REGION 10
SEATTLE, WA 98101

May 7, 2024

MEMORANDUM

SUBJECT: Comments on the GWET System Effectiveness Evaluation
Arkema Inc. Facility, Portland, Oregon
ECSI # 398
March 29, 2024

FROM: Laura Hanna, RG, Remedial Project Manager
Superfund and Emergency Management Division, EPA

TO: Katie Daughtery, RG, Project Manager
NWR Cleanup, Oregon Department of Environmental Quality

The following are the U.S. Environmental Protection Agency's (EPA's) comments on the document titled *GWET System Effectiveness Evaluation, Arkema Inc. Facility, Portland, OR* (Report). The 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 Report focuses on the groundwater upland source contaminant transport pathway.

The Report provides an update on the current performance of the Groundwater Source Control Measure (GW SCM), discusses corrective actions implemented to improve the performance of the GW SCM, evaluates the extent of capture currently achieved by the GW SCM, and proposes actions to improve hydraulic capture. EPA's comments are categorized as: "Primary," which identify concerns that must be resolved to achieve the objective, or "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. **General comment on hydraulic capture based on groundwater elevation evaluation line of evidence.** Given that the Report presents an evaluation of hydraulic capture behind the

groundwater barrier wall, EPA expects relevant figures and information that support the evaluation and conclusions to be provided in the main body of the text. Instead, this document refers the reader to Appendix A that contains over 400 pages of summary technical memos which requires the reviewer to locate and evaluate the information pertinent to what is being presented in the Report. With the current format approach, EPA can only tentatively accept the conclusions stated in the Report with regards to hydraulic capture based on the groundwater elevation evaluation line of evidence. Future Reports should present relevant figures and information supporting the narrative, evaluation, and conclusions in the main body of the document.

To Be Considered

1. **Section 4.1.1 GWET Well Extraction Rates and Relationships with Seasonal Conditions, pages 12 through 13, Tables 1a and 1b and Figure 3b:** The text should explain the purpose of presenting average operational monthly recovery well extraction rates (Table 1b and Figure 3b). EPA notes that the project groundwater flow model indicates an average monthly extraction rate of 60 gallons per minute is necessary to achieved capture zone objectives, so the comparison of this modeled extraction rate is relevant to the average monthly recovery well extraction rates presented in Table 1a. It is unclear what the purpose is for developing and presenting the data in Table 1b/Figure 3b. EPA suggests Table 1b/Figure 3b be removed from the Report to avoid confusion if a purpose cannot be articulated for an operational average flow rate.

2. **Section 7.3 Statistical Data Evaluation Methodology, page 20:** Only data from a "historical" period (i.e., 2007 to 2010) and a "current" period (i.e., 2019 to 2023) have been used in the used in the evaluation, which included a Mann-Kendall test for trends over the total "study" period of 2007 to 2023. It is unclear whether data from 2010 to 2019 do not exist or if those data have been excluded for some other reason. Attempting to detect trends over a 17-year period with an 8-year data gap (i.e., 2011 to 2018) in the middle is inadvisable. If no data for this period exist, or if events during this period (e.g., construction of barrier wall in 2012, startup of pump and treat system in 2014) resulted in non-monotonic trends, then an alternative statistical test should be employed. For example, if a Mann-Kendall test applied to the current period for a well fails to detect a trend, then a generalized Wilcoxon test (Helsel 2012, page 171) could be used to evaluate if the measurements from the two periods are significantly different (note that expanding the historical period to include more than four measurements would probably be advisable to achieve adequate statistical power.) The statistical evaluation currently includes a comparison based on orders-of-magnitude, but a generalized Wilcoxon test would be able to detect smaller differences while also accounting for censored information caused by non-detect concentration measurements.

3. **Appendix C Mann-Kendall Scatterplots and Trend Analysis:** The Appendix B tables indicate that the number of samples for the historical period (i.e., 2007-2010) is four for sampling locations with data, but the scatterplots in Appendix C only show two datapoints. Clarify why four datapoints are not shown in the scatterplots for the historical period.

References

Helsel, Dennis R. 2012. Statistics for Censored Environmental Data Using Minitab and R. John Wiley & Sons.

cc: David Lacey, DEQ
Katie Young, CDM Smith