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August 27, 2007

Ms. Sybil Kolon
Department of Environmental Quality
Jackson State Office Building
301 E. Louis Glick Highway
Jackson, Michigan 49201

Re: Evergreen System

Dear Ms. Kolon:

Pall Life Sciences submits the enclosed Work Plan for Continued Investigations of 1,4-Dioxane in Groundwater in the Dupont Circle Area.

Should you have any questions regarding this Work Plan, please contact me at (734) 913-6130.

Sincerely,

Farsad Fotouhi

Farsad Fotouhi
Vice President
Corporate Environmental Engineering

cc: Celeste Gill, MDAG
Jim Coger, MDEQ
Alan Wasserman, Esq.
Michael Caldwell, Esq.
Matthew Naud, City of Ann Arbor

Work Plan for Continued Investigations of 1,4-Dioxane in Groundwater in the Dupont Circle Area

August 27, 2007

BACKGROUND

This work plan is for continued investigations of the Dupont Circle area. Dupont Circle is a street located in the western portion of the Evergreen Subdivision where elevated levels of 1,4-dioxane have been detected in groundwater samples. The Evergreen area has been extensively investigated by Pall Life Sciences (PLS), and is an area of active remediation (groundwater extraction from three wells: LB-1, LB-3, and AE-3).

Starting in fall 1998, 1,4-dioxane concentrations in water samples from 465 Dupont Circle began to increase. By April 1999, these levels exceeded 85 micrograms per liter, prompting further investigations into this area by PLS. PLS completed a series of investigations of this area and has provided several reports to the Michigan Department of Environmental Quality (MDEQ) regarding the findings of these investigations. The investigations included, but were not limited to, the installation of monitoring wells MW-54s, MW-54d, MW-55, and MW-77; water quality and level monitoring, tritium analyses, slug testing, and other hydraulic testing.

Significant findings of these investigations included:

1. The wells at 465 Dupont Circle, MW-54d and MW-55, are completed in what appears to be the Unit D2 aquifer (September 24, 2001, PLS report).

Geological data collected by PLS from 465 Dupont Circle, MW-54 and MW-55 locations, suggest these wells are completed in the same aquifer. The data suggest the Unit D2 aquifer is divided into an upper and lower zone by a finer-grained intermediate deposit. This division in the Unit D2 aquifer is believed to be localized to the Dupont Circle area. A cross-section illustrating this interpretation is provided as Attachment 1.

2. The wells in the Dupont Circle area are not believed to be completed in Unit E (E2) (December 11, 1998, PLS report).

Groundwater samples were collected from 465 Dupont Circle and 373 Pinewood (October 1998) and analyzed for tritium. Groundwater sampled from 465 Dupont Circle had tritium concentrations of 8.0 +/- 0.8 TI. This suggests that water from this well received recharge after the 1950s. In contrast, water sampled from 373 Pinewood had a tritium concentration of 1.5 +/- TI. The tritium data suggest the groundwater at 465 Dupont Circle and 373 Pinewood are of different ages. This, along with the geological data, suggests the well at 465 Dupont Circle is not completed in the Unit E (E2) aquifer.

