STATE OF MICHIGAN

IN THE CIRCUIT COURT FOR THE COUNTY OF WASHTENAW

ATTORNEY GENERAL FOR THE STATE OF MICHIGAN, *ex rel*, MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY,

Plaintiffs,

v

GELMAN SCIENCES, INC.,
a Michigan corporation,

Defendant.

File No. 88-34734-CE

Honorable Donald E. Shelton

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PLAINTIFF'S BRIEF IN RESPONSE TO PETITION FOR DISPUTE RESOLUTION AND IN SUPPORT OF IMPOSITION OF STIPULATED PENALTIES

Plaintiffs, the Attorney General of the State of Michigan, and the Michigan Department of Environmental Quality (MDEQ), by their undersigned counsel, pursuant to Section XVI.C of the Consent Judgment entered in this matter on October 26, 1992 and as amended on September 23, 1996 and October 20, 1999 (Consent Judgment) submit this Brief in Response to Defendant Pall Life Sciences, Inc's (Defendant) Petition for Dispute Resolution filed on July 9, 2007.

Introduction

This dispute resolution proceeding arises due to Defendant's failure to operate the AE-3 extraction well at the minimum approved extraction rate. If this seems like déjà vu, it is because a very similar issue was previously disputed before this Court with regard to the AE-1 extraction well. This dispute represents just one more instance of Defendants failure to perform as required under the Consent Judgment and orders of this Court.

As an initial matter, the Defendant failed to file its petition for dispute resolution to this Court timely as required by Section XVI.B of the Consent Judgment and therefore this dispute resolution should be dismissed. In the event the Court determines that the Petition was somehow timely filed, the MDEQ's proposed resolution of the dispute should nonetheless be affirmed.

Despite Defendant's attempt to pull other issues into this dispute as evidenced by its petition to this Court, the only issue that is subject to this dispute resolution proceeding, should the Court determine that the Defendant's petition was timely filed, is whether Defendant's failure to operate extraction well AE-3 at the minimum approved purge rate constitutes a Force Majeure. And for the reasons stated below, it is the Plaintiffs' position that it does not.

The Defendant devotes a considerable amount of space in its petition discussing the alleged findings of its Evergreen System Review (ESR) dated May, 2007 and its theory that the Evergreen System, as represented by extraction wells LB-1, LB-3 and AE-3, is being operated at an inappropriate purge rate resulting in "excessive" purging that is allegedly affecting the Unit E plume. MDEQ has completed its review of the ESR and provided its comments to the Defendant since the filing of the dispute resolution petition. The Plaintiffs disagree with the findings and conclusions of the ESR and do not believe it supports the Defendant's position with regard to the

operation, effectiveness, and impact of the Evergreen System. See, affidavits of Richard Mandle (Exhibit 1) and James Coger (Exhibit 2).

The operation of this remediation system is governed by the Consent Judgment, as amended, and the Five Year Plan, adopted by this Court on January 10, 2001. The Consent Judgment establishes the requirement for the Evergreen System and any changes in that remediation system must be accomplished by the agreement of the parties and the Court, as such changes would represent a modification[1] of the Consent Judgment. Such modifications to the remediation systems are not subject to this dispute resolution proceeding. Most importantly neither the ESR nor the proposed modifications change the fact that there was no Force Majeure related to the Defendant's failure to maintain the proper extraction rate for AE-3.

As the Court is aware, the Defendant has filed contemporaneously with its petition for dispute resolution, a Motion to Amend the Consent Judgment with supporting brief. To the extent a response to some of the issues related to the design of the remediation system needs to be addressed, it will be provided in the Plaintiffs' response to Defendant's motion and brief.

The Court is, no doubt, familiar with the history of this case and the Plaintiffs will touch briefly on a few pertinent facts related to this current dispute.

Factual Background

The Consent Judgment, as amended, requires the Defendant to design, install, operate and maintain groundwater remediation systems designed to remove, treat and properly dispose of contaminated groundwater that has been released at and migrated from its facility located at 600 SouthWagner Road in Ann Arbor, Michigan. See, Section V of the Consent Judgment. The

[1] Section XXIV. Modification of the Consent Judgment provides that "This Consent Judgment may not be modified unless such modification is in writing, signed by all Parties, and approved by the Court."

Evergreen Subdivision Area System (Evergreen System) is one such groundwater remediation system.

Section V A. of the Consent Judgment explains the objectives for the Evergreen System:

> The objectives of this system shall be: (a) to intercept and contain the leading edge of the plume of groundwater contamination detected in the vicinity of the Evergreen Subdivision area; (b) to remove the contaminated groundwater from the affected aquifer; and (c) to remove all groundwater contaminants from the affected aquifer or upgradient aquifers within the Site.

Because the Court did not believe that the remediation was occurring as fast as it should, the Court entered its Remediation and Enforcement Order (REO) on July 17, 2000 which required the Defendant to submit a detailed plan to "reduce the dioxane in all affected water supplies below legally acceptable levels with a maximum period of five years." Exhibit 4 to Defendant's Petition (Petition Exhibit) pp 2 and 4. The five-year period to achieve this objective was derived from the Defendant's representations about its understanding of the extent of contamination and the Defendant's ability to remediate it.

And based on the record before it, the Court set a minimum purge rate of 200 gpm for the LB-1, LB-2, and AE-1 purge wells that made up the Evergreen System. Petition Exhibit 4, p 5, ¶ 5.

Defendant drafted and submitted the Five Year Plan to the Plaintiffs, with the stated objectives to:

1. Reduce the 1,4-dioxane in all affected water supplies below legally acceptable levels within a maximum period of five years from July 17, 2000;
2. Provide monthly benchmarks to show progress toward objective (1);
3. Intercept and contain the leading edge (85 parts per billion) of 1,4-dioxane contamination identified in drinking water supplies; and
4. Provide for subsequent monitoring of the water supplies for an additional ten-year period thereafter.

See Petition Exhibit 5, p 3.

