STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
JACKSON DISTRICT OFFICE

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

December 8, 2006

VIA E-MAIL and U.S. MAIL

Mr. Farsad Fotouhi
Environmental Manager
Pall Life Sciences, Inc.
600 South Wagner Road
Ann Arbor, MI 48103-9019

Mr. Alan D. Wasserman
Williams Acosta, PLLC
535 Griswold Street
Suite 1000
Detroit, MI 48226-3535

Mr. Michael L. Caldwell
Zausmer, Kaufman,
August & Caldwell, P.C.
31700 Middlebelt Road,
Suite 150
Farmington Hills, MI 48334

Dear Sirs:

SUBJECT: Gelman Sciences, Inc. Remedial Action
Performance Monitoring Plan, Maple Road Interim Response, February 3, 2006
Performance Review, Maple Road Interim Response, July 17, 2006

The Department of Environmental Quality (DEQ) approved the start up of the Maple Road Interim Response (MRIR) in an e-mail dated March 2, 2006. Since that time, Pall Life Sciences (PLS) has installed additional wells and made other adjustments to the system that were documented in the MRIR Performance Review and in an e-mail dated July 31, 2006.

We have completed our review of the MRIR Performance Monitoring Plan and the MRIR Performance Review referenced above. Our comments are included in this letter and in the attached Interoffice Communication from Mr. Richard Mandle, dated December 7, 2006.

The DEQ does not consider the Revised Performance Monitoring Plan to be adequate for the reasons stated in Mr. Mandle's review of these submittals. In summary, the width of the plume in excess of 2,800 parts per billion (ppb) of 1,4-dioxane is not adequately defined and the monitoring network is not adequate to determine if the plume in excess of 2,800 ppb of 1,4-dioxane migrates east of Maple Road. In addition, there is potential for lateral expansion of the plume as a result of the interim response that may not be detected, especially if the plume is wider than depicted.

Therefore, as specified by Mr. Mandle, PLS must install three monitoring well nests on the east side of Maple Road at the locations indicated in the attached Figure 1. These borings should be vertically profiled to bedrock and the boring information and vertical profiling results should be provided to us as they become available. PLS must consult with the DEQ prior to deciding on the placement and number of well screens at each location.

We also recommend that PLS install additional upgradient monitoring well nests to: 1) better define the plume; 2) ensure that the current interim response measures are adequate, and 3) allow adequate time for adjustment to the interim response actions to prevent 1,4-dioxane above 2,800 ppb from migrating east of Maple Road. In addition, depending on the results of ongoing performance monitoring, additional monitoring wells may be needed to verify that concentrations of 1,4-dioxane above 85 ppb will not migrate beyond the Prohibition Zone.

We discussed the need for better characterization of the upgradient contamination with Mr. Fotouhi and PLS's consultant, Mr. James Brode, during the technical meeting on November 8, 2006. It is our understanding that PLS does not believe that additional upgradient monitoring is required for either technical or legal purposes, although Mr. Fotouhi has acknowledged that it is necessary to have an adequate understanding of the upgradient conditions in order to properly design and operate the remediation system at Maple Road. Mr. Mandle's review provides further technical support for performing additional upgradient monitoring. We also believe that the Consent Judgment and the Court's remedial orders provide a legal basis for performing this work.

The DEQ will consider any migration of 1,4-dioxane above 2,800 ppb east of Maple Road to be a violation of the Consent Judgment and subject to stipulated penalties as allowed by the Consent Judgment.

The MRIR Performance Review indicates that future performance reviews will be submitted with the quarterly reports. That is acceptable; however, because the third quarter ended prior to this response, please include the review for the June to September period with next quarter's report. If performance monitoring indicates that 1,4-dioxane above 2,800 ppb has migrated east of Maple Road, PLS must notify the DEQ within five working days of first becoming aware of the violation, pursuant to Section XVII(C) of the Consent Judgment. In addition, please notify us within five working days of determining that changes to the system are warranted, independent of the quarterly reporting schedule.

The three monitoring well nests to be located east of Maple Road should be installed by the end of February 2007. Please seek access for installation of these monitoring well nests and notify us at least three days prior to beginning field work. Please inform us of your intent to install the three monitoring well nests on the east side of Maple Road by December 22, 2006.

Please contact me if you have any questions.

