

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

October 17, 2013

TO: Sybil Kolon, Pall Life Science (PLS) Project Manager, RRD
Jackson District Office

FROM: Jim Coger, Geologist, RRD *JC*
Jackson District Office

SUBJECT: Review of the May 22, 2013, PLS Report, Analysis of 1,4-Dioxane Trends at MW-103s.

I have reviewed the subject submittal. PLS acknowledges in the first paragraph of the analysis that "1,4-dioxane levels in groundwater sampled from MW-103s have increased slowly over time and in late 2012, the rate of increase accelerated". The March 5, 2013, sample results from MW-103s indicates that 1,4-dioxane was detected at 96 ug/l. MW-103s is located approximately 300 feet north of the Southern Prohibition Zone Boundary (PZ). The generic residential cleanup criterion for 1,4-dioxane in groundwater is 85 ug/l.

There are no compliance monitoring wells located immediately south of MW-103s that monitor 1,4-dioxane concentrations at the PZ. For these reasons, PLS agreed to sample MW-103s at a monthly frequency.

PLS incorrectly depicts the 85 ug/l isoconcentration line in the September 2012 – April 2013, 1,4-dioxane Isoconcentration Map, as being located/orientated east/west at MW-103s. The March 2013 sample results noted above clearly reflect that the interpolated 85 ug/l isoconcentration line should be located an undefined distance south of MW-103s.

At the DEQ's request, PLS provided Geologic Cross Sections for monitor wells in the MW-103/PZ area on June 26, 2013. These cross sections were prepared by Fleis & Vandenbrink Engineering, Inc. The west to east, A – A' cross section, (MW-87s/d – MW-98s/d) depicts a thick continuous sand unit with till stringers/lenses. The shallow and intermediate depth monitoring wells in the MW-103s area, appear to be hydraulically connected with shallow and intermediate wells that currently have 1,4-dioxane concentration levels significantly higher than 85 ug/l (MW-87s, MW-115, MW-83s, and MW-76s) in the Maple Village area.

As discussed at our July 22, 2013, meeting with PLS, the Potentiometric Surface Map Unit E (March 15, 2013) depicts a groundwater flow direction from southwest to northeast for the MW-90, MW-76 nest, and MW-103s general area. This interpretation is contrary to previous PLS interpretations that the "Unit E" groundwater contaminant plume flows generally easterly from Wagner Road toward downtown Ann Arbor and the Huron River. The orientation of the potentiometric flow lines (northwest/southeast) does not correlate with PLS's interpolation of contaminant distribution as depicted in the (September 2012 – April 2013) isoconcentration maps.

Contrary to PLS's potentiometric contouring in the MW-103s area, the 1,4-dioxane isoconcentration map strongly supports a conceptual site flow model based on a west to east contamination migration pattern.

Irrespective of the plume migration semantics discussion (plume widening vs plume migration) addressed in the PLS analysis, 1,4-dioxane is migrating from the Maple Village area to the east. 1,4-dioxane was detected at 320 ug/l in monitoring well MW-76s in May 2013. MW-76s is located approximately 750 feet west and north of MW-103s. The upward trends observed by PLS in MW-76s and MW-103s in late 2012 reflects that higher concentrations of 1,4-dioxane, associated with the west-east plume axis has the potential to flow (disperse/migrate) to the south. When 1,4-dioxane concentrations exceed 85ug/l at MW-103s it indicates that the buffer zone between MW-103s and the PZ is not adequate for concluding that the PZ is a protective institutional control.

Groundwater sample results from the last three monthly sampling events reflect that concentration levels have declined in MW-103s, and MW-76s.

Data from area monitoring wells MW-115, MW-84s, MW-83s, MW-76s, MW-103s, and MW-112s, including contaminant concentration levels/trends, potentiometric head elevations, hydraulic gradients, and attenuation factors, should be evaluated by PLS and incorporated into a conceptual site model (CSM). The CSM should identify the PZ as a receptor, and assess what hydrogeological conditions may result in a flow regime, or contaminant distribution changes, that result in upward or downward contaminant trends. A comprehensive review of site characteristics may identify contaminant fate and transport conditions that result in plume movement to the south.

Recommendations:

PLS should continue to monitor monitoring wells MW-76s/i, MW-103s and MW-112s/i on a monthly basis.

PLS should develop a Conceptual Site Model for the MW-103s area of concern.

If 1,4-dioxane concentrations in MW-103s exceed 85 ug/l again, response activities addressing hydraulic control, additional monitoring wells, and/or changes to the prohibition zone boundary must be assessed.

If you have any questions or comments, please let me know.

cc: Mr. Mitchell Adelman, DEQ