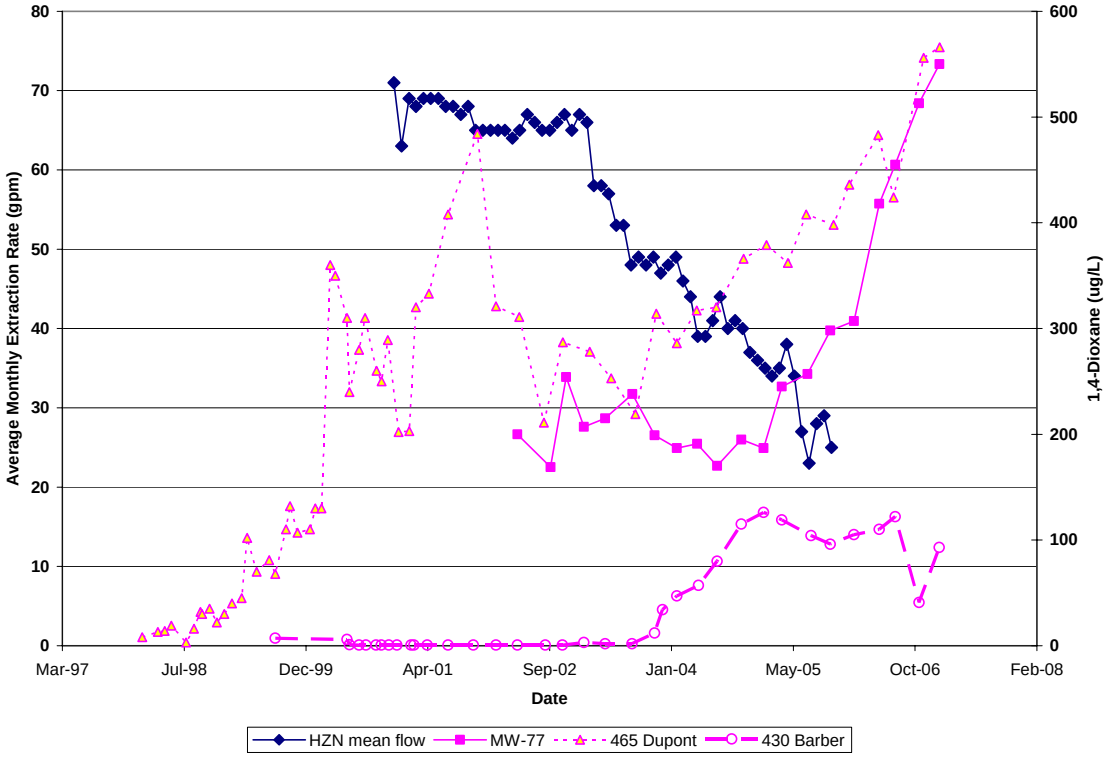
3. 1,4-Dioxane in the Dupont Circle area is believed to migrate toward, and is eventually captured by, the Evergreen extraction system (September 24, 2001, PLS report).

Pumping from LB-1 and LB-2 hydraulically influenced water levels at MW-55, which is in the same portion of the aquifer as 465 Dupont Circle. Furthermore, water level data collected from the Dupont Circle area has shown that groundwater flow in the Dupont Circle area is northeast and/or east. From these data, PLS has concluded that the groundwater in the Dupont Circle area will migrate toward the Evergreen extraction system.

Since August 2002, 1,4-doxane concentrations at MW-KD1d have been increasing. PLS believes the increasing concentrations of 1,4-dioxane at this location correlate to increasing 1,4-dioxane concentrations in the Dupont Circle area. PLS has proposed to further define the northern extent of the Evergreen plume by installing a monitoring well in the area of Hollywood and Dellwood. PLS anticipates this well will provide valuable data regarding the fate of the Dupont Circle area 1,4-dioxane contamination.

PLS recognizes that 1,4-dioxane concentrations in the Dupont Circle area are increasing. PLS believes there is a likely correlation between flow rates at the former North Horizontal Well (NHW) and Dupont Circle area wells. MW-77 clearly responded to the termination of the NHW, while 465 Dupont Circle began an increasing 1,4-dioxane trend in November 2003, as flow rates of the NHW steadily declined. It is important to recognize that the concentrations of 1,4-dioxane in the Dupont Circle area remain consistent with Unit D2 plume concentrations in that area.

Figure 2 – Graph



Plausible explanations for the elevated levels of 1,4-dioxane in the Dupont Circle area include:

1. Localized expansion of the Unit D2 plume in a northeast direction due to localized hydrogeological controls (i.e., preferred migration channels).

2. 1,4-Dioxane migrating from the area around GSI 96-01. If this is true, the Evergreen plume may be wider in the area downgradient of Rose and Valley than depicted on PLS' isoconcentration maps.

The MDEQ has suggested that there is a potential for 1,4-dioxane in the Dupont Circle area to migrate to the northwest. The MDEQ has provided regional potentiometric surface maps in support of this hypothesis. PLS has reviewed these maps and offers the following comments:

1. The groundwater flow direction in the Dupont Circle area suggested by the regional map is consistent with measurements made by PLS (flow to the northeast).

2. The "groundwater divide" in the Evergreen area, as shown on the regional map, does not match data collected by PLS. Data collected by PLS, specifically data from the MW-40 well, next places the divide further west than suggested by the regional map. Water level elevations in the area of MW-40 have consistently been above those elevations measured in Evergreen. It is not possible to honor these data and have a divide like that depicted on the regional map.