Sincerely,

Sybil Kolon
Environmental Quality Analyst
Gelman Sciences Project Coordinator
Remediation and Redevelopment Division
517-780-7937

SK/KJ

Attachment

cc/att: Ms. Celeste Gill, Department of Attorney General
Mr. Mitchell Adelman, DEQ/Gelman File
Mr. James Coger, DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: Sybil Kolon, Project Manager, Jackson District
Remediation and Redevelopment Division

FROM: Rick Mandle, Groundwater Modeling Specialist
Remediation and Redevelopment Division

DATE: December 6, 2006

SUBJECT: Review of System Performance and Performance Monitoring Plan (PMP) – Pall Life Sciences (PLS) Site, Scio Township

We have completed our review of the Maple Road Performance Monitoring Plan (MRPMP) report. The report, dated February 3, 2006, was prepared by Fishbeck, Thompson, Carr & Huber, Inc. (FTC&H) for PLS. The proposed PMP was initially reviewed before the Maple Road system started extracting and injecting groundwater in early March 2006; however, the final review of this plan was postponed to provide an initial evaluation of monitoring data collected prior to and after the start-up of this system. As a result, selected data that have been collected since extraction of groundwater began at this location have been incorporated into the review comments. In completing our evaluation of the PMP, we also reviewed portions of the *Work Plan for Response Activities, Maple Road Area, Unit E Aquifer* (RA Work Plan), dated January 17, 2005, that describes some of the calculations used as the basis for design of the extraction and injection well system at Maple Road, and the recently submitted *Initial Performance Review – Maple Road Interim Response* (IPR) report, dated July 17, 2006. The later report describes an assessment of system operation and performance data collected during the initial system operational period, and proposed modifications to the performance monitoring plan.

Our review comments focus primarily on our assessment of the ability of the proposed monitoring network to determine the effectiveness of the Maple Road Interim Response (MRIR) to meet the performance standards as required by the *Washtenaw County Court Opinion and Order Regarding Remediation of the Contamination of the Unit E Aquifer* (December 17, 2004). In summary, these performance standards require PLS to prevent groundwater having 1,4-Dioxane concentrations exceeding 2,800 micrograms per Liter (ug/L) [Part 201 Generic Groundwater Surface-Water Interface (GSI) criteria] from migrating beyond Maple Road. We also comment on the characterization of the 1,4-Dioxane contaminant plume upgradient of the MRIR system, the capture effectiveness of TW-19 and the potential for migration of 1,4-Dioxane to migrate toward the Prohibition Zone (PZ) boundary.

Proposed MRPMP

The proposed monitoring well network and sampling frequency were described in the MRPMP report dated February 3, 2006. The well locations were shown in Figure 1 of the MRPMP report. A listing of these wells, the monitoring purpose, and frequency of monitoring were shown in a table in Attachment 1 of the MRPMP report and as Revised Attachment 1 in the IPR report. This figure and table (Revised Attachment 1) are attached to this memorandum for ease of reference.

The wells (20) selected for the proposed performance monitoring network consist of most of the available monitoring wells that are in the vicinity of Maple Road or east of Maple Road. These wells were installed during the investigation of the downgradient migration of the 1,4-Dioxane plume, and were not installed for the explicit purpose of monitoring the performance of the MRIR. PLS proposed sampling and measuring groundwater levels on a quarterly basis with the exception of selected monitoring wells located to the north and south to monitor the lateral expansion of the 1,4-Dioxane plume on a monthly basis for the first three months of system operation.

IPR Report Findings

The wells listed in Attachment 1 and shown in Figure 1 of the MRPMP were monitored during the IPR period. Groundwater samples were collected once in May 2006 in all wells, rather than monthly sampling in the wells used to monitor lateral expansion as proposed in the MRPMP for monitoring conditions during the first three months of system operation. Groundwater levels were measured in all wells on a weekly basis between March 7, 2006 and May 6, 2006.

