PHASE 2 REPORT

DOWNGRADIENT GROUNDWATER INVESTIGATION

OF THE

UNIT E PLUME

PALL LIFE SCIENCES
ANN ARBOR, MICHIGAN

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INTRODUCTION

This report summarizes data collected by Pall Life Sciences (PLS) during the most recent phase of PLS' ongoing investigation of the fate of the Unit E plume. PLS undertook the activities summarized in this report pursuant to its *Work Plan for Downgradient Groundwater Investigations and Potential Underflow of the Huron River* (DGWP), dated October 7, 2004. The DGWP was approved by the Michigan Department of Environmental Quality ("MDEQ") in February 2005. The DGWP was intended to: (a) determine the probable migration pathway of the Unit E plume as it moves hydraulically downgradient; (b) establish that the pathway for 1,4-dioxane will remain within the Prohibition Zone (PZ); and (c) determine whether 1,4-dioxane within the Unit E plume will eventually migrate to the Huron River. The DGWP was prepared in response to the MDEQ's request that PLS demonstrate that the Unit E plume will not underflow the Huron River above Generic Residential Cleanup Criteria (September 1, 2004, Unit E Decision Document - Condition 5)[1]

The DGWP was divided into two sections, Part A and Part B. Part A of the DGWP described the steps PLS would take to investigate the migration pathways of the Unit E plume as it moves hydraulically downgradient of the Maple Road area. Part B described the steps PLS would take to investigate the potential for underflow of the Huron River – to be pursued as warranted, pending the findings of Part A.

PLS identified eight tasks in Part A of the DGWP that were subdivided into two separate phases of data collection, data analysis, and reporting as follows:

<u>Part A , Phase 1</u>
Task 1 – Boring/Well Installation
Task 2 – Groundwater Sampling
Task 3 – Water Level Data Collection
Task 4 – Data Analysis

<u>Part A , Phase 2</u>
Task 5 – Well/Boring Installation
Task 6 – Groundwater Sampling
Task 7 – Water Level Data Collection
Task 8 – Data Analysis

[1] For purposes of this Report, the "Unit E plume" refers to the potential for 1,4-dioxane to migrate within the Unit E aquifer along specific flow pathways. This reference is not a prediction about whether or if 1,4-dioxane at concentrations above 85 µg/L will actually reach the Huron River (or other locations downgradient). It is beyond the scope of this investigation to project the distance that 1,4-dioxane concentrations above 85 µg/L will migrate downgradient.

PLS submitted a report in March 2006 that summarized the Part A, Phase 1 work (see below). Part A, Phase 2, Tasks 5 through 8, are the subject of this report and build on the findings of the Part A, Phase 1 investigation. The main objective for the Phase 2 portion of the investigation was to follow up on the findings of the Phase 1 investigation.

REVIEW OF THE FINDINGS FROM THE PART A, PHASE 1 INVESTIGATION

A report on Part A, Phase 1, Tasks 1 though 4, of the downgradient investigation was submitted to the MDEQ in March 2006 (the "Phase 1 Report"). Test borings/monitoring wells were installed at four locations during Phase 1: MW-97s and d, MW-98s and d, MW-99s and d, and MW-102s and d. The test well locations are shown on Figure 1. PLS had initially proposed an additional boring/well in the vicinity of Mulholland Drive; however, the boring/well was not installed during Phase 1 due to concerns regarding strong-flowing artesian conditions. PLS and the MDEQ agreed to postpone the decision to replace this boring/well location until the collective data from the Phase 1 investigation were reviewed.

Part A, Phase 1 data indicated the Unit E plume will migrate eastward, toward the Allen Creek Drain, then turn northeastward, toward the Huron River. Based on these and other findings, PLS identified two areas located between the MW-97 and MW-102 well clusters where more hydrogeological information was needed. These data gaps were addressed during the Phase 2 portion of the investigation.