The Five-Year Plan provides for a minimum purge rate of 35 gpm for AE-1 well. Petition Exhibit 5, p 5. On January 10, 2001, by stipulation of the parties, the Court approved the Five Year Plan, which required the Defendant to clean up 1,4-dioxane in the groundwater to below the cleanup criteria.

From the beginning, Defendant had problems operating AE-1 at the approved minimum extraction rate. Petition Exhibit 17, p 3. These problems were the subject of a previous dispute resolution. The current minimum extraction rate of 25 gpm was approved by MDEQ in a letter dated May 19, 2004 based upon a Capture Zone Analysis (CZA) submitted by Defendant in November 2002. Administrative Record at 277-278. The approval was for AE-1 in combination with extraction from LB-1 and LB-2 to be operated at a minimum combined extraction rate of 200 gpm. Extraction well AE-1 was subsequently replaced by AE-3, thus making the 25 gpm minimum extraction rate apply to the current Evergreen System extraction well AE-3. Extraction well LB-2 has also been replaced by LB-3, so as currently designed the Evergreen System consists of LB-1, LB-3 and AE-3. Defendant has not submitted a request since May 2004 to lower the minimum extraction rate and consequently MDEQ has not approved a lower extraction rate.[2]

The AE-3 extraction well appears to have operated at or above the minimum extraction rate since shortly after it was placed into operation in June, 2004 until January 1, 2006 (Administrative Record at 288-294; 302-313; and 317), at which time AE-3 had been shut down due to non-steady flow rates according to Defendant. The Defendant rehabilitated the well twice between January and April 2006 after which the well generally operated above the minimum

[2] Defendant submitted the Evergreen System Review on or about May 10, 2007 in which it proposes to discontinue operating the AE-3 and reduce the extraction rates for the LB-1 and LB-3 wells but for the reasons discussed above and to be discussed in its Response to Defendant's Motion to Remove, Plaintiffs disagree with that proposal.

extraction rate until January 17, 2007. Administrative Record at 317-328. The well was rehabilitated and extraction resumed on January 22, 2007 and continued above the minimum extraction rate until March 3, 2007. Administrative Record at 368-370. Pump maintenance was performed and extraction resumed on March 6, 2007 until March 14, 2007 when, according to Defendant, the extraction rate for AE-3 was decreased to below the minimum rate and the well was eventually shut down. Defendant notified MDEQ that it would leave AE-3 off for several days to allow the aquifer to recover and that the well should be on again by March 19, 2007. Administrative Record at 331.

MDEQ was notified on April 3, 2007, that AE-3 was still off. It had been turned on only temporarily on March 19, 2007 because it was pulling in air and could not maintain flow. Petition Exhibit 17, p 6, ¶ 26. In contrast to its usual practice of initiating rehabilitation within a few days of shut-down, Defendant delayed rehabilitation until April 23 and did not resume operating AE-3 until April 26, 2007. After turning on AE-3 and running it for several days at a reduced extraction rate of 10 gallons per minute (gpms), Defendant made a claim of "Force Majeure" on April 30, 2007. The extraction rate for AE-3 was gradually increased, and from May 3 – 29, 2007, it operated at or above the minimum extraction rate. See Administrative Record at 370-371 and Exhibit 4.

By its letter dated May 29, 2007, MDEQ denied Defendant's Force Majeure claim with regard to Defendant's operation of AE-3 below the minimum approved extraction rate. Administrative Record at 360-361. In that letter, MDEQ notified Defendant that its failure to operate AE-3 at the minimum extraction rate was a violation of the Consent Judgment and the Five-Year Plan, subjecting Defendant to stipulated penalties

On April 30, 2007, Defendant invoked the dispute resolution process of Section XVI of the Consent Judgment. Pursuant to those procedures, the parties attempted to resolve the dispute through informal negotiations, including a conference call.

On June 15, 2007, the MDEQ provided Defendant with its proposed resolution of the dispute as provided in Section XVI.B of the Consent Judgment. Administrative Record at 364-367. The MDEQ stated:

> The DEQ's resolution of the dispute is that PLS pay stipulated penalties that accrued during the period when AE-3 was not operating or was operating below the minimum approved extraction rate from March 15, 2007 to May 3, 2007 and on May 31, 2007, a period of 37 working days. Pursuant to Section VII.A of the Consent Judgment, the first 15 working days of violations are assessed at $1,000 per day; the subsequent 15 working days are assessed at $1,500 per day; six working days are assessed at $2,000 per day, and one working day, on May 31, 2007 is assessed at $1,000 per day, for a total of $50, 500 in stipulated penalties. Penalties will continue to accrue pursuant to Section XVII of the Consent Judgment for all working days that AE-3 is not meeting the minimum extraction rate of 25 gpm.

Section XVI.B of the Consent Judgment provides the procedure that the Defendant must follow to obtain judicial review of the MDEQ's proposed resolution of the dispute. It provides:

> Immediately upon expiration of the informal negotiation period (or sooner if upon agreement of the parties), the MDNR shall provide to Defendant a written statement setting forth the MDNR's proposed resolution of the dispute. Such resolution shall be final unless, within 15 days after receipt of the MDNR's proposed resolution (clearly identified as such under this Section), Defendant files a petition for resolution with the Washtenaw County Circuit Court, setting forth the matter in dispute, the efforts made by the Parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of the Consent Judgment.

Defendant filed its Petition for Dispute Resolution with the Court on July 9, 2007, more than fifteen days after it received the MDEQ's proposed resolution of the dispute as required by Section XVI.B of the Consent Judgment, and therefore MDEQ's proposed resolution has become final and the Defendant must pay the stipulated penalty. In the event the Court decides to

entertain this dispute, Section XVI.B of the Consent Judgment provides that the Plaintiffs may submit a response, and that the MDEQ will submit all documents containing information related to the matters in dispute. The Plaintiffs are submitting a copy of the Administrative Record, which along with the exhibits attached to this Response and Defendant's Petition shall constitute the record for review.

