

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

---

INTEROFFICE COMMUNICATION

---

TO: Sybil Kolon, Pall Life Science (PLS) Project Manager  
Remediation and Redevelopment Division  
Jackson District Office

FROM: Jim Coger, Geologist  
Remediation and Redevelopment Division (RRD)  
Jackson District Office

DATE: October 31, 2007

SUBJECT: Performance Review Wagner Road Interim Responses (WRIR), dated August 3, 2006 and March 2007, Submitted by Pall Life Sciences, (PLS)

This memo provides my comments on the above referenced submittals from PLS, which address remedial investigation activities performed in April and May 2006 by PLS, and provides an evaluation of the monitoring data collected subsequent to the 2006 and 2007 response activities for the Wagner Road area. My comments address two areas of concern with the WRIR. The monitor well locations referenced below can be found on the attached Figure 1.

**Unit E 1,4-Dioxane Isoconcentration Contour Map:**

The investigation done to-date by PLS has not been sufficient to delineate the vertical and horizontal extent of the Unit E contamination. In particular, the extent of Unit E contamination has not been defined north of purge well TW-11, north of monitor well MW-30d, west/northwest of technical boring GSI 98-02, and east/northeast of Third Sister Lake. The following deficiencies have been identified:

- Figure 5 of the March 2007 WRIR, Unit E 1,4-Dioxane Isoconcentration Contour Map – January 2007 (Figure 5), appears to rely on data from purge well TW-11 to plot Unit E isoconcentration contours for the area north of TW-11. Data from extraction wells are not comparable to data from monitoring wells screened at discrete depth intervals, and thus can not be used as a basis for defining the nature and extent of contamination.

In addition, the November 2001 vertical profiling data collected during installation of purge well TW-11, and the adjacent technical boring, GSI 98-03 installed in July 1998, indicates that 1,4-Dioxane contamination was encountered throughout the saturated interval, from 60 to 190 feet below ground surface (bgs). The boring log for GSI 98-03 does not indicate that the interval from 120 feet to 190 feet bgs was profiled in 1998. The boring log for TW-11 reflects that three samples were collected from the 149 to 190-foot interval. The 1,4-Dioxane concentrations, in this interval, ranged from 1,800 micrograms per liter (ug/l) to 3,100 ug/l. There are no vertically profiled monitor wells north of TW-11 that establish the vertical distribution of contamination, or define the northern extent of Unit E contamination to 85 ug/l, between Wagner Road and monitor well MW-66; a distance of approximately 2,400 feet.

- 1,4-Dioxane concentrations in MW-30d have increased significantly since 2001. 1,4-Dioxane was detected at 1,133 ug/l in monitor well MW-30d during the July 2007 sampling event. The horizontal and vertical extent of Unit E contamination has not been defined north of the MW-30d location.

Figure 6 of the March 2007 WRIR, Unit E Potentiometric Surface Contour Map (Figure 6), depicts the groundwater flow direction for the area proximal to MW-30d as being from west/northwest to the east/southeast. Figure 6 reflects that the source of Unit E contamination in MW-30d is from an area north/northwest of MW-69. Figure 5 does not depict any Unit E contamination north of MW-69. However, there are no vertically profiled monitor wells west of MW-30d characterizing the nature and extent of contamination, or that establish potentiometric data for groundwater flow direction determinations.

- Technical boring GSI 98-02, located approximately 350 feet northwest of MW-30d, encountered 1,4-Dioxane concentrations ranging between 7,580 – 8,600 ug/l at depths corresponding to the Unit D2 aquifer when installed in 1998. The boring was not advanced to bedrock, or to a depth sufficient to determine if the Unit E aquifer is contaminated in this area. The vertical extent of contamination and hydraulic connection between the impacted Unit D2 aquifer and the Unit E aquifer has not been established for the area west of PLS 98-02/MW-30d. Additional investigation is required west of GSI 98-02/MW-30d to determine the source of 1,4-Dioxane contamination in MW-30d.
- Vertical profiling of technical boring PLS 04-01 detected low concentrations of 1,4-Dioxane in March 2004. However, the vertical profiling data from this temporary boring cannot be relied upon to represent current contaminant conditions.