PART A, PHASE 2 DATA COLLECTION

WELL BORING/WELL INSTALLATION (TASK 5)

Five test boring locations were installed east of Maple Road during Part A, Phase 2 of the DGWP. A total of eight monitoring wells were installed at the five test boring locations: MW-103s and d, MW-104, MW-110, MW-111, and MW-112s, i, and d. The test well locations are shown on Figure 1. Test wells MW-104 and MW-110 were installed primarily for the purpose of further defining the northern PZ. MW-103s and MW-112s, i, and d were installed to monitor the area between the Unit E plume and the Montgomery Well Field. PLS also addressed the two areas located between the MW-97 and MW-102 well clusters where more hydrogeological information was needed. PLS installed boring/well MW-111 in the first area, which was near the confluence of the Allen Creek Drain and the Huron River. The second area was in the vicinity of Mulholland and Liberty Drives. PLS was fortunate to obtain access and data from several borings/wells in this area from Eaton Corporation's (Eaton) study of groundwater contamination associated with the former Eaton facility located at 315 South First Street, Ann Arbor, Michigan. Atwell-Hicks performed this study on behalf of Eaton. All these wells provided geological, water quality, and water level data valuable to this investigation. All locations were approved by the MDEQ.

Hollow-stem auger drilling methods were used at each test boring/well location. Each test boring was drilled to depths sufficient to encounter bedrock. Split-spoon and Simulprobe sampling methods were utilized for collection of soil and soil/groundwater, respectively. Split-spoon samples were collected in the non-water-bearing zones at a frequency of 10 feet, beginning at a depth of approximately 10 feet below ground surface (bgs) and extending downward to a depth at the approximate uppermost water-bearing zone (within 10 feet of the observed saturated conditions). In the water-bearing zones, soil and groundwater samples were collected at a frequency of 10 feet using the Simulprobe sampler. Soil and groundwater sampling continued throughout the aquifer(s) to the total depth of the boring. All soil samples were described/classified by an onsite Fishbeck, Thompson, Carr & Huber, Inc. (FTC&H) geologist. Soil samples were described based on their physical characteristics during the drilling of each boring, and representative groundwater samples were collected using a Simulprobe sampler. Groundwater samples were transferred to PLS under chain-of-custody documentation. All groundwater samples were analyzed by PLS for 1,4-dioxane to a detection level of 1 microgram per liter (µg/L).

Upon reaching the total depth of each boring, as determined by the onsite FTC&H geologist, the borehole was geophysically logged using a natural gamma tool. Nested monitoring wells were installed at the MW-103 and MW-112 boring locations. A single well was installed at the MW-104, MW-110, and MW-111 boring locations. All wells were installed for the primary purpose of obtaining representative water level data. Each well was constructed of 2-inch galvanized-steel casing, equipped with a 5-foot stainless-steel (10-slot) well screen. The test screen annulus was gravel packed, and the well casing was grouted with a bentonite slurry injected with tremie pipe. The test wells were completed as flush mounts and equipped with locking caps and locks.

Soil cuttings and development water, derived from the drilling, were containerized and transported back to PLS for appropriate management. Test borings/well logs and natural gamma logs for each downgradient location are provided as Appendix 1.

GROUNDWATER QUALITY

Simulprobe samples were collected from the well borings to guide installation of the wells. The Simulprobe groundwater samples data are included on the well logs provided in Appendix 1. PLS collected groundwater samples from all available Unit E wells during the period March 2006 through October 2007, pursuant to MDEQ-approved sampling schedules. The groundwater analytical data collected during this period from the Unit E test wells, installed pursuant to the DGWP, are provided in Appendix 2. These data are discussed later in this report.

WATER LEVEL AND ELEVATION SURVEY

Geospatial data for the wells were obtained by Atwell-Hicks. Top-of-casing and ground elevations for the new wells were referenced to NAVD88, and x, y coordinates were referenced to Michigan State Plane Coordinate System, Michigan South (NAD83).

PLS collected two rounds of static water level measurements from selected Unit E wells during March and September 2007. The March 2007 findings were incorporated into both the PLS Second Quarterly Report (2007) and the Evergreen System Review, dated May 2007. This first round included the new wells that were installed by that date (all but the MW-112 cluster). The second round of static water level measurements collected on September 13, 2007, included all new downgradient wells, plus water levels from the wells at the former Eaton facility and the observation well located next to the Montgomery Well. Water level data collection for the September 13, 2007 event also includes surface water elevations from the same five locations surveyed along the Huron River in the Phase 1 Report. These locations begin immediately upstream of the Allen Creek Drain/Huron River confluence.

