- 7) **Section 8, Post-Remediation Activities.** Add reporting as a post-remediation activity. DEQ requires a construction completion report for the IRAM.
- 8) **Appendix G, Specifications.** DEQ has the following comments:
 - a) **Section 01 10 00 – Summary of the Work.** Paragraphs 1.09J and 1.09K discuss grading of ISS cover materials and required drainage considerations. Paragraph K states that the Site should be graded toward the existing stormwater swale in accordance with the Drawings. However, Drawing Sheet 10 appears to show surface grades directed toward the Willamette River across a portion of the IRAM footprint. Clarify how the grading plan will achieve the requirement of this specification.
 - b) **Section 31 22 10 – ISS Work Grading.** This Section discusses placement, compaction, and grading requirements for backfill materials, but does not include requirements for ISS swell. The final grade of ISS swell will be an important consideration for long-term

¹ DEQ. 2025. Letter to Todd Slater, Subject: Contaminated Material Management Plan for In Situ Stabilization. Oregon Department of Environmental Quality. July 1, 2025.

stormwater management and will relate to the ability to achieve the placement, compaction, and grading requirements for overlying backfill. DEQ recommends expanding this Section to include ISS swell.

- c) **Section 31 23 25 – ISS Cap.** Paragraph 1.09A requires rough grading of the ISS soil mixture. DEQ recommends providing further direction regarding the desired grades and lines for the ISS soil mixture.

9) **Appendix H, Design Drawings.** DEQ has the following comments:

- a) **Drawing Sheet 2, Existing Site Plan.** The DNAPL Plume and Oil N Sil Plume boundaries do not appear to match those presented in Figure 22.
- b) **Drawing Sheet 4, In-Situ Stabilization Plan and Profile.**
 - i) Add a note stating that where columns exist on the boundary between two treatment areas, the top of the target mixing zone should be the higher of the two treatment areas, and the bottom of the target mixing zone should be the lower of the two treatment areas.
 - ii) Add a note specifying any trench protection requirements or details.
 - iii) The Plan includes a callout stating that the stormwater pipe may be mixed in-situ when within the ISS implementation area. DEQ's preference is to remove stormwater pipes within the ISS implementation area.
- c) **Drawing Sheet 7, Area C Excavation Plan.** Add a profile detail of Trench 2 that shows the anticipated excavation side slopes, and trench features.
- d) **Drawing Sheet 8, ISS Process Flow Diagram.** DEQ requires a demarcation layer between reused backfill and the surface aggregate layer.
- e) **Drawing Sheet 9, Erosion and Sediment Control Plan.** Clarify the reference to carbon in Note 9.

Editorial Comments

- 1) For clarity, DEQ recommends the title of Figure 22 be changed to "Maximum PDI Chlorobenzene Concentrations in Soil."
- 2) "Geotechnical" is spelled incorrectly on the title page for Appendix E.
- 3) Appendix F, Table 3 – The units of the tabulated numbers are not indicated.
- 4) Appendix H, Existing Site Plan – The plan labels several areas as "Existing Potential Stockpile Area." DEQ recommends striking the word "Existing" unless soils are currently being stockpiled.
- 5) Appendix H, Erosion and Sediment Control Plan – The plan shows "Existing Haul Routes" and other "Existing" features. DEQ recommends striking the word "Existing" if these features do not currently exist.

EPA has also reviewed the ISS PDI report. EPA's did not have comments on the ISS PFDR. However, EPA indicated several EPA comments provided on the 30 percent design were deferred to the final design report. EPA is waiting to confirm those comments have been incorporated into the future final design report.

Please contact me at 503-860-3943 or by email at Katie.Daugherty@deq.oregon.gov if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Katie DAUGHERTY". The signature is written in a cursive style, with the first name "Katie" in a more fluid script and the last name "DAUGHERTY" in all caps with a slightly more formal, though still cursive, touch.

Katie Daugherty, R.G.
Project Manager
Cleanup Program
Northwest Region

ecc Laura Hanna, EPA
 Brendan Robinson, ERM