



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 5  
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November 20, 2015

Mail Code: SR-6J

Kristopher D. Krause, P.E.  
TRC, Inc.  
708 Heartland Trail, Suite 3000  
Madison, Wisconsin 53717

**SUBJECT: Comments on Lemberger Landfill Source Control Evaluation, Lemberger Landfill, Whitelaw, Manitowoc County, Wisconsin, September 2015”, Transmitted to USEPA 11 September 2015**

Dear Mr. Krause,

The Agencies have reviewed the above mentioned report and have attached specific comments and suggestions to this cover letter. Based on this review, the Agencies conclude the following:

- The LL source has had minimal contribution to the overall chlorinated solvent contamination in bedrock, relative to the LTR source;
- Overall, the contaminant concentrations monitored over time in the wells within the leachate area have dropped significantly;
- There are no indications of significant impacts outside the slurry wall where apparent gaps in the wall were noted; and
- Groundwater monitoring near the LL should continue in order to evaluate and ensure that groundwater is not being impacted by the LL source.

If you have any questions, please feel free to call me to discuss.

Sincerely,

A handwritten signature in black ink, appearing to read "Demaree Collier".

Demaree Collier, RPM

cc: T. Beggs, WDNR (electronic only)  
D. Dougherty, Subterranean Research (electronic only)

**Comments on Report from TRC for LSRG Entitled “Lemberger Landfill Source Control Evaluation, Lemberger Landfill, Whitelaw, Manitowoc County, Wisconsin, September 2015”, Transmitted to USEPA 11 September 2015**

The subject report reviews the results of data collection at and near the Lemberger Landfill (LL) in 2014 and 2015, and interpretations based on those data, historically collected data, the site conceptual model, and professional judgments.

The data are quite encouraging and go a long way toward resolving the LL extraction well questions. The leachate water quality has improved since earlier (2000) sampling. At LW-07, comparing these data to a 2010 sample indicates reductions in 1,1-dichloroethane, methylene chloride, and xylene, although benzene concentrations fluctuated and were not significantly changed. Note that water level measurements at LW-07 indicate that groundwater has intruded into the waste.

The main limitation of the study is that the study conditions differ from the endpoint that would occur if the LL extraction wells were never again used, i.e., one in which perched groundwater levels within the LL rise over time to a new quasi-equilibrium where the waste becomes resaturated. There are no data to indicate what will happen to the perched groundwater quality levels within the LL or their impacts outside of the LL under such conditions. Note also that there are no indications of significant impact outside of the LL currently.

This report's recommendations provide only a few strokes of a follow-up plan, rather than a fully developed sketch. We would concur with a plan that calls for continuing with no LL extraction, continued monitoring, and retaining a contingency for future active management of LL leachate if required. The continued monitoring would include water levels and water quality, and the latter may be at a reduced frequency for some constituents. As outlined in the “roadmap” developed in the 15 May 2014 meeting, it may be fruitful to develop MNA data for the LL.

Following are some copy-editing corrections and minor comments on the document:

1. PDF page 5, second complete paragraph, line 8: To clarify, insert the word “water” after “leachate” (there are two occurrences).
2. PDF page 10, Section 2.2.1, line 5: Correct “RM-707S” to read “RM-207S”.
3. PDF page 11, line 4: Change “was contained” to “slurry wall and cap were constructed.”
4. PDF page 11, first complete paragraph, last sentence: The phrase “suggests the leachate is not generated from the same source, and the wells may not share a common hydrologic connection” can be made clearer. The leachate's common source is the overlying waste which is heterogeneous in composition and water content, which leads to heterogeneous leachate. The perched groundwater in this area has a sand unit as common hydrologic connection; there is some evidence that suggests differences in hydrologic connection of the wells to the waste, migration downward through the perching materials, and the possibility of differing degrees of landfill cap and well seal permeability. Conclusively establishing any of these is a burdensome proposition that will have little bearing on major conclusions and recommendations. Therefore, we suggest revision to a simpler phrasing that is somewhat less dramatic.