All survey-related data collected for this investigation are provided in Table 1. Water level data report sheets are provided in Appendix 3.

DATA ANALYSIS

PLS has conducted extensive investigations into the geology and hydrogeology of the Unit E plume area. Data from the current investigation augments the available hydrogeological data east of the current extent of the Unit E plume, as reported in the Phase 1 Report. For uniformity, all maps provided in the Phase 1 Report have been updated with the most recent boring, well, and analytical findings and are provided herein. The interpretations provided represent PLS' current analysis of the available data and are subject to change with the gathering of additional geologic and hydrogeologic data.

BEDROCK ELEVATION AND DRIFT THICKNESS

The bedrock underlying the Unit E plume and areas east to the Huron River is the Mississippian Coldwater shale. Figure 2 shows the updated map of the bedrock surface in the area of the current Unit E plume and eastward from Maple Road. The bedrock surface map was generated using Surfer® Version 8 (Surfer). The bedrock contours are based on information from PLS' test borings/wells (including the wells installed specifically for this investigation) and incorporates limited well and boring information from other sources. None of the Atwell-Hicks borings/wells from the Eaton facility encountered the bedrock.

The bedrock surface slopes away from the Unit E plume area and generally toward the Allen Creek Drain and Huron River. An eastward trending bedrock low is present beginning in the Maple Village area and continues toward the Allen Creek Drain. This remains consistent with the preliminary interpretation PLS offered in its DGWP.

A topographic surface map is provided as Figure 3. Data for the contours are based on a map provided by the City of Ann Arbor for the March 2006 Phase 1 Report. Surface elevations generally decline eastward, away from the current position of the Unit E plume (918 feet), toward the Allen Creek Drain (<820 feet) and Huron River (<787 feet). East of the Allen Creek Drain, the surface elevations generally increase, forming a channel-like depression along the Allen Creek Drain.

Figure 4 shows the updated Isopach Map of the drift thickness. Figure 4 was prepared by creating a residual map between the bedrock surface and the topographic surface. Drift thickness values are based on information from PLS' borings/wells and contoured using Surfer. The map indicates a general thickening of the drift within the interpreted bedrock low. Drift thickness generally decreases with proximity to the Huron River, primarily because the topographic surface lowers from approximately 920 feet above mean sea level (amsl) in the current location of the Unit E plume to approximately 790 feet amsl along the river. Drift thickness in the area where the Unit E plume is currently located generally ranges from 200 to 300 feet

HYDROSTRATIGRAPHY

Well data collected for the Phase 2 investigation were used to update the hydrostratigraphic cross sections A-A' through E-E', prepared during the Phase 1 review. One new cross section (F-F') was prepared along the northern boundary of the data set. The location of each cross section is shown on Figure 5. Cross sections A-A' through F-F' are provided as Figures 6 though 11, respectively. Each cross section was prepared by grouping similar lithologic units into hydrostratigraphic units. Strata composed predominantly of fine-grained materials (e.g., silts and clays) have been shaded in green on the cross sections. These strata generally represent material having a relatively low hydraulic conductivity and generally constitute confining units for the area. Strata composed predominantly of coarse-grained materials (e.g., sands and gravels) generally represent material having higher hydraulic conductivity and constitute aquifer units for the area. These units have been shaded in yellow. Significant interpretations based on review of the cross sections are described below. Figure 12 shows the updated total sand thickness below the "undifferentiated" deposits at each boring/well location. Review of Figure 12 facilitates an understanding of the geometry of the water-bearing units within the glacial drift sequence. The mapped sands generally trend eastward and correspond to the general distribution of ice contact outwash (orange) shown on the MDEQ's Glacial Land Systems Map for this area (see Figure 14). Both maps similarly focus on sand-rich deposits along the Allen Creek Drain, then toward the Huron River.

Key comments and observations regarding the hydrostratigraphy are as follows:

- Over the scale of the investigation area, the aquifer systems are not hydraulically isolated from each other, yet separations in the aquifers occur throughout much of the investigation area. These separations are relevant to understanding the flow pathways of the Unit E plume as it migrates hydraulically downgradient.