On the basis of the data collected during the initial operation period of the MRIR system, FTC&H found or concluded that:

- The concentrations of 1,4-Dioxane in upgradient monitoring well MW-72d remained between 3,200 and slightly more than 3,400 ug/L immediately before and during the initial system operation. FTCH states that these concentrations will decrease by the time the contaminant plume reaches Maple Road as a result of dispersion and other processes.
- Concentrations of 1,4-Dioxane at well MW-85 increased from approximately 1,700 ug/L prior to system start-up to more than 2,300 ug/L during initial system operation. FTC&H concludes that this increase in concentration is the result of the influence of pumping from TW-19, causing higher contaminant concentrations to migrate in close proximity to this well (implied).
- There was an increase in 1,4-Dioxane concentrations in all monitoring wells downgradient of Maple Road with significant increases observed at MW-79 and MW-79d.
- There were relatively small increases in 1,4-Dioxane concentrations in the wells used to monitor lateral expansion of the plume.
- Monitoring wells closest to the two injection wells showed a decrease in 1,4-Dioxane concentrations, probably the result of dilution by the injection of treated groundwater into the aquifer in which these monitoring wells are screened.
- Approximately 145 pounds of 1,4-Dioxane were removed by TW-19 during the initial system operation period.
- Groundwater levels appeared to stabilize within days of changes to extraction and injection rates.
- The changes to groundwater levels in the vicinity of the extraction/injection system are subtle with the only significant declines occurring at MW-85, the well nearest TW-19.
- The capture zone (calculated) for TW-19 appears to be sufficient to capture the highest 1,4-Dioxane concentrations found along the plume axis within the Unit E aquifer.
- TW-19 is located properly to intercept 1,4-Dioxane concentrations exceeding 2,800 ug/L should any elevated concentrations reach the Maple Road area.

DEQ Review Comments

After reviewing the groundwater level and chemical data presented in the IPR report we make the following statements regarding the hydraulic or chemical impact of the operation of the MRIR. More specifically, we evaluate the ability of the proposed monitoring network to assess hydraulic or chemical impact or to determine whether the MRIR performance standard is being met.

To date, laboratory analyses of groundwater samples collected from the existing monitoring wells show that there have been no detectable concentrations of 1,4-Dioxane east of Maple Road that exceed 2,800 ug/L, before or since the MRIR system start up. However, the assessment of the nature and extent of 1,4-Dioxane contamination presented by PLS and FTC&H, whether it be upgradient or downgradient of the MRIR, is based on well locations that are either sparse or widely spaced relative to the delineated width of the highest 1,4-Dioxane concentrations. The wells selected to monitor the 1,4-Dioxane concentrations as part of the MRPMP were installed during the investigation of the downgradient migration of the 1,4-Dioxane contaminant plume in an attempt to locate the plume. These wells were not necessarily installed at locations where they could monitor the horizontal or vertical migration of the actual center of mass of the contaminant plume or the performance of a remediation system.

There are several issues that relate well spacing to the characterization of the problem and the ability of the proposed network to assess the performance of the MRIR. These issues are:

- <u>There are not a sufficient number of vertical profilings or monitoring wells placed upgradient of the MRIR to determine the magnitude and extent of the problem migrating toward Maple Road that will require remediation.</u>

  In all Unit E plume maps that have been provided by PLS and FTC&H, the width of the elevated 1,4-Dioxane concentrations (>3,000 ug/L) upgradient of Maple Road is generally 250 feet or less. However, the concentration and width of the elevated 1,4-Dioxane plume within the Unit E aquifer is defined by a single monitoring well, MW-72d. Without additional vertical profiling north and south of this well, it will never be known whether the central part of the plume is actually this narrow. It is expected that there would be some lateral spread of the central part of the plume as it has migrated downgradient from Wagner Road, almost 4,000 feet west of MW-72d. However, the depiction of the Unit E plume in past reports seems to show a slight narrowing of the plume in the vicinity of MW-72d. We believe that this narrowing of the plume is not necessarily real, but may be the result of a lack of data.

  The importance of knowing the width of the central part of the plume that requires remediation is two-fold. First, if the central part of the plume is actually wider than 250 feet, the capture width from extraction at TW-19 may not be sufficient to meet the performance standard at Maple Road. Or, injection at IW-4 and IW-5 may cause lateral migration of substantial concentrations of 1,4-Dioxane (<2,800 ug/L) to the north and south. Second, if this highly concentrated part of the plume, the portion requiring remediation, is generally less than 250 feet in width, monitoring wells selected for the PMP network at Maple Road must be spaced closer than 250 feet in order to detect any 1,4-Dioxane concentrations requiring remediation. It is our opinion that it is not possible to design an effective remediation system or appropriately monitor its performance without fully understanding the lateral extent of the contaminant plume.