The conduct of the dispute resolution proceeding is governed by Section XVI.D of the Consent Judgment which provides:

> The Court shall uphold the decision of MDEQ on the issue in dispute unless the Court determines that the decision is any of the following:
> 1. Inconsistent with the Consent Judgment;
> 2. Not supported by competent material, and substantial evidence on the record;
> 3. Arbitrary, capricious, or clearly an abuse or unwarranted exercise of discretion; and
> 4. Affected by other substantial and material error of law; ...."

Defendant has the burden of proving that MDEQ's June 15, 2007 resolution should not be upheld on the grounds provided in the Consent Judgment and listed above. Defendant has not carried its burden and as discussed below, the MDEQ's position is consistent with the Consent Judgment and applicable law. The Consent Judgment and Five-Year Plan as modified by the agreement of the parties, clearly require Defendant to operate AE-3 at the minimum approved extraction rate of 25 gpm. There is no factual dispute that it failed to do so between March 14, 2007 and May 3, 2007 and again May 30 and 31, 2007.[3] Defendant has admitted as much through its communications with MDEQ and the March, April, and May 2007 Extraction data for AE-3.

Defendant 's admitted failure to operate AE-3 at minimum approved extraction rate subjects it to stipulated penalties as provided in Section XVII of the Consent Judgment. While

[3] MDEQ has recently learned that AE-3 continues to operate below 25 ppm.

there are exceptions to the obligation to pay stipulated penalties, none of them apply to the Defendant. Section XIV of the Consent Judgment (Force Majeure) excuses non-compliance "arising from causes beyond the control of Defendant...." Section XIV.A. However no such excuse is available to Defendant in this situation. Defendant has not shown that its failure to maintain the minimum approved extraction rate was due to circumstances beyond its control as discussed below.

Further, Defendant has waived its right to claim a Force Majeure event as it did not timely assert its claim. Section XIV of the Consent Judgment specifies that Defendant notify the MDEQ of circumstances it believes constitute Force Majeure within 48 hours after it first believes those circumstances to apply and provide a written explanation of the cause of any delay, expected duration of the delay, and measures to be taken to overcome the delay within 14 working days of when it first believes the circumstances to apply. Defendant's claim of Force Majeure was not timely and thus any claim of Force Majeure is waived.

However, the ultimate issue is whether the Defendant should finally be held accountable for its repeated violations of the Consent Judgment and the Five Year Plan. Requiring Defendant to live up to its obligations, including the possibility of stipulated penalties for failure to perform a provision of the Consent Judgment to which it agreed, is not prejudicial or unfair to Defendant. The purpose of stipulated penalties is not to line the MDEQ's pockets, they serve a deterrent effect by making violations costly. As evidenced by its repeated failures to perform as required under the Consent Judgment, the Defendant appears to need some motivation to ensure that it meets its legal obligations under the Consent Judgment.

Argument

I. Defendant failed to file its Petition to this Court timely and therefore the MDEQ's resolution of the dispute is final and not subject to judicial review.

This petition was not filed in the time provided under the Consent Judgment and should be stricken. Section XVI.B. of the Consent Judgment provides that:

> Immediately upon expiration of the informal negotiation period (or sooner if upon agreement of the parties), the [MDEQ] shall provide to Defendant a written statement setting forth the [MDEQ]'s proposed resolution of the dispute. Such resolution shall be final unless, *within 15 days after receipt of the [MDEQ]'s proposed resolution (clearly identified as such under this Section), Defendant files a petition for resolution with the Washtenaw County Circuit Court* setting forth the matter in dispute, the efforts made by the Parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of the Consent Judgment. (Emphasis added.)

The Consent Judgment in Section III.B. provides that:

> *"Day" shall mean a calendar day unless expressly stated to be a working day.* "Working Day" shall mean a day other than a Saturday, Sunday or a State legal holiday. (Emphasis added.)

A plain reading of the Consent Judgment requires that a petition for resolution must be filed within 15 calendar days.

MDEQ submitted its proposed resolution of the dispute by e-mail on June 15, 2007 and also sent it out by first class mail that same day. Defendant received it electronically on June 15 and fifteen days from June 15 is June 30, a Saturday. Pursuant to Section III.B. of the Consent Judgment, the petition should have been filed by Monday July 2, 2007, the first working day after the weekend. Even if you use receipt by mail as the starting point, Defendant's filing of its petition on July 9, 2007 is still without a doubt more than 15 calendar days after the Defendant received the resolution of the dispute. Furthermore, Defendant in its Petition indicated that it used 15 "working days" to calculate the deadline for filing its Petition. Petition, Paragraph 65. Due to the Defendant's failure to timely file its petition, the MDEQ's proposed resolution is now

final and Plaintiffs request that the Defendant be ordered to pay the requested Stipulated Penalties.

If the Court determines that the Defendant's petition was timely filed, the MDEQ's proposed resolution should be affirmed and the proposed stipulated penalties should still be assessed as Defendant's operation or lack thereof of AE-3, does not constitute a Force Majeure.

II. Defendant is required to operate the Evergreen System including AE-3 pursuant to the Consent Judgment and Five-Year Plan.

Section V of the Consent Judgment requires that Defendant implement a comprehensive MDEQ-approved program of groundwater remediation. One area subject to remediation is the Evergreen Subdivision Area and the Consent Judgment contemplated the development and use of a groundwater remediation system known as the "Evergreen System" in Section V.A. The Consent Judgment has been amended twice and has also been supplemented by the July 17, 2000 Remediation Enforcement Order and the January 10, 2001 Order adopting the Five-Year Plan. The Consent Judgment as amended still remains in effect.

Section V.A. of the Consent Judgment contains at least two independent requirements with regard to the Evergreen Area. First, Section V.A.1 specifies that one of the objectives of the Evergreen System is to "intercept and contain the leading edge of the plume of groundwater contamination detected in the vicinity of the Evergreen Subdivision Area." Second, Section V.A.4 contains a distinct and separate requirement that Defendant "continuously operate and maintain the [Evergreen] system according to the [MDEQ] approved plans." The Consent Judgment plainly requires Defendant to meet both requirements: (1) overall plume containment; and (2) operation of the system to meet state-approved plans. According to the January 10, 2001, Stipulated Order Adopting the Five Year Plan (Exhibit 5, p 2), to which both parties

agreed, Defendant is obligated pursuant to Section V.A.4 of the Consent Judgment to operate the Evergreen System according to the relevant provisions of the Five-Year Plan.