- Given the distribution of test boring and well data in the downgradient area, the correlations presented on the cross sections have a degree of uncertainty. Alternative correlations are entirely possible.

- Stacked sand/gravel sequences are found in the area of Maple Road, where a bedrock low is present.

- Review of the cross section data indicates the upper sand unit at Maple Road intersects the ground surface as it approaches the Allen Creek Drain and Huron River. This geometry promotes groundwater venting to surface water.

Thinning of the total sand volume (Figure 12) with proximity to the Huron River is graphically shown on cross section A-A'. Sands generally thin eastward from the West Park-73 boring, toward the Allen Creek Drain and Huron River. This is observed at MW-102 and MW-111, located east of the Allen Creek Drain. Thinning of the sand and gravel units to the east may be an artifact of a thinner drift sequence.

- The thickest sand/gravel sequences (aquifers) are positioned along an east-west trend that corresponds to a low in the bedrock surface. The sand/gravel sequences thin to the north and south. The position of the Unit E plume appears to correlate to this sand/gravel trend.

- The thickest sand sequence appears to be in the area of MW-76 (approximately 211 feet).

GROUNDWATER FLOW

Potentiometric surface maps are provided for water level data collected during March 13 and September 13, 2007. March 2007 data were used to prepare a potentiometric surface map for the Unit E plume in areas east of MW-72 (Figure 13a). This map recognizes historic water level data from measurements at the City of Ann Arbor's Montgomery Well and PLS' boring West Park-73. Water level data collected during September 2007 (Figure 13b) includes water level data from all new downgradient wells, including data from the Atwell-Hicks borings/wells No. 1 and No. 7 at the former Eaton facility, the Montgomery Well Field (OW-2), and surface water elevations along the Huron River. This map also

shows groundwater flow data from three other non-Pall related contaminated sites that are discussed later in this report. Both maps represent the flow interpretation based water level data from wells completed in deeper hydrofacies relevant to the Unit E plume or its potential flow path.

Review of the potentiometric surface maps shows the horizontal groundwater flow direction east of Maple Road is generally toward the east and turns northeastward toward the Huron River, in the area of the Allen Creek Drain. This flow direction is consistent with the underlying bedrock surface and the geometry of the drift deposits. This flow is also consistent with the glacial landforms of the area. A comparison of the potentiometric surface map and the glacial land systems map (source) is provided as Figure 14. A review of the map shows a strong relationship between the potentiometric surface in the Allen Creek Drain corridor and ice-marginal outwash deposits, as delineated on the MDEQ's Glacial Land Systems Map.

The horizontal hydraulic gradient of the September 2007 potentiometric surface downgradient from Maple Road to the Huron River ranges between 0.0015 and 0.04 foot/foot. The gradient steepens considerably with proximity to the Huron River.

Vertical hydraulic gradients were calculated from the September 13, 2007 water level data measured at well cluster locations. Calculated values ranged from 0.0706 foot/foot downward to 0.3668 foot/foot upward. Calculated values of vertical hydraulic gradient are provided in Table 2. A contour map of the vertical hydraulic gradient data is provided as Figure 15. The blue and red shaded areas shown on Figure 15 are areas with downward and upward vertical gradients, respectively.

Areas of flowing artesian groundwater flow conditions may exist east of MW-98, toward the Huron River. PLS used Surfer to generate a residual between the topographic and potentiometric contours for this area. The updated residual map is provided as Figure 16. The area of likely flowing artesian is shown as green contours.

Key observations made from the March and September 2007 potentiometric surface maps, plus Figures 14 and 15 are as follows:

- Steep horizontal gradients are observed close to Maple Road and generally coincide with a bedrock low and thinner sand sequences in the Maple Road area. Gentle hydraulic gradients near MW-83 become generally steeper east of MW-82, toward the Huron River.

- Downward gradients are predominant in the western portion of the study area. Upward hydraulic gradients become predominant closer to the Huron River. This information suggests the western portion of the study area is a groundwater recharge area, while the eastern portion of the study area is a groundwater discharge zone.

- Flowing artesian conditions are found in areas close to the Allen Creek Drain and the Huron River. Strong upward hydraulic gradient between the lower and upper hydrofacies suggests the likelihood of groundwater discharge to the Huron River, rather than underflow.