Sufficient vertical profiling and hydrogeological investigation activities have not been completed for the area west of monitor well MW-105d to establish a basis for drawing the Unit E isoconcentration contours shown on Figure 5, or for determining groundwater flow direction shown on Figure 6. Figure 5 appears to represent that there is no Unit E contamination, west or southwest (upgradient) from monitor well MW-105d. The source of contamination in monitor well MW-105d has not been determined.

#### **Hydraulic Capture at Wagner Road:**

As referenced above, the hydrogeological investigations conducted to-date have not adequately defined the northern extent of the Unit E plume north of purge well TW-11 or west and north of monitor well MW-30d. The northern extent of the Unit E plume must be adequately defined before the ability of TW-18 to capture the northern edge of the Unit E plume can be determined.

The concentration of 1,4-dioxane in monitor well MW-105d was 872 ppb in April 2007 and 932 parts per billion (ppb) in July 2007. The concentration in this well has decreased since the first sample was collected (1,104 ppb in August 2006); however,

additional data needs to be collected over time to determine if there is a downward trend. Figure 6 depicts a "west to east" groundwater flow direction for the area immediately west and north of MW-105d. The static groundwater level at MW-105d was measured at 873.0 feet above mean sea level (amsl), in February 2007. The static groundwater level in Unit E monitor well MW-95 (873.40 in February 2007), located between purge well TW-18 and MW-105d was higher; indicating that purge well TW-18 has little or no hydraulic influence at MW105d. The current Wagner Road purge system does not influence hydraulic control at MW-105d and is, therefore, failing to prevent further migration of 1,4-Dioxane, above 85 ug/l from migrating east of Wagner Road.