The minimum purge rate for specific Evergreen System extraction wells was initially set at 35 gpm for AE-1, which was replaced by AE-3. The current minimum extraction rate for AE-3 as discussed above, is 25 gpm pursuant to MDEQ's approval dated May 19, 2004. It is undisputed and the record clearly reflects that AE-3 must be operated at 25 gpm.

III. There is no factual dispute that Defendant did not operate AE-3 at Minimum Required Extraction Rate.

Defendant admits, and the record further indicates, that it did not operate AE-3 at the minimum approved minimum extraction rate from March 14, 2007 to May 3, 2007 and on May 30-31, 2007, the period for which stipulated penalties were assessed as provided under the Consent Judgment. According to Defendant's petition and June extraction well data, it has not operated AE-3 at the minimum required purge rate since the end of May and therefore it is subject to additional stipulated penalties. While the MDEQ recognizes that the extraction wells may periodically be shut down for routine maintenance, and MDEQ has not penalized Defendant before for such activities. However, the reduced operation and shut down of AE-3 in this instance exceeded what is reasonably necessary for maintenance (rehabilitation) of the well.

IV. The Consent Judgment mandates the stipulated penalties determined by the MDEQ.

Defendant is subject to stipulated penalties for specific violations of the Consent Judgment and requirements established under the Consent Judgment. Section XVII.A provides:

> A. Except as otherwise provided, if Defendant fails or refuses to comply with any term or condition in Sections IV, V, VI, VII, or VIII, or with any plan, requirement, or schedule established pursuant to those Sections, then Defendant shall pay stipulated penalties in the following amounts for each working day for every failure or refusal to comply or conform:

Period of Delay	Penalty Per Violation Per Day
1st through 15th day	$1,000
15th through 30th day	1,500
Beyond 30 days	2,000

Section SV.II.D provides:

> D. Stipulated penalties shall begin to accrue upon the next day after performance was due or other failure or refusal to comply occurred. Penalties shall continue to accrue for each separate failure or refusal to comply with the terms and conditions of this Consent Judgment. Penalties may be waived in whole or in part by Plaintiffs or may be dissolved by the Court pursuant to Section XVII.

MDEQ's June 15, 2007 letter calculated the applicable stipulated penalties of $50,500 based on 37 working days of violation. Administrative Record at 366 The Defendant has not disputed the calculation.[4]

V. Defendant waived and, in any event, has not supported a claim of Force Majeure.

"Force Majeure" is defined as "an occurrence or non-occurrence arising from causes beyond the control of Defendant. ...." Section XIV.A Section XIV.B requires the Defendant to notify the MDEQ if it believes that "force Majeure" circumstances have arisen and failure to provide the notice as required under the Consent Judgment waives any right to claim such and excuse.

Section XIV.B states:

> When circumstances occur that Defendant believes constitute Force Majeure, Defendant shall notify the MDNR by telephone of the circumstances within 48 hours after Defendant first believes those circumstances to apply. Within 14 working days after Defendant first believes those circumstances to apply, Defendant shall supply to the MDNR, in writing, an explanation of the cause(s) of any actual or expected delay, the anticipated duration of the delay, the measures taken and the measures to be taken by Defendant to avoid, minimize, or overcome the delay, and the timetable for implementation of such measures. Failure of Defendant to comply with the written notice provisions of this paragraph shall

[4] Stipulated penalties have continued to accrue due to Defendant's continuing failure to operate AE-3 at the minimum required purge rate.

constitute a waiver of Defendant's right to assert a claim of Force Majeure with respect to the circumstances in question.

Defendant did not comply with this requirement. After several stops and starts, the Defendant shut down AE-3 on March 3, 2007. A pump was replaced and the well turned back on March 6, 2007. It was operated at or above the minimum extraction rate until March 14, 2007 at which time Defendant shut it off.

While Defendant did advise MDEQ that it shut down AE-3 due to air being sucked into well and fouling of the screens, it indicated that the wells would be turned on in a few days – once it allowed the aquifer to recover. On March 19, after turning AE-3 back on, Defendant only operated it a short period of time before shutting it off again because, according to Defendant it was still pulling in air. Without a word to MDEQ, Defendant decided to leave AE-3 off in contravention of the Consent Judgment, the Order Adopting the Five Year Plan, and the MDEQ's approval of extraction at 25gpm. Defendant also decided to delay any attempts at rehabilitating the well.

MDEQ learned of Defendant's decision to leave the well off by chance on April 3, 2007 while discussing other issues with Defendant's representative Farsad Fatouhi. Defendant did not claim a Force Majeure for the prolonged shutdown of AE-3 and only made the claim after the well rehabilitation in late April resulted initially in lower extraction rates upon startup. Eventually AE-3 was returned to the approved extraction rate without further rehabilitation on May 3, 2007.

Defendant's belated attempt to claim a Force Majeure should not prevail as it is clearly untimely. Defendant in defending its actions has on the one hand contended "it was unable to operate AE-3 at the minimum purge rate because of circumstances that, were in retrospect, *beyond its control from March 15, 2007 to May 3, 2007*, and from May 31, 2007 to present...."

Petition, p 18, ¶ 67. And therefore, presumably any stipulated penalties related to its operation or AE-3 during that period should not be assessed. While at the same time the Defendant alleges that it could not have claimed a Force Majeure prior to April 30, 2007 and may have in fact claimed it too early. If the Court were to grant the Defendant's requested relief not to assess any penalties related to its failure to operate AE-3 at the minimum required extraction rate, the Court would be in effect applying the Defendant's claim of Force Majeure retroactively, because even the Defendant admits in its Petition that it did not operate AE-3 as required. This result is clearly not warranted under the Consent Judgment.