- The potentiometric surface contours form a “V” shape on the Allen Creek Drain corridor. The shape of this feature is such that it tends to “block” groundwater from moving eastward, along the river corridor in areas east of the Allen Creek Drain. The presence of this hydraulic feature is expected to “funnel” groundwater toward the river. This feature is consistent with the presence of coarse-grained ice-marginal outwash deposits in this area mapped by others and shown on the glacial land-systems map (Figure 14).

1,4-DIOXANE DISTRIBUTION AND TRENDS

An updated 1,4-dioxane isoconcentration map, presented as Figure 17, has been prepared using the most recent 1,4-dioxane data collected from the Unit E wells and newly installed borings/wells. 1,4-Dioxane data suggest the majority of the Unit E plume is advancing in shallower, rather than deeper, hydrofacies. This is demonstrated by a review of 1,4-dioxane trend graphs for grouped shallow and deep monitoring wells provided below as Figures 18 and 19.

Figure 18

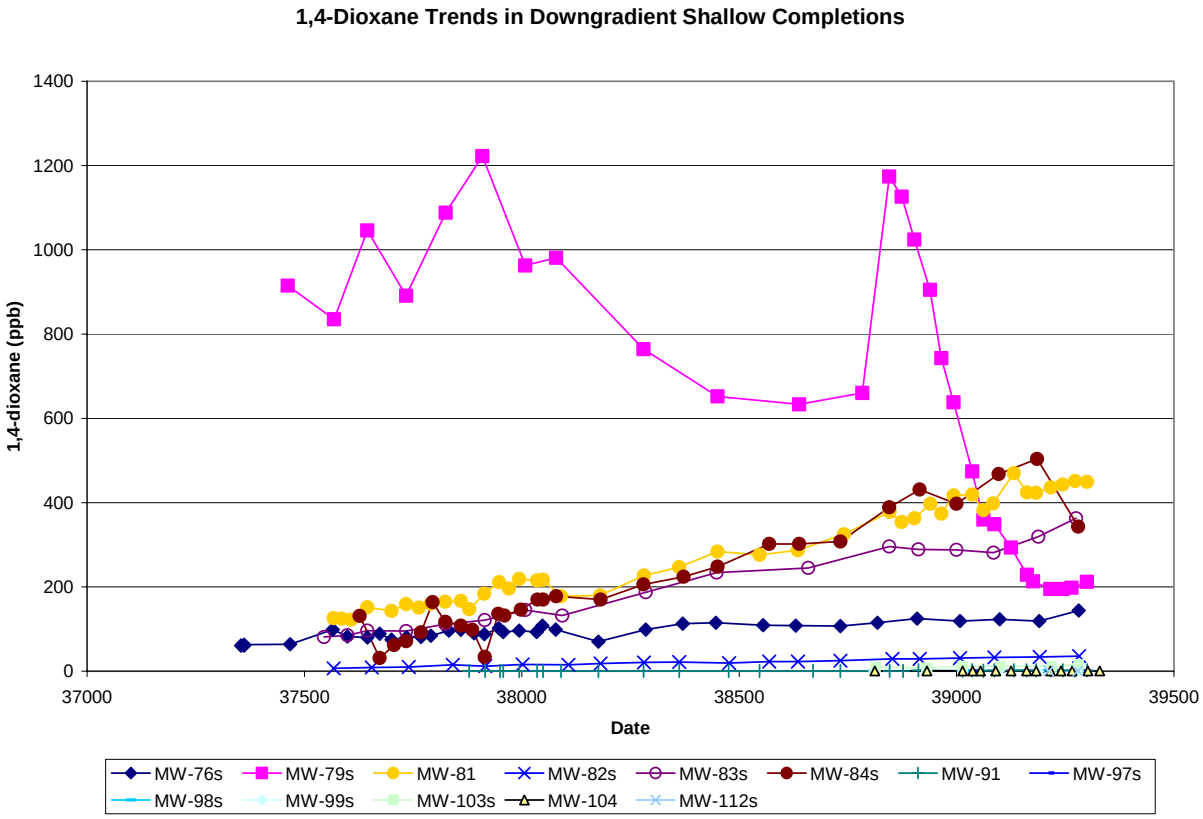
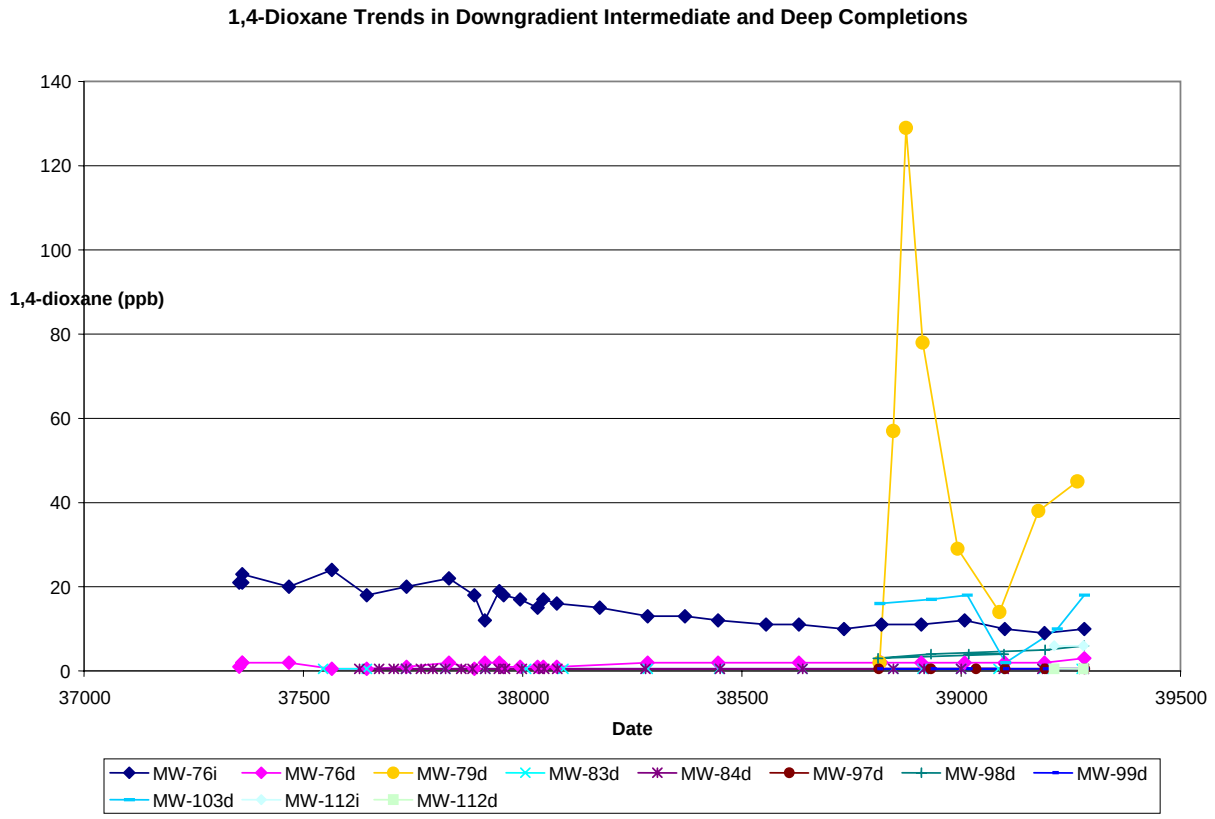

1,4-Dioxane Trends in Downgradient Shallow Completions
1,4-dioxane (ppb)
1400
1200
1000
800
600
400
200
0
37000
37500
38000
38500
39000
39500
Date
MW-76s
MW-79s
MW-81
MW-82s
MW-83s
MW-84s
MW-91
MW-97s
MW-98s
MW-99s
MW-103s
MW-104
MW-112s

Figure 19



The plume is migrating in a direction consistent with the groundwater flow. Furthermore, the groundwater flow data is the best indicator of the future pathway of the plume. It is expected that the plume will follow a pathway predicted by the groundwater flow, with some level of dispersion along this pathway.

ANALYSIS SUMMARY

Data from the Phase 1 and Phase 2 Part A investigation provide considerable insight into the probable pathway of the Unit E plume as it migrates hydraulically downgradient.