- The actual extraction rate at TW-19 has decreased to 100 gallons per minute (gpm), one-half the rate that FTC&H had estimated when designing the system to capture the highest 1,4-Dioxane concentrations; and, there are no existing monitoring wells or piezometers that may be used to verify the conceptual or actual capture zone of well TW-19, whatever the extraction rate.

  A very simple capture-zone analysis was performed in the IPR report (Attachment 6) showing that the proposed extraction rate of 200 gpm would be sufficient to contain the central part of the 1,4-Dioxane plume. A previous analysis presented in the RA Work Plan also showed that pumping at a rate of 200 gpm, along with injecting treated groundwater at 100 gpm each into two lateral injection wells would contain all groundwater requiring remediation. Neither of these conceptual analyses was compared to actual measured head data (presented in the IPR report) to verify actual aquifer response to extraction and injection. This may be because the monitoring well network used to assess hydraulic containment is very sparse and widely spaced. There are no groundwater level measurements proximal to TW-19 that may be used to verify the conceptual capture zone shown on Figure 7 in the IPR report. In order to verify the capture zone shown in this figure, there would have to be a sufficient number of piezometers or monitoring wells located in close proximity to, and within, the capture zone to verify hydraulic gradients.

  In the wells that are relatively close to the extraction and injection well system, there was very little actual hydraulic response observed in the monitoring wells during the MRIR system start-up, especially relative to the hydraulic-head gradients observed in the vicinity of Maple Road. Because there are so few nearby measurements and there was so little response it's really not clear that pumping 200 gpm from TW-19 is sufficient to change hydraulic gradients to create an appropriately-sized capture zone around TW-19. Recent system operation data for the MRIR show that the extraction rate for TW-19 has decreased to 100 gpm, one-half the proposed extraction rate. This will result in even less of a hydraulic response in the aquifer. Also, this reduction in pumping rate will result in a one-half reduction in the capture width for TW-19. A capture zone will develop around TW-19; however, there are absolutely no data that are being collected to verify its horizontal or vertical extent, or to justify a reduction in the extraction rate.

  It's our opinion that none of the groundwater-level measurements from the proposed performance monitoring network are useful for evaluating the hydraulic-capture effectiveness of the IR, whatever the extraction rate. The data that have been collected may only be useful to assess possible general contaminant migration directions.

- There are not a sufficient number of monitoring wells in the MRPMP network that may be used to monitor the impact of injection on possible lateral expansion of the 1,4-Dioxane plume beyond the Prohibition Zone (PZ) boundary.

  The hydraulic analysis of the MRIR remediation system presented in the RA Work Plan shows a depiction of the theoretical hydraulic impact of extraction and injection on groundwater flow directions. In theory, the injection of treated groundwater at both IW-4 and IW-5 will help focus the contaminant plume toward the capture zone that develops from the extraction at TW-19. This assumes that the width of the central part of the highest 1,4-Dioxane concentrations is relatively narrow and this center of the plume is immediately upgradient of TW-19, as has been depicted in all previous plume maps for

this area (see Figure 7 of the IPR report). The theoretical analysis also assumes that the centerline of the injection zones for both IW-4 and IW-5 are outside the zone of highest contaminant concentrations. As previously discussed, there are insufficient data defining the width of the zone of highest contamination upgradient of the MRIR. If there are elevated 1,4-Dioxane concentrations outside the injection zone centerlines (north of the IW-4 centerline or south of the IW-5 centerline), there is the potential for there to be a change in contaminant migration direction toward the PZ boundary, either to the north or south. However, there may not be a sufficient number of existing monitoring wells to the north of IW-4 or south of IW-5 that may be used to assess the possible impact of injection on the migration of contaminants.

- The wells used to monitor the performance of the MRIR at Maple Road are too widely spaced, requiring the installation of additional monitoring wells at Maple Road.

  It is clear from data that have been collected over the past several sampling events, that there is some uncertainty as to the plume migration pathway in the vicinity, or immediately east, of Maple Road. The data show a steepening of the hydraulic and chemical-concentration gradients in close proximity to Maple Road. Whether this steepening of gradients and apparent sharp decrease in 1,4-Dioxane concentrations are real, as a result of an abrupt change in subsurface geology, or an artifact of well screen placement, or both, is not entirely clear.

