

STATE OF MICHIGAN

IN THE CIRCUIT COURT FOR THE COUNTY OF WASHTENAW

ATTORNEY GENERAL for the  
STATE OF MICHIGAN, et al,  
MICHIGAN NATURAL RESOURCES  
COMMISSION, MICHIGAN WATER  
RESOURCES COMMISSION, and  
MICHIGAN DEPARTMENT OF NATURAL  
RESOURCES,

Plaintiffs,

Case No. 88-34734-CE

vs

Hon. Donald E. Shelton

GELMAN SCIENCES INC.,  
a Michigan corporation,

Defendant.

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PALL LIFE SCIENCES' MOTION FOR APPROVAL OF PROPOSED  
MODIFICATIONS TO EVERGREEN AND MAPLE ROAD REMEDIAL SYSTEMS

Defendant, PALL LIFE SCIENCES, INC., d/b/a Pall Life Sciences ("PLS") through its attorneys, ZAUSMER, KAUFMAN, AUGUST, CALDWELL & TAYLER, P.C., and WILLIAMS ACOSTA, asks this Court to approve PLS' proposed modifications to the Evergreen and Maple Road remedial systems described in the Brief in support of this Motion.

1. As explained in the attached Brief, PLS has proposed modifications to the Evergreen and Maple Road portions of the current cleanup program that are necessary to address operational difficulties regarding these systems. PLS did not propose any specific modifications with regard to the portion of the site west of Wagner Road, but rather suggested that the parties meet to jointly develop a strategy for arriving at appropriate modifications to that area. PLS advised MDEQ that it did not believe that the "straight-forward modifications regarding the Evergreen Subdivision and Maple Road should be delayed while the parties tackle the more difficult Wagner Road issues.

2. The Michigan Department of Environmental Quality ("MDEQ") has informed PLS that it would not consider the proposed modifications to the Evergreen and Maple Road systems unless they were included in a comprehensive proposal that addressed the entire site.

3. After several subsequent meetings with the MDEQ, PLS acquiesced to the DEQ's requirement that any proposed modifications to the cleanup program must address the entire site.

4. Just as PLS feared, inclusion of proposed modifications regarding the portion of the site west of Wagner Road, has complicated and slowed down the process of obtaining approval for the necessary modifications to the Evergreen and Maple Road remedial systems.

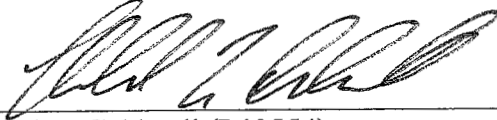
5. Consequently, PLS is seeking this Court's approval of the necessary modifications to the Evergreen and Maple Road remedial systems that had originally

submitted over a year ago separate from, but without prejudice to, the accompanying Motion for approval of PLS' entire comprehensive remedial proposal.

WHEREFORE, PLS asks this Court to approve the remedial modifications described in the accompanying Brief regarding the Evergreen and Maple Road remedial systems.

Respectfully submitted,

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Dated: August 18, 2009

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BRIEF IN SUPPORT OF MOTION FOR APPROVAL OF PROPOSED MODIFICATIONS TO  
EVERGREEN AND MAPLE ROAD REMEDIAL SYSTEMS

## INTRODUCTION

Defendant, GELMAN SCIENCES, INC., d/b/a Pall Life Sciences ("PLS") has been remediating the groundwater contamination associated with past operations on the 600 South Wagner Road property ("the PLS property") since the late 1980s. As discussed in PLS Brief in Support of Motion to Approve Comprehensive Proposal to Modify Cleanup Program ("Comprehensive Brief"), this cleanup effort has been a spectacular success given the magnitude and complexity of the task. Both PLS and the Michigan Department of Environmental Quality ("MDEQ") agree, however, that it is now important to update the cleanup program to ensure that it reflects the progress made to date and the parties' current understanding of the nature and extent of the remaining contamination. Central to this effort is the need to establish a sustainable program with clear and coordinated cleanup objectives.

PLS originally sought permission to implement relatively straightforward modifications of the Evergreen Area and Maple Road systems while the parties jointly developed modifications for the portion of the site west of Wagner Road. The MDEQ, however, required PLS to submit a comprehensive proposal covering all areas of the site before it would consider PLS' original proposal. As PLS feared, the MDEQ's demand that PLS submit a comprehensive proposal has only resulted in delaying approval of the more pressing modifications to the Evergreen and Maple Road systems.

For that reason, PLS is now seeking approval of the Evergreen and Maple Road modifications described below, regardless of what modifications this Court decides to make, if any,

with regard to the rest of the site. As set forth below, these modifications are necessary and appropriate.