Even assuming arguendo such a claim was not waived, it is without merit. MDEQ's June 15, 2007 letter explained:

> ...We believe the above information demonstrates that meeting the minimum extraction rate for AE-3 is not beyond the control of Defendant and Defendant's failure to do so does not qualify as a "Force Majeure" event. Defendant is well aware of the lower water levels that persist in this aquifer. And as demonstrated by the operation and maintenance history of AE-3, Defendant could have avoided this failure with the use of reasonable diligence.

In fact, while the water levels had decreased in the D2 aquifer from August 1996 to August 2003, the water levels appeared to have stabilized beginning in 2004. Coger Affidavit, p 2, ¶ 18. And since that time, the Defendant has had more than ample opportunity to investigate the aquifer and determine whether other alternatives were available to address what is a well known chronic situation. In fact, there is every indication that when AE-3 was installed, water levels had stabilized which raises the question, why the Defendant screened AE-3 at the depth that it chose, given the historical problem of low water levels in the area. That is poor planning and design, not Force Majeure.

The Defendant has raised the issue of the need to do frequent maintenance and rehabilitation of AE-3. It is not unusual nor should it be surprising that the more one uses

equipment, the more likely it is to need frequent maintenance. This is true with remediation systems and one of the reasons that Operation and Maintenance (O&M) plans are often required and if not required, at least prudent. Defendant also questions the frequent maintenance because of the type of chemicals used in rehabilitating wells. Whenever maintenance and rehabilitation is performed on AE-3, presumably, Defendant is using trained individuals who know proper procedure and how to handle any equipment or substances used in the process.

MDEQ has even suggested one possible alternative to lessen the impact of the chronically low water levels found in this part of the Evergreen area and Defendant's increasing need to do maintenance and rehabilitation of AE-3.

> [T]hat Defendant install multiple extraction wells that can operate at lower extraction rates. The DEQ believes this should help reduce the need to shut down wells for rehabilitation as the amount of air pulled in would be minimized, thus avoiding the fouling that results in the need to do more maintenance and rehabilitation. At the same time it would assist Defendant in meeting its remedial obligations under the Consent Judgment and Five Year Plan.

Administrative Record at 361. See also, Mandle Affidavit, Exhibit 1 ¶ 16 and Kolon Affidavit, Exhibit 3, p 2, ¶ 6. While there are no perfect solutions, the above recommendation provides the Defendant with the opportunity to meet its obligations under the Consent Judgment. Even Defendant's consultant recognizes that a potential advantage of multiple wells pumping at lower rates is a reduction in plugging of the individual wells and longer intervals between maintenance. Petition Exhibit 2, p 3, ¶ 10.

Nonetheless, the Defendant alleges that a multi-well system "is unworkable and only multiplies the problems caused by poor aquifer conditions and low water levels present at this location." Petition, p 19, ¶ 73. The Defendant offers as support for its position, the difficulty in obtaining access in the area. Access is often hard to obtain when remediating contamination that has migrated off-site. Not many people want someone else drilling or working on their property,

so it is a universal problem, but not one that excuses the Defendant, or any other liable party from seeking the needed access, including if necessary resorting to judicial action. While the City of Ann Arbor recently rejected a request by Defendant for permission to drill at a particular location, Defendant has not shown that it cannot find an appropriate location and obtain access to make multi-well system workable.

Another excuse that the Defendant offers for not considering a multi-well system is that the installation and operation of AE-2, which was intended to be a backup to AE-1, was unsuccessful. The lack of success with AE-2 was not because of some problem inherent in a multi-well system or, for that matter, problems with the water levels in the area, which the multi-well system the MDEQ proposes would address. Kolon Affidavit, Exhibit 3, pp 2-3, ¶¶ 7-9. It failed because "the AE-2 location turned out to be an area with very low levels of contamination." Petition Exhibit 17, p 4, ¶ 17. It appears, that because of a lack of vertical profiling for 1,4-dioxane, AE-2 was located south of the D2 (Evergreen) plume. See Coger Affidavit, Exhibit 2, p 3, ¶ 22. Most importantly, as discussed above, water levels appear to have been stable since 2004 and therefore a multi-well extraction system installed in a location based on vertical profiling down to a hydraulically conductive zone and properly screened should provide productive extraction. See generally, Coger Affidavit, Exhibit 2, p 3, ¶¶ 20-22.

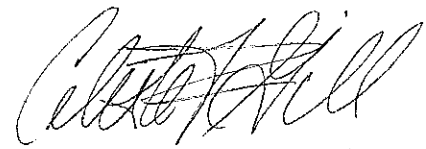
The above recommendation represents just one possible alternative that would permit the Defendant to meet its obligations under the Consent Judgment. There are likely other alternatives that had Defendant been so inclined and exercised diligence could have discovered.

Conclusion

Defendant has failed to establish any of the grounds required under Section XVI.D for overturning the MDEQ's June 15, 2007 resolution of the pending dispute. Furthermore, the Defendant has no substantial basis for not operating AE-3 at the minimum required extraction rate. For all of the reasons provided in the Brief, this Court should uphold the MDEQ's proposed resolution imposing stipulated penalties.

Respectfully submitted,

Michael A. Cox
Attorney General



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Dated: July 19, 2007

Gelman/1989001467response to petition

EXHIBIT 1

AFFIDAVIT OF RICHARD MANDLE

1. I, Richard Mandle, begin first duly sworn, attest as follows:

2. The facts stated in this Affidavit are based on my personal knowledge and I am competent to testify to them.

3. I am a Groundwater Modeling Specialist for the Remediation and Redevelopment Division (RRD) of the Michigan Department of Environmental Quality (MDEQ), in Lansing, Michigan. I work in the RRD Executive Section. I have been employed by the MDEQ and its predecessor, the Michigan Department of Natural Resources for approximately nine (9) years.

