HydroAnalysis

TECHNICAL MEMORANDUM

To: Jim Orr and David Lacey, Oregon Department of Environmental Quality

From: Peter Shanahan, HAI

Subject: **Review of Proposed Source Control Decision for Mt. Hood Chemical**

Date: April 22, 2020

This review of DEQ's proposed Source Control Decision (SCD) (DEQ, 2020) for the Mt. Hood Chemical upland parcel has been prepared on behalf of the Five Tribes[1].

Substantive Comments

1. While we concur with DEQ's conclusion that most compounds do not pose a serious threat for the groundwater pathway at the Mt. Hood site, we do not agree with that conclusion with respect to trichloroethylene (TCE). Page 9 of the proposed SCD lists a number of lines of evidence to support their conclusion that there is not a groundwater pathway of concern. As discussed in Comment 2 below, the contention that modeling shows contaminants will attenuate before reaching the river as indicated by Line of Evidence Item 4 does not appear to be correct. This further invalidates Items 6 and 8. Based on the available information, Item 7 does not appear to be correct for this site—the gradient is not "flat" and the direction of groundwater flow appears to be straight towards the river. In summary, our assessment of groundwater transport indicates a likely complete pathway for TCE to reach the river at concentrations above Portland Harbor Cleanup Levels (CULs).
   Propose to not rely on model presented in SCE or Tribes model but use Dan's line of evidence. Correct the statement that the gradient is flat with a value. Not flat but not as steep gradient.

2. The proposed SCD reproduces the entirety of an analysis of groundwater transport at the site presented by GeoDesign (2019) as Attachment 4. Unfortunately, the original presentation is incomplete and appears to be erroneous in some respects. With the Domenico (1987) model used by GeoDesign, concentrations decrease along the path of the plume due to lateral and vertical dispersion and first-order degradation. GeoDesign fails to detail how they derived these values and other important parameters in their model. All dispersivity values appear to be high compared to Gelhar et al. (1991) and Xu and Eckstein (1995). The value of the vertical dispersivity is notably high—Gelhar et al. (1992) and Garabedian et al. (1991) report vertical dispersivities on the order of a millimeter while GeoDesign uses 1.6 feet. This overestimation of the dispersion results in significant underestimation of concentrations at the river. We used the BIOCHLOR model (Aziz et al., 2000) to complete a screening-level analysis of the GeoDesign

[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.

results. We used Aziz et al.'s recommended dispersivity values but otherwise the same parameters as GeoDesign. This BIOCHLOR model predicted steady-state concentrations of TCE that were well above the CUL at the river. Even with the source concentration reduced from the historical high concentration (2030 µg/L) to the current high concentration (216 µg/L), BIOCHLOR continued to predict concentrations of TCE above the CUL at the river. This is consistent with observations at many sites that TCE can be extremely persistent in aerobic groundwater (see Pankow and Cherry, 1996, pg. 81). Groundwater was most likely aerobic prior to on-site remediation and likely remains aerobic outside the small area on site where treatment has occurred. Based on this, we do not believe GeoDesign (2019) demonstrates convincingly that the groundwater pathway to the river can be eliminated for this site.

3. We accept DEQ's characterization that the stormwater pathway does not pose a significant contamination threat to the river.

4. DEQ concludes on page 10 that "the likelihood of facilitated groundwater transport in the stormwater conveyance lines is low" because the South Private Line was abandoned in 2011. The proposed SCD describes this line to be "at or beneath the water table." A more complete explanation of the character of this line is required. Even if grouted, a stormwater sewer could provide a pathway for groundwater and contaminant flow. Stormwater and other utility lines are typically constructed on gravel backfill which constitutes a preferential pathway for groundwater independent of the sewer pipe itself. However, in their memo regarding site stormwater lines, GeoDesign (2010) notes that there does not appear to be bedding or backfill under the South Private Line. This information is significant insofar as mitigating concerns about preferential groundwater flow along this sewer line and should be noted in the SCD.
Comment noted but the evidence noted in the SCE no gravel bedding is observed, the line was abandoned and does not have flow noted through the pipe or bedding.

Editorial Comments

5. Pg. 2. Replace "The investigations suggested the presents…" with "The investigations suggested the presence…"

6. Pg. 5. Replace "4-isopropyltolune" with "4-isopropyltoluene"
Agree with comments 5 and 6.

7. Pg. 7. Domenico (1987) is cited but not included in the list of references.
If the model is not used the reference is not needed.

Cited References

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