  Figure 1 in the IPR report shows the location of wells to be monitored as part of the proposed MRPMP. As can be seen on this figure, there are very few wells in close proximity to Maple Road. The distances between the wells nearest to Maple Road are approximately 500 feet between the clusters at MW-79 and MW-84, and approximately 850 feet between the clusters at MW-84 and MW-89. Because of uncertainty in the contaminant migration pathway and the distance between these monitoring wells, we cannot be sure that these wells are placed in the appropriate locations to monitor compliance to the performance standard at Maple Road. It is clear that, if the central part of the 1,4-Dioxane plume is approximately 250 feet as mapped, having wells spaced 500 to 850 feet apart will not be adequate. Collecting groundwater samples from widely spaced monitoring wells that may not be along the plume centerline may not provide an accurate depiction of remedy performance. Additional monitoring wells will be needed along Maple Road to provide data to make timely decisions regarding the operation of the MRIR.

- Many of the monitoring wells located east of Maple Road that are part of the proposed MRPMP, are located too far downgradient to be of use in making timely decisions regarding the operation or modification of the MRIR.

  As previously stated, these wells were installed in an attempt to locate the contaminant plume, not to monitor the MRIR system performance. In addition, these wells are spaced as far as 1400 feet apart. There is no indication that these wells are located along, or near, the plume centerline, or that they give an accurate depiction of the 1,4-Dioxane plume east of Maple Road. The data from these wells might only be useful in monitoring possible 1,4-Dioxane concentrations downgradient of Maple Road. There is no certainty that the chemical data represent maximum, or likely maximum, 1,4-Dioxane concentrations. It is far better to monitor compliance from a reliable monitoring network at Maple Road than make compliance decisions on the basis of groundwater samples collected from the existing wells.

Suggested Changes to PMP

The *Washtenaw County Circuit Court Opinion and Order Regarding Remediation of the Contamination of the Unit E Aquifer* (December 17, 2004) requires PLS to prevent groundwater having 1,4-Dioxane concentrations exceeding 2,800 ug/L from migrating beyond Maple Road. The proposed MRPMP relies on the use of monitoring wells that were installed during the investigation of the downgradient migration of the 1,4-Dioxane plume in the Unit E aquifer. These wells are not placed appropriately to adequately monitor the IR performance at Maple Road or to monitor a secondary problem that may be caused by injection of treated groundwater as part of the MRIR system. Deficiencies in the proposed network must be corrected so that adequate data are collected at Maple Road to monitor performance to the standard required by the court order and to monitor the possible lateral spread of contaminants toward the PZ boundary.

Monitoring Compliance at Maple Road

In order to monitor whether the MRIR meets the performance standard at Maple Road, monitoring wells must be placed no more than 250 feet apart along Maple Road. The existing wells are spaced much farther than this or located too far downgradient. It is recommended that vertical profiling of the aquifer be completed at three locations (*MRC 1, MRC 2,* and *MRC 3*); midway between MW-79 and MW-84s, and 250 and 500 feet south-southeast of MW-84s. The proposed locations for vertical aquifer profiling are shown on Figure 1. Monitoring well nests should be installed at these locations and completed in the zones of highest 1,4-Dioxane concentration. The vertical placement of well screens should be determined after examination of the vertical profiling data and consultation with Department of Environmental Quality (DEQ) staff. Groundwater sample collection and groundwater level measurement should be performed quarterly in these proposed wells. Wells used to monitor compliance at Maple Road are listed in Table 1.

Assessment of 1,4-Dioxane Concentrations Upgradient of the MRIR

The current network for monitoring upgradient 1,4-Dioxane concentrations consists of wells MW-72s, MW-72d, and MW-85. For reasons that have been previously stated, we believe that this network is not adequate to characterize 1,4-Dioxane concentrations upgradient of the MRIR. We recommend that additional vertical profiling of the aquifer should take place north and south of the nest at MW-72 to insure that the width of the zone of highest 1,4-Dioxane has been delineated. This information will eventually be required since they are necessary to decide whether, or for how long, the MRIR must be operated by PLS to meet the requirements of the court order. That is, the system must operate as long as there are 1,4-Dioxane concentrations upgradient of the MRIR that exceed the applicable cleanup criteria. The demonstration that there is no remaining 1,4-Dioxane upgradient of the MRIR must be based on a monitoring network that is acceptable to the DEQ.