The regional map (as provided by the MDEQ) depicting these comments is provided below.

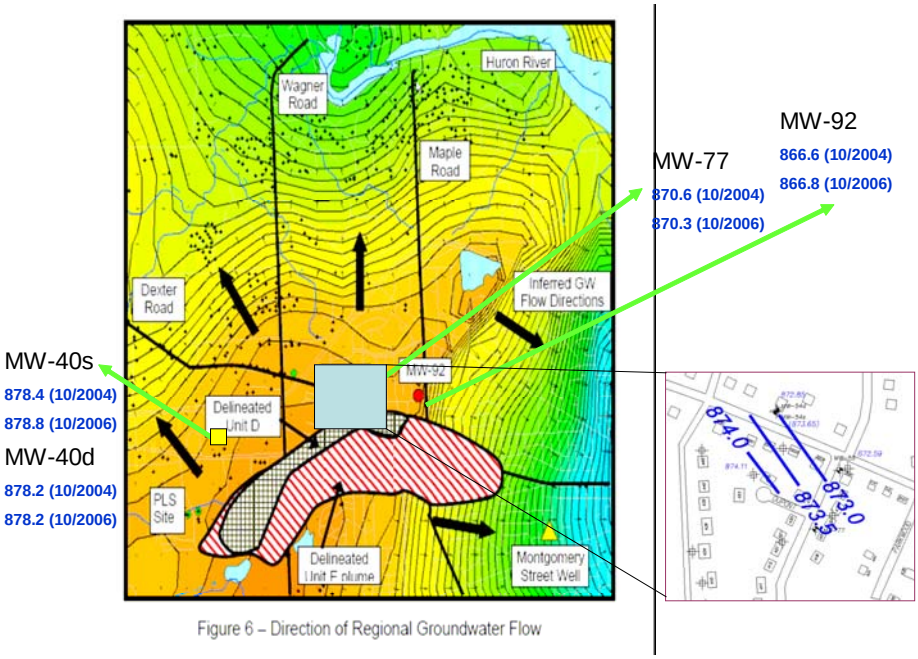


Figure 6 – Direction of Regional Groundwater Flow

PLS cautions against using such regional generalizations of data, especially given the abundant amount of data collected in the PLS area.

In June 2007, the MDEQ sampled groundwater from numerous residential wells in the area northwest of the Dupont Circle area. 1,4-dioxane was not detected in any of the samples. These data provided further support that migration of 1,4-dioxane in the Dupont Circle area to the northwest is unlikely. Nevertheless, PLS agrees this hypothesis warrants some further analysis.

WORK PLAN

PLS believes the exact mechanism behind why 1,4-dioxane has migrated into the Dupont Circle area is not as relevant as the fate of the 1,4-dioxane in this area. As such, the investigations in this work plan are focused on ruling out the possibility that 1,4-dioxane from the Dupont Circle area would migrate beyond the capture of the Evergreen extraction wells.

PLS recognizes that 1,4-dioxane concentrations in the Dupont Circle area are increasing. PLS believes there is a likely correlation between flow rates at the former NHW and Dupont Circle area wells. MW-77 clearly responded to termination of the NHW, while 465 Dupont Circle began an increasing 1,4-dioxane trend in November 2003, as flow rates of the NHW steadily declined. It is important to recognize that the concentrations of 1,4-dioxane in the Dupont Circle area remain consistent with Unit D2 plume concentrations in that area.

WATER LEVEL DATA COLLECTION

PLS proposes to collect water level data from wells in and around the Evergreen subdivision. This data collection will include two new monitoring wells (south of Valley and along Dellwood). It will also include some residential wells located northwest of the Evergreen subdivision.

Table 1 (Attachment) contains a listing of wells from which PLS proposes to collect water level data. If the water level data suggest there is a potential for groundwater to flow northwest from the Dupont Circle area, PLS will install a monitoring well at an appropriate downgradient location (to be determined from the water level data) to detect 1,4-dioxane that could potentially migrate beyond the Evergreen System capture zone. This well will be preceded by a boring to the bedrock surface where vertical aquifer sampling will be performed.