## **FACTUAL BACKGROUND**

### **A. Cleanup Objectives/Infrastructure for Evergreen and Maple Road Systems.**

The October 26, 1992 Consent Judgment ("Consent Judgment") established the cleanup objective for the "Evergreen Subdivision Area System." Section V.A.1 of the Consent Judgment requires PLS to capture the leading edge of the contamination above the drinking water criterion in the area of the Evergreen Subdivision to prevent it from migrating further east. This objective was established at a time when essentially all of the properties in the Evergreen Subdivision and downgradient areas were serviced by private drinking water wells.

To meet this objective, PLS currently operates two extraction wells (LB-1 and LB-3) on Evergreen Street, roughly in the middle of the Evergreen Subdivision, and one extraction well (AE-1) located further east on Allison Drive. PLS originally operated a treatment system within the Evergreen Subdivision and injected the treated groundwater into the Unit E aquifer. In part because of the risks associated with operating an industrial treatment system within a residential subdivision, PLS installed the horizontal well and deep transmission line in approximately 1998. The deep transmission line connected the Evergreen extraction wells to PLS' Wagner Road treatment system. This allowed PLS to transport up to 200 gallons per minute (gpm) of water from the Evergreen area to the Wagner Road treatment facility. This Court's July 14, 2000 Remediation Enforcement Order ("REO") established a minimum combined purge rate for the Evergreen extraction wells of 200 gpm. Thus, PLS is currently utilizing 100% of the transmission line's capacity.

The Maple Road remedial system was installed to accomplish the cleanup objective established by this Court's December 17, 2004 Order and Opinion Regarding Remediation of the Contamination of the "Unit E" Aquifer (the "Unit E Order"). The Unit E Order required PLS to prevent groundwater contamination with concentrations above 2,800 parts per billion (ppb) from migrating east of Maple Road. To accomplish this objective, PLS has installed an extraction well in the parking lot of the Maple Village Shopping Center, just west of Maple Road. The groundwater is extracted, then transported by shallow pipelines to a nearby mobile treatment unit located north of the extraction well. After ozone treatment, the treated water is then reinjected back into the aquifer via two injection wells located north and south of the extraction well. PLS has installed a third injection well in an attempt to address operational problems associated with the first two injection wells. Groundwater contamination with concentrations above 2,800 ppb of 1,4-dioxane has not reached the Maple Road extraction well.

**B. Operational Difficulties Requiring Program Modifications.**

1. Evergreen System Problems

PLS has experienced operational difficulties with the Evergreen System that center around the leading edge extraction well on Allison Street. When first installed, AE-1 yielded 50 gallons per minute. The amount of groundwater PLS can extract from the Allison Street location has declined steadily over the years due to falling water levels and the relatively poor geology of the aquifer in the

Allison area.<sup>1</sup> PLS is only able to withdraw 15 gpm from the current Allison Street well. PLS has attempted to address the falling purge rates of the original Allison Street well (AE-1) by replacing the failing well with a new well on two separate occasions. However, the current Allison Street well, AE-3, is experiencing the same problems as its predecessors.

Disagreements regarding PLS' inability to sustain the minimum purge rate required by the MDEQ and whether the reduced purge rate is sufficient to capture the leading edge of the plume have been the source of repeated and wasteful technical and legal disputes between PLS and the MDEQ. In 2001, the MDEQ attempted to fine PLS when the AE-1 purge rate fell below the required rate despite a subsequently submitted capture zone analysis ("CZA") demonstrating the reduced rate was sufficient to capture the leading edge.<sup>2</sup> The documentation associated with the parties' technical disputes regarding whether PLS is continuing to meet its capture obligation at this location is simply too voluminous to attach to this brief.

Most recently, in April, 2007, the maximum purge rate of AE-3 fell below the MDEQ-required minimum purge rate of 25 gpm. PLS was forced to declare that circumstances constituting a "force majeure" existed because it was no longer possible to maintain the rate determined by the

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<sup>1</sup> The extraction wells located on Evergreen Street (LB-1, LB-2 and LB-3) have served their mass removal function well for many years with only routine maintenance. The disparity between the performance of the LB wells and the wells located on Allison Street is due in large part to the poor aquifer conditions in the Allison Street area. Because of the poor aquifer conditions, operation of the Allison Street wells creates a greater and steeper "drawdown". This effect, combined with falling water levels, causes air to be drawn into the screen of the extraction well. The presence of air in the screen creates "bio-fouling" that clogs the screens and creates even greater problems. In order avoid/minimize these conditions, PLS is forced to reduce its purge rates.