Monitoring the Impact of Injection of Treated Groundwater at IW-4 and IW-5

The lateral spread of groundwater contamination having 1,4-Dioxane concentrations less than 2,800 ug/L is potentially a very real outcome of the design of the MRIR system. 1,4-Dioxane concentrations that may be less than 2,800 ug/L but greater than 85 ug/L may migrate to the north or south of the MRIR system, beyond the PZ boundary. To what extent the injection of water at IW-4 or IW-5 is exacerbating the problem is not clear. In our opinion there are severe

deficiencies in the monitoring network that would allow the impact of injection on contaminant migration to be assessed. Given the recent chemical analyses of groundwater and hydraulic-head data from MW-88, MW-101, and MW-81, it appears that groundwater containing elevated concentrations (>85 ug/L) are migrating toward the PZ boundary. A monitoring well to be located at the intersection of Carbeck and Walter Roads has been proposed. We have added this well to the list of monitoring wells in Table 1. It is not clear from the limited available data to the south near Jackson Road whether groundwater containing elevated 1,4-Dioxane concentrations is migrating to the south-southeast. An additional monitoring well cluster may be needed south of IW-5 near Jackson Road in the event that elevated 1,4-Dioxane concentrations are detected at MW-89 or MW-90.

Collection of Data from Downgradient Monitoring Wells

PLS has proposed that groundwater sample collection and measurement of groundwater levels in downgradient wells MW-91, MW-83s, MW-83d, MW-86, MW-90, MW-76s, and MW-76d be completed on a quarterly basis as part of the MRPMP. As previously discussed, these wells are located too far downgradient from Maple Road to be of use in monitoring the performance of the MRIR or to make timely decisions regarding its operation. These wells should be removed from the MRPMP network; however, they may still be used as part of other investigations of the downgradient migration of the 1,4-Dioxane plume.

Miscellaneous Issues

The maps showing the potentiometric surfaces for January 10, 2006 and May 5, 2006 were created using data that were measured on dates different than January 10th or May 5th, by as many as four days. PLS and FTC&H should show the degree of change in static water levels over the time that static water levels are measured to show the degree of error in the potentiometric surface contours. Either that, or measure the static water levels in all performance monitoring network wells in a single day.

Please contact me at 517-241-9001 or mandler@michigan.gov if you have any questions or comments regarding this review.

Attachment

Table 1		
Proposed Revised Performance Monitoring - Maple Road Interim Response		
Unit E System		
Well I.D.	**Purpose of Monitoring**	**Proposed Revised Maple Road Groundwater Quality and Water Level Measurement Frequency**
Extraction Well		
TW-19 (Treatment system influent)	Mass Removal Calculations plus Operations and Maintenance Monitoring	Weekly (water quality only)
Injection Wells		
IW-4 & IW-5	Operation and Maintenance Monitoring	Monitor Water Level/Pressure Daily
Treatment System		
Treatment system Effluent	Compliance with Injection Rules	Weekly, minimum frequency
Monitoring Wells		
	Upgradient Assessment	
MW-72s	1	Quarterly
MW-72d	1	Quarterly
MW-85	1	Quarterly
Additional wells that may be installed to define plume width upgradient of TW-19	1	Quarterly
	Maple Road Compliance	
MW-79	2	Quarterly
MW-79d	2	Quarterly
MW-84s	2	Quarterly
MW-84d	2	Quarterly
MRC 1 (proposed)	2	Quarterly
MRC 2 (proposed)	2	Quarterly
MRC 3 (proposed)	2	Quarterly
	Close Proximity to injection wells	
MW-88	3	Quarterly
MW-87s	3	Quarterly
MW-87d	3	Quarterly

Table 1 (Continued)		
Well I.D.	**Purpose of Monitoring**	**Proposed Revised Maple Road Groundwater Quality and Water Level Measurement Frequency**
	Lateral Expansion	
MW-81	4	Quarterly
MW-89	4	Quarterly
MW-90	4	Quarterly
MW-101	4	Quarterly
MW-104	4	Quarterly
Proposed well at Carbeck and Walter	4	Quarterly
1 = Upgradient assessment of 1,4-Dioxane concentrations.		
2 = Monitor compliance at Maple Road		
3 = Monitor within close proximity to injection wells		
4 = Lateral expansion of the Unit E plume.		
Note: All samples will be analyzed for 1,4-Dioxane by PLS.		