If the data collection confirms PLS' earlier interpretations that the 1,4-dioxane contamination in the Dupont Circle area is migrating toward, and being captured by, the Evergreen extraction wells, PLS will conduct no additional investigations of the Dupont Circle area.

The MDEQ has suggested installation of a well/boring in the vicinity of Rose and Valley. PLS drilled a testing boring at this location (GSI 96-01) using the mud rotary drilling technique. This boring had to be abandoned due to the very difficult drilling problems at this location. Numerous cobbles and boulders were encountered, which ultimately led to termination of the boring before encountering bedrock. Given the significant drilling problems with drilling GSI 96-01, it will be difficult to drill in this particular location again.

SCHEDULE

PLS will collect water level data within one month after the two new monitoring wells (Valley and Dellwood) are installed. PLS will provide the MDEQ with a report of its findings from this investigation within one month of collecting the water level data.

Table 1 - Wells to be Used for Water Level Data Collection

544 Allison	MW-55
593 Allison	MW-56s
170 Aprill	MW-59s
430 Barber East	MW-59d
2652 Dexter Rd	MW-60
2819 Dexter Rd	MW-61s
3313 Dexter	MW-61d
465 Dupont	MW-62i
3365 Jackson Rd	MW-62s
4141 Jackson Road	MW-63i
3245 Kingwood	MW-63s
110 Parkland Plaza	MW-69
373 Pinewood Shallow	MW-71
728 Rose Drive	MW-72d
752 Rose Drive	MW-72s
776 Rose Drive	MW-77
828 Rose Drive	MW-79d
Swim Club 4"	MW-79s
Swim Club 6"	MW-81
3480 Wagner Road	MW-83d
LBOW-1	MW-83s
MW-4d	MW-84d
MW-9d	MW-84s
MW-11d	MW-85
MW-13	MW-87d
MW-14d	MW-87s
MW-17	MW-88
MW-30i	MW-89
MW-31	MW-91
MW-34d	MW-92
MW-38d	MW-93
MW-39d	MW-94s
MW-400 Clarendon	MW-100
MW-40d	MW-101
MW-40s	MW-104
MW-41d	MW-106s
MW-41s	MW-106d
MW-42d	MW-107
MW-42s	MW-108d
MW-43	MW-108s
MW-44	MW-110
MW-47d	MW-BE-1d
MW-47s	MW-BE-1s
MW-51	MW-KD-1s
MW-53d	MW-KZ-1
MW-53i	New Well - Dellwood/Hollywood Well
MW-53s	New Well - Well South of Valley
MW-54d	
MW-54s	

Note - Measurements in Non-PLS Wells Subject to Access

F

NORTHWEST

575 WAGNER (DRY HOLE)

520 WAGNER

3480 DEXTER

3313 DEXTER

465 DUPONT

MW-77

373 PINEWOOD (deep)
373 PINEWOOD (shallow)

IW-1

F'

SOUTHEAST

ELEVATION IN FEET ABOVE MEAN SEA LEVEL

980
960
940
920
900
880
860
840
820
800
780
760
740
720
700

<1
(06–07)

<1
(06–07)

<1
(06–07)

1,759
(11–06)

D_2

550
(01–07)

566
(01–07)

BEDROCK

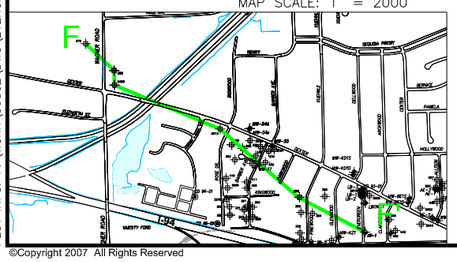
BEDROCK

<1
(11–06)

$E (E_2)$

BEDROCK

MAP SCALE: 1" = 2000'



Scale: 1" = 400'

0 200 400

VERTICAL EXAGGERATION = 10X

CROSS SECTION F-F'

PLOT INFO: F:\WORK\96502\DWG\EVERGREEN 2007\XSEC EVERGREEN MDEQ 2007.DWG DATE: 8/24/2007 TIME: 10:46:44 AM USER: ACS

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fr&h
engineers
scientists
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constructors

fishbeck, thompson, carr & huber, inc.

Hard copy is intended to be 11"x17" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

Pall Life Sciences
Scio Twp., Washtenaw County, Michigan

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