<sup>2</sup> Applying the standards for review set forth in the Consent Judgment, this Court found that there was a "substantial basis" for PLS' defense to this claim and did not impose the stipulated penalties.



MDEQ to be necessary to capture the leading edge of the Evergreen plume. (Appendix 1).<sup>3</sup> The MDEQ denied PLS' force majeure claim, asserting that PLS could, among other things, install and simultaneously operate a system of four extraction wells along Allison Street, each of which could theoretically extract a few gallons per minute. (Appendix 2). PLS was thus forced to file a Petition for Dispute Resolution with this Court, and the MDEQ again sought stipulated penalties. PLS' subsequent CZA established that a reduced purge rate of 15 gpm was sufficient to capture the leading edge of the plume, and the MDEQ ultimately agreed to waive its claim for stipulated penalties. In exchange, PLS agreed to further investigate the Evergreen area to, among other things, establish PLS' compliance with the Consent Judgment objective for this location.

Although PLS spent all fall and winter of 2007-2008 investigating this area, PLS has been unable to satisfy the MDEQ that it is in compliance with its Consent Judgment obligation. As indicated in correspondence dated June 23, 2008, the MDEQ believes that PLS' investigations have not established PLS' compliance. (Appendix 7, pp. 1-4). Although PLS rebutted the MDEQ's assertions in a lengthy technical and legal response dated August 7, 2008 (Appendix 9), it is clear that the technical and legal disputes regarding PLS' ability to comply with the existing Consent Judgment obligation for the Evergreen area will continue to be the source of ongoing legal and technical disputes. As recent as July 20, 2009, the MDEQ informed PLS that it would file a motion seeking to enforce this obligation. (Appendix 18). Furthermore, while PLS has been able to coax 15 gpm out of AE-3, PLS does not believe that continuing to capture the leading edge of the

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<sup>3</sup> In that correspondence, PLS noted that there were no data that suggested that the containment objective was not being met by the reduced rate PLS was able to maintain.

contamination at this location is practical in the long term.<sup>4</sup> For these reasons, PLS is seeking to modify its obligations at this location.

## 2. Maple Road Sustainability Issues

PLS began operating the Maple Road system shortly after entry of this Court's Unit E Order. PLS did so even though groundwater concentrations above 2,800 ppb have not yet reached Maple Road (i.e., PLS is not required to operate this system at this point). PLS' early operation of the Maple Road system, however, has provided crucial information regarding the sustainability of the existing system. It has become clear that PLS' plan to inject treated groundwater back into the aquifer north and south of the Maple Road extraction well (TW-19) is not reliable. Within 1 month of beginning operations, PLS began experiencing problems with the injection wells. After numerous attempts to rehabilitate the original two wells failed to improve their performance, PLS installed a third injection well, IW-5, in the area of IW-3. Unfortunately, PLS began experiencing similar operational problems with IW-5 shortly after it began operating. Consequently, although the extraction well and mobile treatment units have performed extremely well, the sustainability of the existing Maple Road system is poor. PLS has only been able to consistently inject approximately 50 gpm, which may not be sufficient to capture the plume of groundwater contamination above 2,800 ppb when and if it reaches Maple Road. Given the variable reliability and capacity of the injection wells in the Maple Road area, PLS believes it is prudent to install a more robust system in this area.

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<sup>4</sup> Nor is there is a practical location at which to capture the leading edge further east of Allison Street, primarily because the Unit E contamination plume is only a few hundred feet downgradient of Allison Street.

### C. Elements of PLS' Remediation Proposal.

PLS has proactively sought to address the operational problems experienced by both the Maple Road and Evergreen remedial systems. In June 2008, PLS submitted its Proposed Modifications To Cleanup Program. (Appendix 6). The proposed modifications included the following elements:

- Installation of a pipeline connecting the Maple Road system to the transmission line. The proposed pipeline would run from the Maple Road groundwater extraction system to the Evergreen Subdivision, where it would be connected to the existing deep transmission line. This would allow PLS to convey the groundwater extracted from the Maple Road extraction well back to the Wagner Road facility for treatment. This modification would permit PLS to maintain the current groundwater and reinjection disposal method as a backup system rather than as the front line method.
- Expansion of the Prohibition Zone. Because compliance with the existing Consent Judgment cleanup objective for the Evergreen system requires PLS to fully utilize the 200 gpm capacity of the deep transmission line, modifications to the Evergreen system cleanup objective would be necessary before PLS could transmit groundwater from the Maple Road area back to the Wagner Road treatment system. Consequently, PLS proposed to expand the existing Prohibition Zone to include the Evergreen Subdivision area. Consistent with the Unit E Order requirements, PLS would replace the six existing private drinking water wells in the Evergreen area with connections to municipal water.
- Modification of Evergreen containment cleanup objective. The Consent Judgment cleanup objective for the Evergreen system of capturing the leading edge of contamination above 85 ppb would be eliminated. This would allow PLS to terminate groundwater extraction from the Allison Street area and to reduce purging from the LB wells. Remnants of the Evergreen plume in this area would migrate east and merge with the Unit E plume, ultimately venting to the Huron River within the expanded prohibition zone. PLS would continue to be responsible for preventing contaminant concentrations above 2,800 ppb from migrating past Maple Road in this area as well.
- Continued Evergreen groundwater extraction. PLS has proposed to continue to operate the LB wells at reduced levels in order to reduce mass and concentration levels. Operation of these wells would ensure that groundwater concentrations migrating past Maple Road would remain well below 2,800 ppb.
- Installation of additional monitoring wells. PLS proposed to install (and subsequently has installed) monitoring wells at 3 additional locations within the Evergreen Subdivision area.

- Continued operation of Maple Road extraction well. Upon installation of the Maple Road/Evergreen pipeline, PLS would continue to operate the Maple Road extraction well (TW-19) as necessary to ensure that contaminant concentrations above 2,800 do not migrate past Maple Road (and to remove mass as appropriate).
- Prohibition Zone monitoring. PLS proposed to expand its downgrading and monitoring program for the Unit E plume to include the expanded prohibition zone area.

These modifications would serve a dual purpose of both providing a reliable water treatment/disposal method for the Maple Road system and providing a sustainable and more protective remedy for the Evergreen area. (See Affidavit of Farsad Fotouhi ("Fotouhi Aff.")).

**D. The MDEQ Has Prevented PLS from Implementing Necessary Modifications.**

PLS explicitly asked the MDEQ to allow PLS to move forward with its proposed modifications to the Evergreen and Maple Road systems while the parties continued to discuss potential changes to the portion of the site located west of Wagner Road. (Appendix 6, p. 3). PLS did not believe the straight-forward modifications necessitated by the significant operational difficulties associated with the Evergreen and Maple Road systems should be delayed while the parties attempted to resolve the Wagner Road issues. PLS informed the MDEQ that it would like to begin construction of the proposed Maple Road/Evergreen pipeline before the end of 2008.<sup>5</sup> PLS also believed that it would be better for the parties to collaborate in developing an acceptable approach to the Wagner Road issues than to have the MDEQ respond to a specific proposal from PLS. (Appendix 6, p. 3).

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<sup>5</sup> Although the MDEQ has said it would allow PLS to install the proposed pipeline, it specifically denied PLS permission to use it. Not surprisingly, the City of Ann Arbor has indicated that it would not grant PLS permission to tear up its right-of-ways to install a pipeline unless the MDEQ approved its use.

Unfortunately, the MDEQ responded to PLS' proposed Evergreen/Maple Road modifications by demanding that PLS also provide comprehensive modifications that would address the portion of the site west of Wagner Road. As a result of the MDEQ's refusal to approve the proposed Evergreen/Maple Road modifications, PLS has been prevented from making the proposed modifications to improve the reliability of those systems. Rather, PLS has been forced to put these prudent changes on hold while the parties debated the specifics of various comprehensive proposals. PLS is seeking approval of these changes separately from its proposal to modify the area west of Wagner Road to ensure that these important modifications are not further delayed.<sup>6</sup>

### LEGAL ARGUMENT

#### **A. Approval of the Evergreen/Maple Road Modifications Is Necessary.**

1. The Sustainability Issues Affecting the Maple Road/Evergreen Systems Should Be Addressed Independent of Any Issues Affecting the Western Area.

The ongoing difficulties with the Allison Street extraction wells make it increasingly difficult, if not impossible, to continue to capture the leading edge of the Evergreen plume at that location. Modifications to the existing program are needed so that the unachievable objective of continuing to capture the leading edge of the plume can be set aside without affecting the protectiveness of the cleanup program. Similarly, the Maple Road system may not be sustainable as currently configured. Groundwater reinjection does not appear to be a reliable long-term method of disposing of treated groundwater. The existing program must be modified to provide a reliable disposal method for water purged by the Maple Road extraction system. (*See Fotouhi Aff.*).