4. I received my Batchelor's degree in Geology from Michigan State University (MSU) in 1973. In 1975 I received a Master's degree in Geology with an emphasis in groundwater hydrology from MSU. I attended the University of Arizona (UA) in 1982-1983 as part of the U.S. Geological Survey Graduate School Training Program. While at UA I completed graduate coursework in groundwater modeling.

Professional Experience

5. For the past 32 years, I have worked as a practicing groundwater hydrologist for the federal government, the consulting industry, and for the state of Michigan. While employed with the federal government (approximately 14 years) I work on several groundwater resource investigations in a wide variety of

hydrogeologic settings in Maryland, California, Wisconsin, Minnesota, Iowa, Illinois, Missouri, and Michigan. My primary responsibilities in these investigations were as the groundwater modeling specialist and hydrogeologist. I was employed as a groundwater hydrologist in the consulting industry in Michigan for approximately nine (9) years. In this capacity I worked on several groundwater contamination investigations, ranging in size and complexity from small leaking underground storage tank sites to large Superfund sites. During the investigations of these sites I worked as the team member in charge of the application of groundwater modeling to design remediation systems, typically consisting of extraction wells. Other responsibilities included the design and testing of large capacity municipal water-supply wells. I also provided technical support for designing field data collection efforts and analysis of hydrogeologic and chemical field data. The largest site for which I utilized groundwater modeling in the design of an extraction well system was for the Kysor/Northernaire Superfund site in Cadillac Michigan. This system consisted of 17 extraction wells pumping approximately 2,000 gallons per minute (gpm). I was responsible for the design, construction oversight, and testing of these wells.

6. I have been employed by the state of Michigan for the last nine (9) years as the Groundwater Modeling Specialist. In this capacity I provide groundwater modeling and hydrogeological technical support to all divisions within the DEQ, as needed. The types of projects for which I provide support include evaluating

the potential impacts to lakes and wetlands by quarrying or mining, estimating the impact of groundwater withdrawals from high capacity water extraction wells on surrounding hydrologic features, assessing the recharge areas for public drinking-water supply wells, investigation the impact of the migration of contaminated groundwater on the environment, and the evaluation of the effectiveness of groundwater remediation systems.

7. The groundwater models that I have developed or reviewed have ranged from very simple calculations using a pocket calculator to complex three-dimension computer models requiring the use of a high-powered computer. Keeping in mind that all models, regardless of their complexity, are approximations of real-world conditions, I have consistently strived to objectively compare all model predictions to field data. The purpose of this comparison is to assess the accuracy and reliability of the model. Models for which comparisons to field data are poor are inaccurate and unreliable.

Experience with Gelman Site

8. Since 1998 I have been the RRD's Groundwater Modeling Specialist. As Groundwater Modeling Specialist, I have reviewed several groundwater models submitted by Pall Life Sciences (PLS) for the Gelman Sciences, Inc. site at 600 South Wagner Road, Ann Arbor, Michigan. These models have been developed for the purpose of designing or assessing groundwater extraction wells for the Evergreen, Maple Road, or Wagner Road Systems. I have also reviewed the

reports detailing the testing of extraction wells at Maple Road and Wagner Road; the Performance Monitoring Plan (PMP) reports for the Evergreen, Maple Village, and Wagner Road systems; and I have reviewed the report discussing the work plan for investigating the extent of the downgradient Unit E contamination.

9. I have reviewed the Evergreen System Review (ESR) report, dated May 2007, submitted to the DEQ on May 10, 2007 and the associated groundwater model developed by Fishbeck, Thompson, Carr & Huber, Inc. (FTC&H). My detailed review of the groundwater model is included in the attached Interoffice Communication dated July 13, 2007 (Exhibit 1). It is my opinion that there are three main issues with the ESR; 1) Data deficiencies that limit the proper characterization of the vertical and horizontal extent of 1,4-Dioxane contamination and correct assessment of groundwater flow and contaminant migration directions, 2) The ESR relies heavily on simulations made with a groundwater flow model that is not calibrated, and 3) The lack of a monitoring network that is installed for the sole purpose of assessing the performance of the Evergreen System.

Groundwater Flow Model

10. The model used for the 2007 evaluation of the Evergreen System (2007 Model) was a revision of an earlier submitted model that I reviewed on February 14, 2004. At that time, my review comments focused on the adequacy of the data needed to define the groundwater flow directions and the horizontal and

vertical extent of the 1,4-Dioxane contamination. It is necessary to fully define the problem before a remedy can be properly designed or evaluated. It was my opinion that there were too many uncertainties in the direction of groundwater flow or contamination extent to develop a model that could reliably be used to assess the capture effectiveness of the Evergreen System wells. I also stated concerns about the lack of monitoring well clusters (groupings of wells screened at different vertical depths) immediately downgradient of the Evergreen System wells to monitor the hydraulic containment of the contaminant plume. It is my opinion that these problem characterization performance monitoring deficiencies still exist. Also, the lack of acceptable calibration and possible errors in conceptualization of the geology and hydraulic boundaries in the 2007 Model play a significant role in the accuracy of model simulations.

Groundwater Flow Directions

11. The direction of groundwater flow in the Unit D aquifer in the Evergreen Subdivision area is based on measurements in wells found principally within the subdivision. There are a limited number of monitoring wells north of Dexter Road and none east of Rose Drive in which to measure groundwater levels. Available data from more than 1500 residential water well records in the vicinity of the PLS site show that the direction of groundwater movement at the west end of the Evergreen Subdivision may be to the north. However, using the 2007 Model, the direction of simulated groundwater movement in this area is from the west to the east. The continued increase in 1,4-Dioxane concentrations in wells MW-77 and

465 Dupont in the west end of the Evergreen Subdivision is not consistent with the directions of groundwater flow calculated by the 2007 Model. These rising concentrations are more consistent with a northerly flow direction that is depicted by the residential water well records. In order for the rising 1,4-Dioxane concentrations to be consistent with the model-calculated groundwater flow directions, there would have to be elevated 1,4-Dioxane concentrations to the west of Rose Drive, beyond the present delineated extent of 1,4-Dioxane contamination. As a result, either the simulated groundwater flow directions in this area are not correct or the delineated western extent of 1,4-Dioxane contamination is not correct.

