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MEMORANDUM | April 15, 2026

TO	Katie Daugherty and David Lacey, Oregon Department of Environmental Quality (DEQ)
FROM	Peter Shanahan, HydroAnalysis LLC (HALLC); Jennifer Hart and Gail Fricano, Industrial Economics, Inc. (IEc)
SUBJECT	Five Tribe review of four reports related to groundwater monitoring at the Arkema upland site, dated March and April 2026

This memorandum, submitted on behalf of the Five Tribes,[1] reviews four documents related to groundwater monitoring and the interim remedial action measure (IRAM) involving in situ soil stabilization (ISS) at the Arkema upland site. All four reports were prepared by Environmental Resources Management, Inc. (ERM) on behalf of Legacy Site Services LLC (LSS). The reports are: (i) the *Updated Groundwater Source Control Measure Monitoring Evaluation Memorandum* (SCM Memorandum, ERM 2026a); (ii) the *IRAM 1 Performance Monitoring Evaluation Memorandum* (Performance Monitoring Memorandum, ERM 2026b); (iii) the *IRAM 1 Well Decommissioning Completion Report* (Well Report, ERM 2026c); and (iv) the *Arkema Quarter 4, 2025, Groundwater Monitoring Report* (Q4 Monitoring Report, ERM 2026d).

Comments on the SCM Memorandum (ERM 2026a)

1. Section 4.2.1 puts forward an approach for monitoring and statistically analyzing concentration data to determine whether contaminants of concern (COCs) are migrating from the site, around or beneath the groundwater barrier wall (GWBW), to the Willamette River. While this approach provides some rigor for the identification of COC migration, we are concerned that it could result in an arduous and inefficient process. Trends in COC concentrations will often be readily apparent. Rather than delay evaluating trends in an annual statistical analysis, we recommend including provisions to flag and follow up on noteworthy observable changes each quarter. For example, some wells may be sampled monthly rather than quarterly on an interim basis and additional field-based assessments may be warranted (as discussed in Step 4 of Section 4.2.1).

2. The SCM Memorandum indicates that hydraulic head will be measured in some wells using transducers and in other wells by manual measurement, but provides no rationale for the division of wells between those two methods nor the differences in the data that will be collected or their processing. We recommend that additional information be provided to explain these potential differences. This comment applies to the Performance Monitoring Memorandum as well.

[1] The five tribes are the Confederated Tribes of the Grand Ronde Community of Oregon, the Nez Perce Tribe, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Warm Springs Reservation of Oregon.

Comments on the Performance Monitoring Memorandum (ERM 2026b)

3. Section 2 indicates that wells in clusters PMW-02, PMW-03, PMW-05, and PMW-06 will not be sampled during ISS implementation due to their proximity to ISS operations. We recommend that these wells be sampled unless they are inaccessible or sampling would create a safety hazard. We recognize there may be times when these wells cannot be sampled, but if possible, it seems preferable to collect this potentially important data during ISS implementation.

Comments on the Well Report (ERM 2026c)

4. For the wells that were discovered to have been previously abandoned (NMP-3S, NMP-5S, NMP-6S), we recommend LSS thoroughly inspect the wells to confirm they were decommissioned properly and ensure the appropriate paperwork was filed.

Comments on the Q4 Monitoring Report (ERM 2026d)

5. This quarterly groundwater monitoring report is the first that depicts elevation contours in the gravel zone. Figure 5 shows that well MWA-76g is an obvious outlier, with a head value more similar to the higher heads in the overlying zones than to the lower heads in other gravel- and basalt-zone wells. The high head suggests a break in the casing or other fault in well MWA-76g such that it is not actually measuring head in the gravel zone but rather in some overlying zone.

    a. We recommend well MWA-76g be inspected to ensure it is intact.

    b. We recommend that the head value for MWA-76g be omitted for purposes of constructing the contour map in Figure 5. As discussed, the value is questionable and including it in the contouring indicates there is flow to the northwest from MWA-76g to MWA-77g, or flow parallel to the river. This is contrary to what we would expect; flow is expected to be more or less perpendicular to and towards the river.

    c. If MWA-76g is indeed connected to overlying zones, it could create a conduit for groundwater to migrate from the shallow and intermediate zones to the gravel and basalt zones (the deep zone is absent in this area). ERM (2024) does not show the shallow and intermediate zones to be particularly contaminated in this area, which mitigates concerns about potential migration from these units. However, artificial connections between hydrogeologic zones should generally be avoided.

6. The change in scale from Figures 2, 3, 4 and 5 to Figure 6 is difficult to track. We recommend the data presented in Figure 6 be displayed at the same scale as the other figures.

7. The legends in Figures 7 through 17 show the lowest numerical concentration category with a greater-than sign when it should be a less-than sign.

8. Section 3.2.2.1 notes that the highest concentration of chlorobenzene was observed in basalt zone well PMW-04b but fails to note that this is a new well and that this reading and other high readings in new basalt zone wells signal more widespread contamination of the basalt-zone groundwater than previously known. Other COCs are also high in basalt zone wells at PMW-04, -05, and -06 including tetrachloroethylene (PCE), organochlorine pesticides (DDx),

perchlorate, and/or chloride. We recommend these facts and their implications be discussed in the report. The findings also suggest that new wells should also be considered in the gravel zone in the PMW-04 and PMW-05 clusters.

9. Well PMW-08b is omitted on Figure 33.

References

Environmental Resource Management, Inc. (ERM). 2024. Trespass Contamination Determination. Environmental Resources Management, Inc., Portland. Oregon. February 14.

Environmental Resource Management, Inc. (ERM). 2026a. Updated Groundwater Source Control Measure Monitoring Evaluation Memorandum. Environmental Resources Management, Inc., Portland. Oregon. March 31.

Environmental Resource Management, Inc. (ERM). 2026b. Interim Remedial Action Measure 1 Performance Monitoring Evaluation Memorandum. Environmental Resources Management, Inc., Portland. Oregon. March 31.

Environmental Resource Management, Inc. (ERM). 2026c. IRAM 1 Well Decommissioning Completion Report. Environmental Resources Management, Inc., Portland. Oregon. March 23.

Environmental Resource Management, Inc. (ERM). 2026d. Arkema Quarter 4, 2025, Groundwater Monitoring Report, Arkema Inc. Facility, Portland, Oregon, Prepared for Legacy Site Services LLC. Environmental Resources Management, Inc., Portland. Oregon. April 2.