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<sup>6</sup> The Evergreen area and Maple Road modifications included in PLS' May 4, 2009 Comprehensive Proposal to Modify Cleanup Program ("Comprehensive Proposal") are identical to those originally set forth in the June 2008 Proposal. (*See Appendix 13*).

Almost as important as addressing the operational issues is eliminating the costly and wasteful technical and legal disputes arising from the complex geology in the Evergreen Subdivision area. Debates over whether PLS is successfully capturing the leading edge of the 85 ppb plume and the MDEQ's incessant demands for additional monitoring wells in this area have occupied an inordinate portion of both parties' time and resources. (*See Fotouhi Aff.*). The MDEQ has claimed that it needs to be able to demark an imaginary contour line of 85 ppb of 1,4-dioxane in the Evergreen area and to distinguish between the Evergreen plume and Unit E aquifers with precision so that it can determine if the Consent Judgment capture requirement has been met. This is an essentially meaningless exercise from a public health and safety standpoint because the D<sub>2</sub> and Unit E aquifers are interconnected. Modification of the Evergreen cleanup objective in the manner suggested by PLS should eliminate the MDEQ's need for exceedingly precise delineation and render irrelevant many of the most intractable disputes between the parties. If PLS is no longer required to capture the groundwater contamination above 85 ppb in the Evergreen area, there will be no basis or need for the MDEQ to demand the type of investigation that it demanded in its June 23, 2008 correspondence. (Appendix 7). Nor will PLS be required to further disturb the residents on Allison Street in order to comply with the MDEQ's calls for a multi-well groundwater extraction system.

This improvement in both operational and administrative sustainability would be achieved without diminishing the protectiveness of the cleanup program for the residents of the Evergreen Subdivision and surrounding areas. PLS is currently monitoring the six Evergreen area drinking water wells to insure that they do not become contaminated. Although this monitoring has never suggested that any of these wells are threatened with unacceptable exposures, PLS' agreement to pay

to connect these properties to municipal water will remove any concerns regarding the long-term reliability of these private water supplies.

The proposed modifications would also make the objectives of the Evergreen and Maple Road systems consistent with and reflective of the current circumstances. In 1992 when the Evergreen capture objective was established, all of the residents of this area were utilizing private wells (other than the properties that had already become contaminated, which PLS connected to municipal water). That objective has remained unchanged even though municipal water now services almost the entire subdivision and downgradient areas. Consequently, allowing the Evergreen plume to migrate to the Huron River will no longer affect the residents in the Evergreen area. In 2004, this circumstance allowed the Court to establish the Prohibition Zone to address the Unit E contamination with little or no impact on the residents.

Finally, consistent cleanup objectives for the Evergreen and Unit E plumes make sense because the parties now realize that the Evergreen plume and the shallower portion of the Unit E plume located just south of the Evergreen Subdivision are hydraulically connected and, in reality, part of the same plume. (Brode Aff., ¶ 63). Operating at their current purge rates, the Evergreen extraction wells may in fact be pulling contaminated groundwater from the Unit E plume north into the Evergreen Subdivision area. (Brode Aff., ¶ 64). It is also clear that, if allowed to migrate east, the Evergreen plume will simply rejoin the Unit E plume and migrate to the Huron River safely within the Prohibition Zone. Consequently, PLS' proposed change to the Evergreen cleanup objective would reflect the parties' current understanding of the relationship between the Unit E and Evergreen plumes and would achieve a consistent cleanup objective.

**B. The MDEQ's Objections to the Evergreen/Maple Road Modifications Are Without Basis.**

1. Reducing the Evergreen Extraction Rates Will Not Change Groundwater Flow Direction.

The MDEQ does not disagree that PLS' proposed modifications to the Evergreen/Maple Road systems have merit. The MDEQ is, however, concerned that the proposed reduction of the combined Evergreen system groundwater extraction may cause the current easterly groundwater flow direction to change to the north or northeast. The MDEQ is concerned that, if this were to occur, the plume might migrate past the northern boundary of the expanded Prohibition Zone and might eventually reach the City's Huron River municipal water intake, which is located in Barton Pond, some 11,000 feet northeast of the Evergreen plume and well upstream from the discharge point of the Unit E into the Huron River.<sup>7</sup> The MDEQ's objections are not based on any data that suggest that either of these events would occur. Rather, the MDEQ is not satisfied that PLS has provided enough data to prove the negative.