Extent of 1,4-Dioxane Contamination

12. The extent of 1,4-Dioxane contamination that has been delineated for the Evergreen area has been based, in large part, on samples collected from wells that were not installed using vertical aquifer sampling (VAS). VAS has been a regulatory agency standard since the mid-to-late 1980's. Vertical aquifer sampling involves collecting discrete groundwater samples with depth during the drilling process in order to determine the vertical extent of contamination. At this site, failure to base the delineation of the full extent, especially vertical, of the 1,4-Dioxane contamination on VAS resulted in the lack of detection of the contamination found within the deeper Unit E aquifer and eventual impact to the City of Ann Arbor's Montgomery Street well. In the Evergreen area, there are a number of areas where the lateral extent of contamination is based on sampling

from wells that may not extend to a sufficient depth to encounter the 1,4-Dioxane contamination or to determine it's vertical extent. In these areas, VAS borings should be completed so that the full area requiring containment by the Evergreen System can be determined.

Model Boundaries

13. The type and placement of hydraulic boundaries in a model affect the simulation results. In this case, they affect the simulation of the capture effectiveness of the Evergreen System. The hydraulic boundaries used in the 2007 Model for the area north and east of the Evergreen Subdivision are responsible for forcing the model to simulate a west-to-east direction of groundwater movement. A "no-flow" boundary is used for the area north of Evergreen, preventing the northward movement of groundwater. A "constant-head" boundary is used for the area east of Evergreen, forcing groundwater to move in this direction, toward an area that falls within the simulated extent of capture of the Evergreen System. There are not sufficient data that have been collected as part of the Evergreen investigation, especially north of Dexter Road, that verify the west-to-east flow direction or support the use of the "no-flow" boundary. In addition, no assessment of the impact of the selection of these boundaries on the model simulation of the capture efficiency of the Evergreen System was conducted.

Model Layers

14. The model assumes that the subsurface sediments consist of continuous layers that extend over the entire model area. In particular, the model includes a continuous layer of relatively-low permeability that separates the "Unit D" aquifer model layer from the "Unit E" layer. This low-permeability layer restricts the degree to which water can move, within the model, between the Unit E aquifer and the Unit D aquifer. Data collected since 2002 show that this layer is not continuous and appears to be absent under parts of the Evergreen Subdivision: however, no modification was made to the 2007 model. The impact that the absence of the low permeability layer has on the model simulations of the capture effectiveness of the Evergreen System was not evaluated. If the two aquifers are better connected, it is likely that the lateral extent of capture within the Unit D aquifer will not be as extensive as that presented in the ESR report.

Migration of Contamination from the Unit E Aquifer toward the Evergreen System

15. PLS has indicated that the reason for increasing contaminant levels in selected monitoring wells screened in the Unit D aquifer is that contaminated groundwater found in the Unit E aquifer is being drawn toward the Evergreen remediation system. This would require that groundwater level elevations within the Unit E aquifer be greater than those found within the Unit D aquifer. Monitoring well clusters (wells in close proximity to one another) that have wells screened in the Unit D and Unit E aquifer are needed for this purpose. There are no clusters of monitoring wells within the Evergreen Subdivision that have wells

screened within the Unit D and Unit E aquifers to make this determination. No groundwater level elevation data were presented by PLS to support this claim. Simulations by DEQ using the 2007 Model show that pumping from the Evergreen System do not affect groundwater levels in the Unit E aquifer nor is groundwater drawn from the Unit E aquifer to the Unit E aquifer. My examination of the data suggest that elevated 1,4-Dioxane contamination found in the Unit D aquifer that is upgradient of the Evergreen Subdivision is likely responsible for the increasing concentration trends found within the Evergreen Subdivision.

Failure of Well AE-3

16. It has not been possible to maintain the desired pumping rates from well AE-3. I did not review any design documents for well AE-3, if they exist, to evaluate the performance of this well. Reasons that were given for failure to maintain the desired pumping rates are that groundwater levels have declined several feet, there is limited available drawdown (the distance that water levels can be safely lowered within a well), and the well has required frequent maintenance. It appears that these reasons are correct, but only because PLS has attempted to obtain the desired pumping rate from a single well rather than installing a second, or third extraction well, dividing the desired pumping rate equally between all wells. Groundwater levels have declined; however, they have not declined since before AE-3 was designed and installed. This should have been accounted for in the design of this well. Attempting to pump a single well that has limited available drawdown, at the desired rate, results in water

levels that may drop below the top of the well screen This exposes the screen to the atmosphere and promotes biochemical fouling of the well screen, resulting in lower well yields and more frequent well maintenance. Proper well design would have recognized that available drawdown was limited and that to prolong the life of the extraction system and minimize well maintenance, it would be necessary to install multiple wells, each pumping at a lower rate. The summation of these lower pumping rates may have been adequate to attain the pumping rate needed to contain the contamination, once it has been fully delineated.

Proposed Performance Monitoring Plan

17. On the basis of the 2007 Model and PLS's interpretation of the reasons behind the increasing 1,4-Dioxane concentration in the Evergreen Subdivision, PLS has proposed to reduce the extraction rates for wells LB-1 and LB-3 by 25 percent. PLS also propose to monitor nearby wells to assess the capture effectiveness of the system at these reduced rates. An examination of the locations of available monitoring wells relative to the extent of capture simulated by the 2007 Model clearly show that there are not a sufficient number of well-placed monitoring wells near the downgradient extent of capture that can be utilized for this purpose. If PLS proposes to adjust pumping rates, there must be a sufficient number of monitoring well pairs that can be used to demonstrate groundwater flow directions toward the extraction wells (inward hydraulic gradient). These well pairs must be located near the estimated downgradient extent of capture. The figures shown in Exhibit 2 illustrate this concept. In

Evergreen, only monitoring wells MW-47S and MW-47D are in a location that may be appropriate. A figure showing a zone within which monitoring well pairs should be located downgradient of the Evergreen System wells is found in the attached memo (see Figure 10).