**Recommendations:**

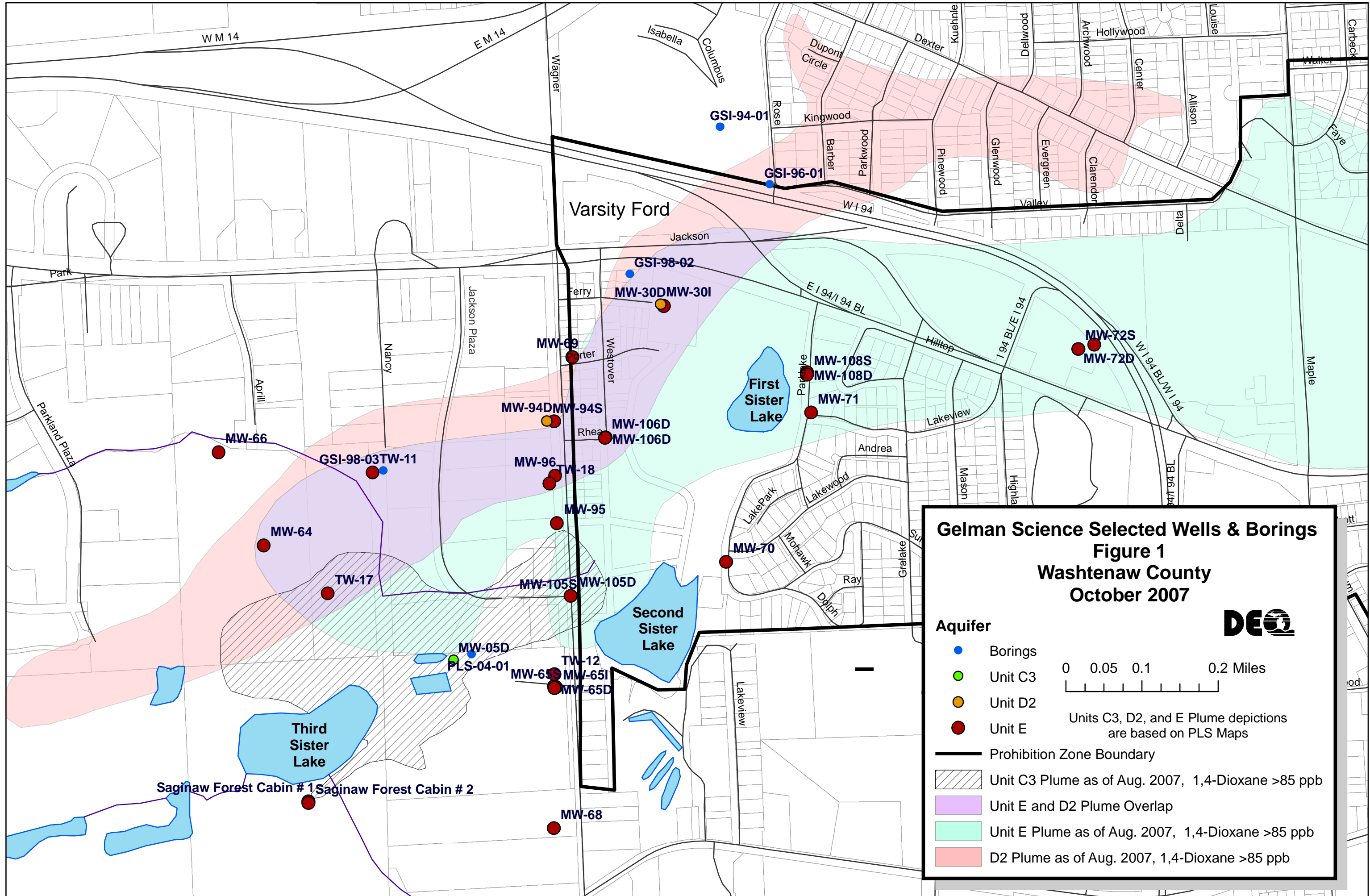
- A monitor well is needed north of TW-11, in the Nancy Drive area, to define the nature and extent of Unit E contamination.
- One or more monitor wells are needed north of MW-30d to define the horizontal and vertical extent of Unit E contamination. The monitor well location(s) should determine if 1,4-Dioxane above 85 ug/l has migrated north beyond the Prohibition Zone Boundary.
- A monitor well is needed west/northwest of boring GSI 98-02. A monitor well at this location is needed to define the nature and extent of Unit E contamination and to help determine the source of contamination found at MW-30d.
- A monitor well may be needed in the area northeast of PLS 04-01 to support PLS's interpretation of contaminant distribution and groundwater flow direction. The need for a monitor well between PLS 04-01 and MW-105d will be contingent on review of additional monitoring data from MW-105d.
- Upon defining the nature and extent of contamination north and south of purge well TW-18, modifications to the existing Wagner Road purge systems may be required to prevent groundwater contamination, above 85 ug/l, from migrating east of Wagner Road.
- All monitor wells should be vertically profiled, at 10-foot intervals, to bedrock. Nested wells should be installed contingent on review of the vertical profile data and boring logs descriptions.

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

CJ/KJ

Attachment: Figure 1

cc: Mitch Adelman, RRD  
R. Dowe Parsons, RRD



**Gelman Science Selected Wells & Borings**  
**Figure 1**  
**Washtenaw County**  
**October 2007**

**DEQ**

**Aquifer**

- Borings
- Unit C3
- Unit D2
- Unit E

Units C3, D2, and E Plume depictions are based on PLS Maps

— Prohibition Zone Boundary

Unit C3 Plume as of Aug. 2007, 1,4-Dioxane >85 ppb

Unit E and D2 Plume Overlap

Unit E Plume as of Aug. 2007, 1,4-Dioxane >85 ppb

D2 Plume as of Aug. 2007, 1,4-Dioxane >85 ppb

0 0.05 0.1 0.2 Miles