It should go without saying that PLS would not have proposed modifications that included reduced Evergreen extraction if there was any reason to believe that the plume would shoot off to the northeast beyond the proposed Prohibition Zone boundary, let alone reach Barton Pond. PLS thoroughly investigated whether reduction or even termination of the Evergreen groundwater extraction will affect the flowpath of the Evergreen plume before PLS submitted its Comprehensive Proposal:

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<sup>7</sup> MDEQ Denial, Appendix 15, p. 12. PLS does not dispute that reduction of the Evergreen groundwater extraction is likely to allow a portion of the plume to migrate east to the Huron River. (See "DEQ Comments, B2," Appendix 15, p. 8). In fact, that is the assumption underlying PLS' proposal. The remnant plume will follow (and merge) with the Unit E, and will discharge well downstream of the City's Barton Pond intake.



- PLS studied the natural groundwater flow patterns that existed in the Evergreen area before PLS began purging from the LB area in 1992. These early investigations show that groundwater in the Evergreen area naturally flows due east as it passes through the subdivision. (Brode Aff., ¶ 52). There is, therefore, no reason to believe that the natural groundwater flow pattern will not continue to control the migration of the plume after the Evergreen extraction is reduced or terminated.
- PLS agreed to install three new monitoring well clusters (MW-120, 121, and 122) to further define the extent of contamination and to provide additional data points from which to gather groundwater elevation data.
- After hearing the MDEQ's continued concerns regarding the possible change in groundwater flow direction, PLS agreed to further study what effect, if any, reducing and terminating the Evergreen extraction would have. With significant input from the MDEQ technical staff, PLS developed a testing procedure for determining whether lowering purge rates in this area would affect groundwater flow direction. The MDEQ approved that work plan. The results of this investigation were described in PLS' March 2009 Report on Water Level Testing Under Reduced Flow Conditions Evergreen Area (the "Evergreen Groundwater Flow Report") (Appendix 11). This investigation unequivocally demonstrated that even with no extraction, groundwater in the area continues to flow east, consistent with the natural flow pattern observed before purging began. (Appendix 11, pp. 11-12).<sup>8</sup>

The MDEQ, however, has not fully accepted PLS' conclusion that the groundwater flow direction will not change. The MDEQ has asserted that PLS' MDEQ-approved test was not conclusive because it relied on data collected during the test from the northern-most monitoring well cluster (MW-120). The MDEQ has claimed that these data were not valid, even though the MDEQ acknowledged that it had no basis for discounting these data:

We have no technical reason for dismissing the data from MW-120s&d;  
however, we would not make a decision regarding pumping rates in the  
Evergreen Area without confirming the flow pattern inferred on [PLS' maps],  
or without further monitoring to the north-northeast.

<sup>8</sup> The City of Ann Arbor hired its own consultant to review and comment on PLS' Evergreen Groundwater Flow Report. The City consultant commented favorably on PLS' testing procedure and methodology and agreed with the Report's conclusion that groundwater flow was to the east regardless of the pumping conditions. (Appendix 17, pp. 3, 6-7).

(Appendix 12 (emphasis added)). In other words, because the groundwater flow path indicated by PLS' study relied on this data point, the MDEQ did not feel comfortable making a decision without additional data from new monitoring wells. In what has now become an unfortunate but familiar pattern in this case, the MDEQ could not make the technically obvious conclusion even after an agreed upon study, and instead ducked the issue, claiming it needed more information and demanding that PLS install two additional well clusters for the sole purpose of corroborating the data from MW-120.

PLS reluctantly agreed to install one of the two requested well clusters. (PLS concluded that the second location was too far away from MW-120 to provide any useful data.) PLS installed well cluster MW-123 and provided updated potentiometric maps that confirmed that groundwater flow was to the east. (Brode Aff., ¶¶ 56-57). Again, the MDEQ refused to accept the obvious and make a decision. As set forth in Mr. Mandle's June 15, 2009 Memo attached to the MDEQ Denial, the MDEQ continues to discount the data from MW-120s, concluding that this well is "more reflective of local conditions" – i.e., that it is separated from the aquifer where the Evergreen plume is located. (Appendix 15, 06/15/09 Mandle Memo, p. 2). This conclusion flies in the face of Mr. Mandle's early observation that MW-120s was "hydraulically connected to the same aquifer from which the Evergreen Area wells extract groundwater." (Appendix 12, p. 4). Ironically, only by ignoring the data from all three of the shallow monitoring wells the MDEQ asked PLS to install prior to the Evergreen Groundwater Flow test (MW-120s, 121s, and 122s) can the MDEQ manipulate the data to show any northeast flow direction – and even then, the flow in that direction is only temporary before it returns to a easterly flow. (Appendix 15, 06/16/09 Mandle Memo, Figure 5).

