REGION 10
SEATTLE, WA 98101

January 10, 2025

MEMORANDUM

SUBJECT: EPA Comments on In Situ Stabilization Pre-Design Investigation
Arkema Inc. Facility, Portland, Oregon
ECSI #398
December 9, 2024

FROM: Eva DeMaria, Remedial Project Manager
Superfund and Emergency Management Division

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TO: Katie Daugherty, Project Manager
Northwest Region Cleanup Section, Oregon Department of Environmental Quality

The following are the U.S. Environmental Protection Agency's (EPA's) comments on the document titled *In Situ Stabilization Pre-Design Investigation* (ISS PDI Report). The ISS PDI Report was prepared by Environmental Resources Management, Inc. (ERM) for Legacy Site Services LLC. The Former Arkema Inc. Facility (site) is located at 6400 NW Front Avenue in Portland, Oregon and listed as Environmental Cleanup Site Information (ECSI) #398. The site is located adjacent to the Willamette River upland of the River Mile 7 West (RM7W) remedial design project area within the Portland Harbor Superfund Site (PHSS). The ISS PDI Report has been prepared to present Phase 1 of the investigation and sampling activities completed to inform the pre-design of Interim Remedial Action Measure (IRAM 1). EPA understands the goal of IRAM 1 is to address the monochlorobenzene source area using a combination of excavation, in situ stabilization/solidification (ISS) and/or in situ chemical oxidation (ISCO) technologies, and the treatment area of IRAM 1 focuses on dense nonaqueous-phase liquid (DNAPL) present in soil and groundwater.

EPA's comments are categorized as "Primary," which identify concerns that must be resolved to achieve the objective; and "To Be Considered," which, if addressed or resolved, would reduce uncertainty, improve confidence in the document's conclusions, and/or best support the objectives.

Primary Comments

1. The Arkema upland remedy design group should evaluate, parallel with the design and construction of this ISS remedy, the potential influence the proposed ISS remedy will have to the

current groundwater flow regime. This evaluation would focus on understanding potential effects of the displacement of groundwater storage replaced by the remedy feature, resulting changes to groundwater level conditions (if any) and changes in groundwater flow and flow paths that may require adjustments in the existing hydraulic containment control system upgradient of the barrier wall.

2. The conclusion in Section 7, first paragraph, second sentence stating that "*The horizontal extent of DNAPL is well constrained, and DNAPL does not extend into Willamette River sediments*." should be removed as it is premature to make this conclusion until PDI Phase 2 data, which are intended to refine the lateral extent of the DNAPL, are presented and evaluated. For example, Cross-Section 1-1' (Figure 12) shows the NAPL extent abruptly ending at PDI-08 where it is present, yet there is no additional subsurface data towards the river to confirm the absence of NAPL.

To Be Considered

1. EPA recommends providing an explanation on how the offshore borings, presented in the transect location map and cross-sections (transects) extending into the river, were used in evaluating and delineating the horizontal extent of the DNAPL.

2. It is apparent the approved PDI Work Plan used sonic boring drilling methods with no split spoon sampling noted. Performing traditional geotechnical soil sampling to obtain additional soil parameters could be used with correlations for soil parameters. Since the treatment area is contained to the upland area and the final product will be stronger than the existing soils, strength data for constructability may be needed for the design. Presenting historical borings showing blow counts or any other lab testing may be useful to inform this topic.

3. The proposed use of sodium persulfate ISCO in combination with stabilization/solidification may have some synergies. For example, the high pH of the Portland cement environment can favor the formation of highly reactive sulfate and hydroxide free radicals, particularly under the higher temperatures due to the heat of formation generated during curing of the cement. Persulfate reacts slowly with natural soil organic matter preserving reactant for chlorobenzene. However, high concentrations of chloride can act as scavengers for sulfate free radicals, resulting in a reduction in the effectiveness of persulfate. The former salt pads are adjacent to the NAPL plume suggesting that chloride concentrations may be high in some areas. Consider addressing chloride in the bench-scale study.

4. Residual or mobile DNAPL which cannot be destroyed by ISCO may require stabilization/solidification additives such as organoclay or lime/fly ash. Consider these additives in the bench-scale study.

5. Section 5 (Interim Remedial Action Measure #1 Conceptual Design), discusses, but does not fully explain the difference between this conceptual design option and others considered. It is confusing in Section 5.3 Paragraph 2 Bullet Points 1 and 3 which state that clean soil from 0 – 10 feet below ground surface (bgs) will be excavated and stockpiled but Section 5.4 states that approximately 5.0 to 15.0 feet bgs will be excavated. This is further exacerbated in Appendix E

which provides figures showing 3 different options of excavation depths (5, 10, and 15 feet bgs) but the Conceptual Mixing Plan in Sheets 7 and 8 only indicate 5 feet bgs excavation depth. Please add clarification on the extent of the proposed conceptual design.