Key findings from the Phase I and 2 Part A investigation are:

- The hydrogeological conditions identified during this study indicate the Unit E plume will migrate eastward, toward the Allen Creek Drain, then turn northeastward, toward the Huron River, where it will vent into the Huron River.

- The predicted pathway of the Unit E plume is well within the existing PZ. The findings of this investigation suggest there is no need to adjust the boundaries of the PZ to accommodate the projected pathway of the Unit E plume.

PART B INVESTIGATION: HURON RIVER UNDERFLOW/VENTING REVIEW

Data from the Part A investigation confirm the Unit E plume will migrate toward the Huron River within the PZ boundaries. The data also demonstrate it is highly unlikely that water from the Unit E plume would underflow the river. As such, only limited additional investigation into the potential for underflow of the Huron River (Part B investigations) is warranted.

PRELIMINARY REVIEWS

As a preliminary data search (Part B – Task I of the PLS October 2004 Work Plan), FTC&H (on behalf of PLS) requested a Freedom of Information Act (FOIA) review of MDEQ records for select sites located on the Huron River in the general proximity to the Argo Dam. Information related to physical hydrogeological conditions was the primary focus for our review.

FTC&H reviewed three sites of particular interest:

1. The University of Michigan (U of M) North Campus Landfill (Landfill No. 3). This site is located on the opposite side of the Huron River, downstream of the southern boundary of the PZ.

2. DTE Energy's former manufacturing gas plant "Broadway Street Site" located on the west bank of the Huron River, immediately downstream of the Allen Creek Drain outfall.

3. A review of the Barton Hills Wellhead Protection study was also performed. This site is located east of Barton Pond (Huron River).

The locations of these three sites are shown on Figure 13b.

U OF M LANDFILL NO. 3

Points of interest related to the U of M Landfill No. 3 FOIA review include the following:

- **Location** – The U of M Landfill No. 3 is located on the opposite side of the Huron River, downstream from the Argos Dam, the Allen Creek Drain outfall, and the southern boundary of the PZ. The landfill site constitutes 42 acres and 4 fill areas: Fuller Road Landfill, Frederic Farms, Landfill No. 3, and Fill Area No. 4.

- **Geology** – General geologic conditions in the area are similar to areas investigated by PLS proximal to the Huron River. Numerous borings and wells are installed at the landfill area. Cross section data indicate the presence of a shallow aquifer, underlain by a thick clay (till) confining unit, and underlain by a confined aquifer. Bedrock was encountered at approximately 640 feet amsl at a well in Furstenberg Park.

- **Groundwater Flow** – Groundwater data from a Dragun Corporation's April 2000 and September 2001 sampling event for the site area shows groundwater flow direction is generally southeastward, toward the Huron River.

- **Surface Water** – An intermittent stream crosses the landfill to eventually become a tributary to the Huron River. Chemicals of concern were assessed in water samples from the stream. Of particular interest, 1,4-dioxane concentrations in the stream were as high as 216 µg/L near SW-5 in 2000.

- **1,4-Dioxane in Groundwater** – In groundwater, 1,4-dioxane was measured up to 1,100 µg/L (MW-X) in 2000.

DTE ENERGY BROADWAY STREET SITE (841 BROADWAY STREET SITE)

This site, shown on Figure 13b, is strategically located along the Huron River, where the Unit E plume is likely to discharge. This site has been well studied, and information from this site is very useful to evaluate the geological and hydrogeological conditions in this important area.

Points of interest related to the Broadway Street Site FOIA review include the following:

- **Site Geological Conditions** – The deeper wells installed at the site are only about 60 to 70 feet bgs. Cross section data provided in the Mixing Zone Determination report for the Michcon Broadway Street Site were examined during the FOIA review. These data indicate a shallow, semi-confined sandy unit is present at the site. Greatest sand thickness is found near the river, with upwards of 40 feet of fine to coarse sand with gravel that is underlain by a gray, stiff clay. Copies of cross sections A-A' and B-B' from the RETEC Group, Inc., used in calculating the area of the venting of groundwater at the Michcon Broadway Street Site are provided in Appendix 4. Review of cross section A-A' (Figure 6) shows a similar shallow sand unit at Well 20-2 and in MW-111. This sand unit is interpreted as being in communication with sands associated with the Unit E plume in upgradient areas.