Despite the internal inconsistency of the MDEQ's own conclusions, PLS has continued to attempt to address the MDEQ's misplaced concerns so that it could finally make a decision that was already dictated by the field data and geology. PLS recently retained Dr. Neven Kresic, a world-renowned hydrogeologist<sup>9</sup>, to review all of the data from the Evergreen area and make his own conclusion. His report, "Analysis of Groundwater Flow Direction, Evergreen Subdivision" (MACTEC, August 5, 2009) ("MACTEC Report"), is attached to his Affidavit.

In the MACTEC Report, Dr. Kresic presents his own analysis of the groundwater flow directions in the Evergreen subdivision area. He concludes that both the shallower (D<sub>2</sub>) and deeper (E) aquifers are flowing to the east (Unit E is generally east-southeast). (MACTEC Report, pp. 4-5). His conclusions are based upon "textbook" hydrogeology, and take into account groundwater elevations, regional topology and geology, the tendency for groundwater to follow that geology, and the actually data gathered by PLS. According to Dr. Kresic, the possibility that contamination from either the D<sub>2</sub> or Unit E aquifers could migrate north of the proposed Prohibition Zone boundary is "non-existent," even if PLS stops purging from the Evergreen wells altogether. (Affidavit of Neven Kresic, PG, PhD ("Kresic Aff."), ¶¶ 12-13).

One might legitimately ask at this point that if "textbook" hydrogeology leads to the conclusion that Dr. Kresic and PLS reached independently that the groundwater is not flowing north, how is it that the MDEQ decided that it did not have adequate information to reach that conclusion?

Dr. Kresic answered this question in the MACTEC Report:

The analysis of groundwater flow direction in the Evergreen area performed by Michigan Department of Environmental Quality (DEQ,

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<sup>9</sup> Dr. Kresic literally "wrote the book" on modern hydrogeology – six of them actually. Dr. Kresic, among many other postings, served as a groundwater modeling consultant for the United Nations. (See Dr. Kresic's CV, Attachment A to Kresic Aff.).

2009) fails to account for the role of geologic, hydrogeologic, and hydrodynamic conditions in the subsurface. Groundwater elevations recorded in various monitoring wells are interpreted incorrectly, and groundwater contour maps are created by arbitrarily excluding various monitoring wells and/or mixing data from wells screened in different aquifers.

(MACTEC Report, p. 9). In short, if the MDEQ did not have adequate information, this was because it was unaware of or did not use some of the information (geologic, hydrogeologic, and hydrodynamic conditions), it excluded additional information (various monitoring wells), and it misinterpreted other information (groundwater elevations in various monitoring wells). More specifically, the MDEQ did "not recognize" that groundwater flows away from topographically high areas, which are areas of recharge, and toward areas of lower hydraulic head. (MACTEC Report, p. 9). This explains why the data from MW-120 was not "anomalous" as hypothesized by the MDEQ. Also, the MDEQ mixed groundwater elevations from two aquifers (D<sub>2</sub> and E) that are separated by confining layers in the study area, which "ignores standard industry practice" and which, as Dr. Kresic points out, leads to an "erroneous potentiometric map which would not be representative of true groundwater flow directions in either shallow or deep aquifers." (MACTEC Report, pp. 9-10). Finally, Dr. Kresic notes: "The results of the reduced pumping test performed by PLS are interpreted incorrectly by DEQ, including failure to account for the natural aquifer recovery due to increased recharge and the influence of barometric pressure on groundwater elevations recorded in monitoring wells." (MACTEC Report, p. 10).

There is no data that suggests that groundwater contamination will suddenly start flowing to the north or northeast if PLS reduces or even terminates extraction from the Evergreen area. Not only is there ample information available for the MDEQ to reach the obvious conclusion that

groundwater in both aquifers will flow east (or east-southeast, in the case of Unit E), the MDEQ-hypothesized change in flow would be contrary to scientific principles and all of the data PLS has painstakingly gathered and presented to the MDEQ as well as the natural groundwater flow patterns observed before purging was initiated. The MDEQ's conjecture in this regard is not supported by data and therefore renders its denial of PLS' proposed modifications arbitrary and capricious.