5. PDF page 11, end of page: Taken together, the paragraphs in this section indicate that the southeast and southwest areas within the LL differ. It would be useful to incorporate a couple sentences on the central and northern areas of the LL, likely linking them to the southwest area, and then making a summary identifying two “zones”. (This is implied, yet requires the reader draw conclusions.)
6. PDF page 12, paragraph 1, next to last sentence: The sentence regarding the “water balance model” seems out of place—What water balance model? While the description in the last complete paragraph on PDF page 5 identified a need to “revisit the water balance model”, where is it shown or discussed?
7. PDF page 12, paragraph 1, last sentence: In what way is it “better”? Fewer uncertainties? Fewer errors in estimating parameters needed for water balance?
8. PDF page 12, paragraph 2, sentence 4: Can delete “(EMP)” as it is not used elsewhere. The second half of the sentence should be revised, because it says monitoring external to the LL will “determine if leachate levels will continue to rise and document any changes to the leachate chemistry”—this is goal is pertinent to the next sentence.
9. PDF page 12, last line: The phrase “with an ESD to **allow no further leachate extraction** at the LL” (emphasis added) could be misconstrued as meaning “not allow further leachate extraction”, when we would presume the meaning is “not require further leachate extraction”. Please clarify.
10. Table 1, pages 1 and 2: Change footnote to “D = sample diluted during laboratory for analysis” (clarifies the dilution was not inadvertent). Also, define qualifier “M1” (page 2, RM-302S, cis-1,2-DCE).
11. Figure 1, Legend:
  1. Two lines below “Cross section lines”, define “CU”.
  2. On fourth line below, what does “1/9-6/15” mean? (Obviously some dates, but “January 9 through 6, 2015” doesn’t make sense.)
  3. Consider posting the estimated bottom of waste at each well, along with water level and top of confining unit.
12. Appendix A:
  1. Suggest adding event markers to all hydrographs for (a) cessation of P&T operation on 8/1/2006 and (b) cessation of LL extraction well operation on 12/10/2008. This will help the eye. For example, the hydrographs for RM-5I and RM-5D indicate water level increases that are discernible in late 2006, while RM-301S suggests a discernible change at the start of 2009. The latter is upgradient from the LL, while RM-5S and RM-302S are “side-gradient”—this suggests the possibility of some cross-wall leakage during LL extraction.
  2. Suggest adding base of well to the hydrographs for LW-series wells. (Already shown for LH-series of wells.)
  3. The hydrograph for LW-01 shows a very slow, steady increase in water level since the end of LL pumping. No sustained rise is observed in nearby wells LH-06 and LH-07. However, LH-06 and LH-07 heads are volatile, with episodic rapid increases and decreases, and the response at LH-07 is slower than at LH-06.
    1. The following figure shows the water levels above the bottom of the well versus time since the end of leachate well pumping (12/10/2008). The plot shows that LH-06 responds to impulse recharge to a greater degree than LH-07. It also shows that after an impulse causes a rise in water level, there is a slower response

(decay) at LH-07 than at LH-06. Note that in the initial months after leachate pumping ended, the water level above base of well was essentially zero at LH-07 much longer than at LH-06—we hypothesize that this is simply water level at LW-01 did not rise above the base of LH-07 for those months. (See PDF pages 32-34.) Note also that there are some cases where the magnitude of the rise at LH-07 is (uncharacteristically) greater than at LH-06, such as in April 2012; we hypothesize that the peak rise at LH-06 was not observed given the frequency in the water level monitoring program. This makes sense because LH-06 responds quite rapidly to impulses of infiltration.

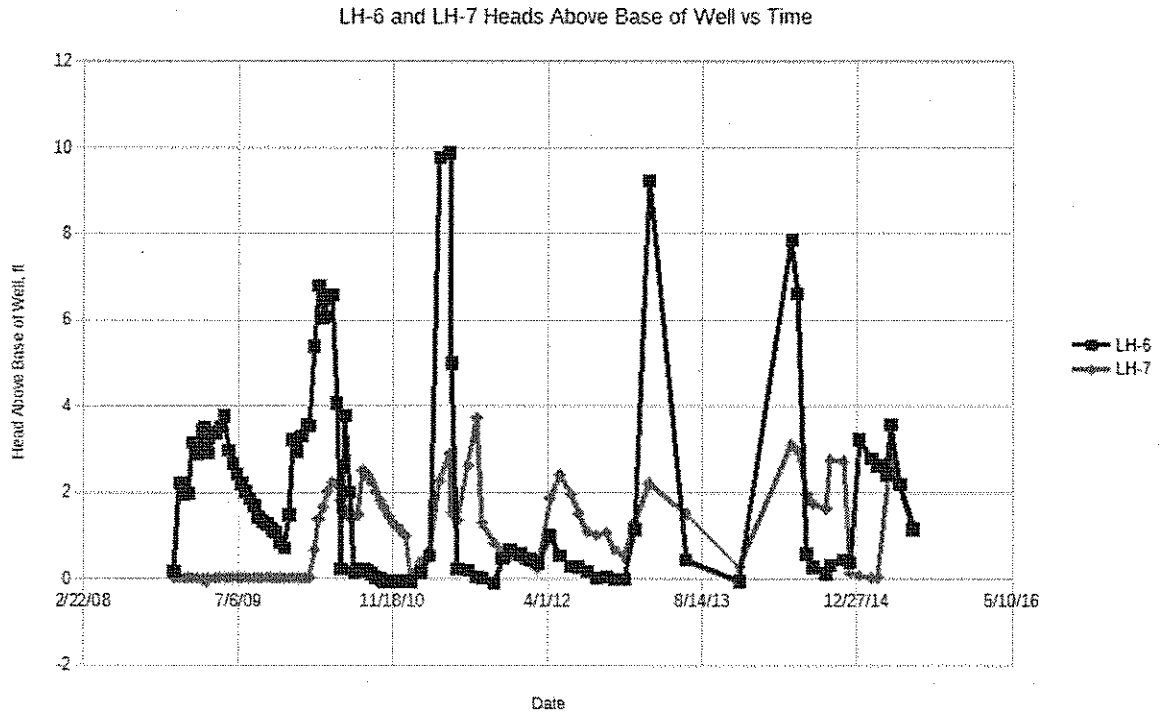


Figure: LH-06 and LH-07 heads vs time, plotted as heads above the base of the well (not as elevations). Only data since the cessation of leachate extraction are plotted.