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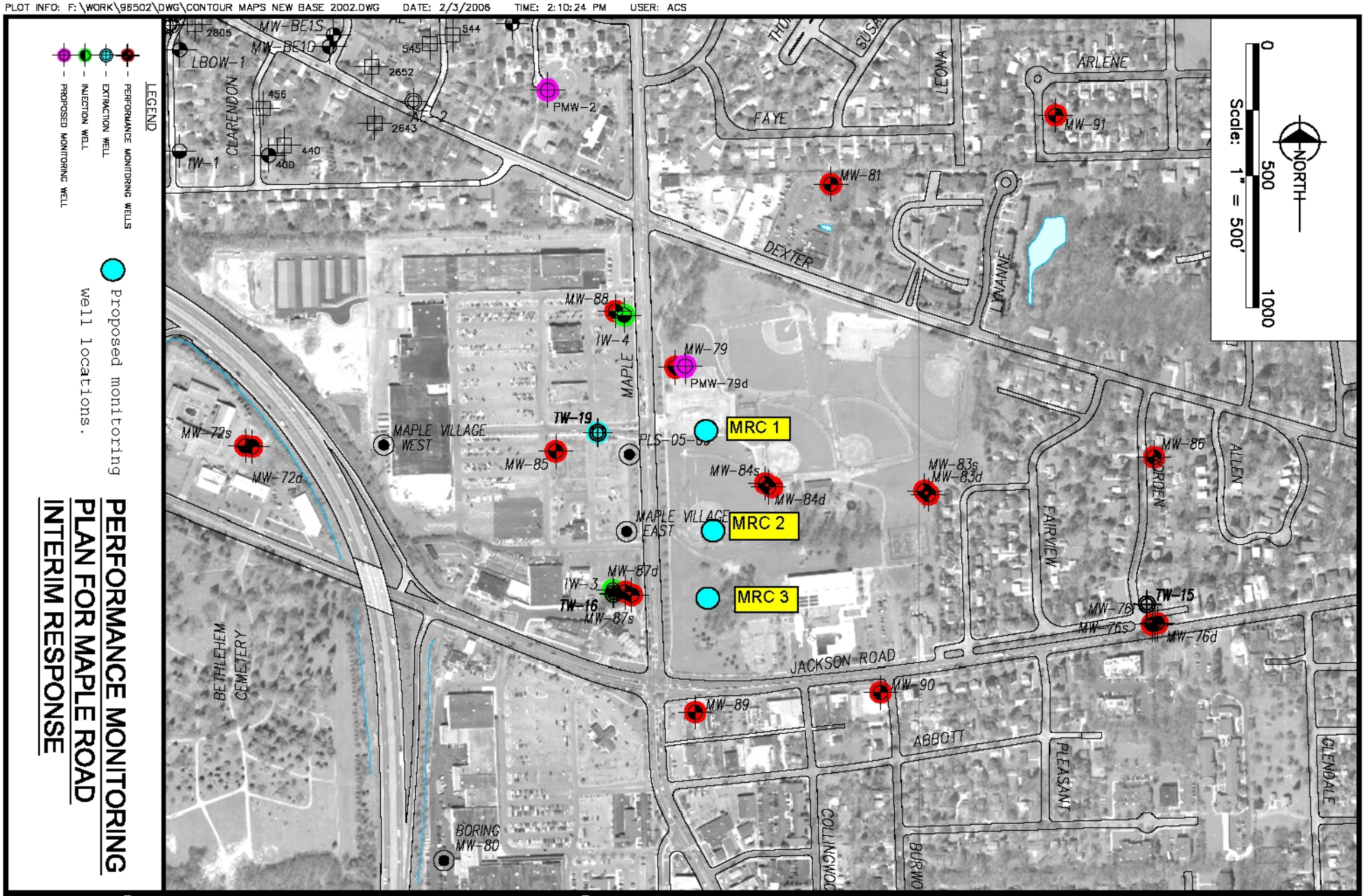

PALL LIFE SCIENCES
SCIO TWP., WASHTENAW COUNTY, MICHIGAN

Performance Monitoring Plan

PROJECT NO. F96502
FIGURE NO. 1

Fishbeck, Thompson, Carr & Huber
Engineers • Scientists • Architects
Grand Rapids, Michigan (616) 575-3824