2. There is No Need for, Nor Even a Basis for Developing, a Contingency Plan for the Evergreen System.

The MDEQ has also demanded that PLS develop a contingency plan to address two concerns: a) that the Evergreen plume might expand north beyond the proposed Prohibition Zone boundary; and b) a separate, less plausible, concern that groundwater contamination might migrate the 11,000 feet cross gradient to the City's Barton Pond water intake. Such a contingency plan is unnecessary for several reasons. First, as discussed above, all of the data and the analysis of two experts is that the chance that either of these contingencies would happen is "non-existent." (See Kresic Aff., ¶¶ 12-13, 16; Brode Aff., ¶¶ 60-62). Second, the Court's orders establishing the Prohibition Zone already permit the parties to seek to expand the Prohibition Zone boundary as needed to maintain its protectiveness if the plume expands to the point that it gets close to the boundary.<sup>10</sup> Therefore, a

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<sup>10</sup> Contrary to the MDEQ's unsupported statements in its Denial, there are no areas immediately north of the proposed Prohibition Zone boundary where municipal water is unavailable or where there are a significant number of private drinking water wells. (Appendix 15). While PLS is not suggesting that the Prohibition Zone boundary should be casually expanded in the future, there is no compelling reason a limited expansion could not be done with little impact on area residents in the extremely unlikely event the plume expands to the point where it reaches the proposed boundary.

contingency plan already exists if there is some slight infringement on the proposed boundary.<sup>11</sup>

PLS has not proposed a contingency plan for addressing the risk that groundwater contamination would migrate all the way to the Barton Pond intake because even proposing such a plan gives this “risk” more credence that is warranted and would again immerse the parties in an endless debate regarding the merits and viability of any such plan. Such a migration would require a significant change in groundwater flow direction, the risk of which is “non-existent.” Moreover, even if such a change occurred, it would take approximately 30 years for the plume to reach the pond (assuming a conservatively rapid groundwater flow velocity). (Brode Aff., ¶ 62). Clearly, the parties and this Court would have sufficient time to respond if this exceedingly unlikely event were to actually occur. Delaying approval of necessary modifications to the cleanup program while debating the merits of a contingency plan to address a non-existent risk would be unconscionable.

Although it is not possible now to develop a plan to address a “non-existent” risk, PLS did bolster its monitoring plan in the Evergreen area in an attempt to address the MDEQ’s concerns and commit to undertake additional investigations if contaminant levels in certain boundary wells reached 20 ppb. (See June 3, 2009 Evergreen Plan for Verifying Protectiveness of Proposed Remedial Modifications (“Verification Plan”), attached as Appendix 14). PLS’ Verification Plan includes the installation of monitoring wells at three additional locations along the northern border of the proposed Prohibition Zone. (Appendix 14, p. 4). With these new wells, there would be a total of

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<sup>11</sup> The Part 201 rules regarding contingency plans, cited throughout the DEQ Denial, do not require the type of contingency planning the MDEQ is demanding here. Only two MDEQ cleanup rules address contingencies: Rule 538(2)(g) provides for a contingency plan to address mechanical failures in a system component; and Rule 540(2)(k) provides for a contingency plan to address “ineffective monitoring.” These rules do not require any planning beyond the narrow scope of the subjects covered, and certainly do not touch on planning for unanticipated changes in the environment, such as movement of a plume 11,000 feet cross-gradient.

five monitoring points along the northern border of the Prohibition Zone in the immediate area of the Evergreen Subdivision. These monitoring wells would provide important data and serve as backup boundary wells if contaminant concentrations in one or more of the current boundary wells (located further south, nearer the current plume boundary) rise above the cleanup criterion.<sup>12</sup>

These wells would also serve as sentinel wells. PLS has agreed to undertake additional investigations if 1,4-dioxane concentrations in these wells ever exceed 20 ppb. The goal of the investigations will be to determine the flow path of the 1,4-dioxane that may migrate north of the Prohibition Zone boundary. Such investigations will include the installation of monitoring wells to evaluate groundwater flow directions and water quality north of the Prohibition Zone. Based on the results of this investigation, PLS and the MDEQ will determine what additional investigations and/or response actions, if any, are appropriate to prevent migration of the plume into Barton Pond. Thus, PLS will have time to conduct an investigation to obtain the information needed to develop an appropriate contingency plan if that investigation shows that one is needed. There is no reason to conduct this investigation now precisely because all available data show that the risk to be addressed will not occur.

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<sup>12</sup> The proposed reduction in groundwater extraction and migration of the groundwater contamination is expected to result in some slight "swelling" of the plume, even absent any change in groundwater flow direction. If this occurs, concentrations in the existing border wells – which are quite close to the current plume boundary – might exceed 85 µg/L. In that event, the plume would remain defined by the modified well network.

## CONCLUSION

For the above-stated reasons, PLS asks this Court to approve PLS' proposed modifications to the Eastern Area and the Evergreen and Maple Road systems, independent of how this Court resolves the issues related to the Western Area.

Respectfully submitted,

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