- **Groundwater Flow** – Earth Tech, Inc. prepared several groundwater monitoring reports for this site. Groundwater elevation maps show groundwater flow direction is generally northeastward, toward the Huron River. This direction is consistent with that measured by PLS.

- **Contaminated Groundwater Venting to Surface Water** – One part of the Broadway Street Site study was a preliminary request for a mixing zone determination to allow contaminants of concern to migrate to the river at concentrations above the MDEQ's default Groundwater Surface Water Interface values. Results show several monitoring wells along the Huron River, with groundwater elevations higher than the surface water elevations; which is to say, groundwater is venting to the river at those locations. An area of approximately 900 feet (river length) was identified where groundwater is venting to the Huron River. The estimated discharge rate was calculated at approximately 39 gallons per minute as being the groundwater seepage flux into the Huron River for the portion of the groundwater plume associated with the Broadway Street Site that exceeds the groundwater surface water interface criteria for that site. Copies of select text sections and maps from this review are provided in Appendix 4.

BARTON HILLS WELLHEAD PROTECTION

In 1995, FTC&H performed an investigation for the development of a wellhead protection area for the village of Barton Hills and reported the results in the December 11, 1995, report titled, *Wellhead Protection Delineation Report for the Village of Barton Hills.* The area of this investigation is shown on Figure 13b. Direction of groundwater flow at the Barton Hills delineation area was characterized as being in the direction of surface drainage (toward Barton Pond and the Huron River). Tritium data indicated water from the producing wells was less than 50 years old and suggested recharge to the local confined aquifer system was rapid and from local sources. The target aquifer system was considered to be in hydraulic communication with overlying leaky confining units and aquifer systems.

Information collected from reviews of the Barton Hills and U of M Landfill site indicate groundwater flow on the east side of the Huron River in this area is west, toward the river. This suggests it is unlikely there would be groundwater underflow of the Huron River from the opposite side of the river in this area, which makes sense considering the hydrological significance of the Huron River.

ANALYSIS OF NEED FOR PART B INVESTIGATION

The following interpretations form the basis of the Part B work plan:

1. The potential for the Unit E plume to underflow the Huron River (flowing to the opposite site of the river) is extremely low. Data gathered from two sites located along the relevant stretch of the Huron

River support this interpretation, as does regional interpretations of groundwater flow presented in studies published by others.

2. To the extent 1,4-dioxane migrates through the deeper portions of the drift sequence, upward hydraulic gradients proximal to the Allen Creek Drain and Huron River should cause the plume to begin an upward migration as it moves toward the Huron River. Potential discharge areas for the plume could include: topographic lows, storm drains, the Allen Creek Drain, and the Huron River.

3. It is very unlikely that the plume would discharge into Argo Pond (upstream of the dam), since Argo Pond is a hydraulic high.

4. Data from the DTE Broadway Site demonstrate a significant connection between groundwater and surface water in the area that the Unit E plume is likely to discharge. These data support the conclusion that the Unit E plume will discharge to the Huron River as expected.

Based on the above, it is highly unlikely that the Unit E plume will underflow the Huron River, even if concentrations remain above Part 201 Drinking Water Criterion at the point the plume reaches the river. As such, no further field investigations are planned at this time. The Unit E plume is not currently proximate to the Huron River, and overall concentrations are expected to decline as a result of upgradient extraction efforts and dispersion/natural attenuation. Also, with the passage of time there is the potential for variation of conditions specific to the Huron River itself. Both factors suggest that it would be preferable to observe the migration of the plume, particularly its depth, as it approaches the river. It would be inefficient at best to engage in extensive additional field investigations now, particularly when the data already strongly support that there is little potential for underflow. PLS, in communication with the MDEQ, will continue to evaluate the hydrogeological conditions, including groundwater quality data, as the Unit E plume migrates toward the Huron River. PLS will recommend additional field investigations, if these data suggest that such steps are warranted. Using the FOIA, PLS will also continue its review of sites in the area of interest that may provide relevant data. PLS is aware of several other sites with MDEQ files that may provide such data. PLS will also review information regarding storm water infrastructure in areas where groundwater may discharge to surface water.