18. This affiant says nothing further.

a.
b. Richard Mandle

c. Subscribed and sworn to before me, July 19, 2007.

d Jere Marie Sherwood Notary

e. Ingham County
f. My commission expires: 11/10/08

JERI MARIE SHERWOOD
NOTARY PUBLIC WICHITA CO., TX
MY COMMISSION EXPIRES Nov 10, 2008

EXHIBIT 1

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: Sybil Kolon, Project Manager, RRD, Jackson District

FROM: Rick Mandle, Groundwater Modeling Specialist, RRD, Lansing

DATE: July 13, 2007

SUBJECT: Review of 2007 Model of Evergreen System

The Groundwater Modeling Program has completed its review of the model (2007 Model) used to evaluate the hydraulic containment effectiveness of the Evergreen System extraction wells. The application of this model is described in a report (2007 Model Report) entitled, "Evergreen System Review, May 2007". The 2007 model is a slight revision of the model that was previously developed by Fishbeck, Thompson, Carr & Huber, Inc. (FTC&H) of Kalamazoo, Michigan in 2002 (2002 Model).

The purpose of the 2007 Model was to assess the impact that reductions in the pumping rates for wells LB-1 and LB-3 would have on the capture effectiveness of the Evergreen System extraction wells. The rationale for reducing pumping rates from these wells is based on the presumption that the existing pumping rates are excessive and that they are causing contaminated groundwater to migrate toward the Evergreen Subdivision or toward the Prohibition Zone (PZ) boundary from areas south of I-94 and Jackson Road where 1,4-Dioxane contamination has been detected in the E aquifer. On the basis of model simulations, FTC&H has determined that pumping rates in wells LB-1 and 3 could be reduced by almost 50 percent and still maintain hydraulic containment of the 1,4-Dioxane plume, although they've recommended an initial 25 percent reduction in pumping rates for these wells and field data collection to verify plume containment In these simulations, the pumping rate for well AE-3, the replacement for well AE-1, was varied from 10 to 32 gallons per minute (gpm). No analysis was conducted in which the impact of changing the location of, or eliminating the pumping rate from, well AE-3 on the effectiveness of the hydraulic containment of the Evergreen System.

The review comments contained in this document focus on the usefulness and limitations of the 2007 Model in assessing the capture effectiveness of the Evergreen System wells and in determining optimal pumping rates for these wells.

Modification to Model

The model used for this latest review of the Evergreen System is a slight modification of the 2002 Model. FTC&H noted that the groundwater levels in the area had been steadily declining since 1994. They attributed this decline to pumping by the Pall Life Sciences (PLS) remediation wells. Rather than attempting to simulate the decline in hydraulic heads (groundwater level elevations) as a means of calibrating their model, the hydraulic head values used at the downgradient constant-head boundary were decreased approximately 2 to 5 feet from values used in the 2002 Model. The location of this boundary with respect to the Evergreen Subdivision is shown in Figure 1. Since the upgradient constant-head boundaries were not changed, changing the constant-head values at the downgradient boundary resulted in a very slight increase in the hydraulic gradient through the model. It was not apparent that any other model features or parameter values were changed from those used in the 2002 Model.

Model Calibration

Model simulated hydraulic heads were compared to groundwater level elevations measured in wells open to model layers 2 (Unit D aquifer) and 4 (Unit E aquifer) from the September 2006 sampling event. The model simulated heads and differences between the simulated heads and measured heads (residuals) are shown in Figures 2 and 3. Positive residual values indicate that the measured heads are higher than the model simulated heads. Negative residual values indicate that the measured heads are less than the model

simulated heads. The results show that, with the exception of wells MW-17 (-0.95 feet) and MW-BE1d (-2.48 feet), the model-simulated heads are lower than the measured heads in the Unit D aquifer (layer 2). On the basis of the limited number of hydraulic head measurements used for comparison, it appears that the model-simulated heads are lower than the measured heads in the Unit E aquifer (layer 4). Since there were no simulations or measurement of groundwater level elevations that reflect pre-pumping conditions, it is not apparent whether the model is over-predicting drawdown caused by the Evergreen System pumping or there is a conceptualization problem with model framework, hydraulic properties, or the values used to represent the constant-head boundaries No other model calibrations, such as simulating the decline in hydraulic heads since 1994, comparing to another set of measured hydraulic heads, or tracking contamination back to source areas to verify simulated groundwater flow directions or model conceptualization were attempted. On the basis of statistics that were calculated using these head residuals, FTC&H determined that the model was "calibrated".

Evaluation of Capture Effectiveness Using Different Pumping Rates

The capture effectiveness of the Evergreen System had been evaluated by FTC&H through particle-tracking analysis using the previous model (2002 Model) This was described in their November 18, 2002 report. In that analysis, the simulations showed a complete containment of the known extent of contamination using a combined pumping rate of 202 gpm from the three Evergreen System extraction wells. The particle-tracking analyses using the 2007 Model show the simulated capture effectiveness assuming pumping rates of 90, 45, and 67 gpm from extraction well LB-1; 80, 40, and 60 gpm from well LB-3; and 32, 10, and 10 gpm for well AE-3. The particle-tracking analysis for pumping LB-1, LB-3, and AE-3 at pumping rates of 90, 80, and 32 gpm, respectively, are presented in Figure 4 The impact of reducing the pumping rates 25 percent in LB-1 and LB-3 (to 67 and 60 gpm, respectively) and AE-3 to 10 gpm are shown by the particle-tracking analysis in Figure 5. The lateral extent (north-south) of capture is smaller than that shown on Figure 4 for the higher system pumping rates. On the basis of these particle-tracking analyses, FTC&H concluded that using the lower pumping rates would be adequate to contain the contaminant plume as they have delineated it. In their report, FTC&H also show, through particle-tracking analysis, that a further reduction in pumping rates for LB-1 and LB-3 to 45 and 40 gpm, respectively, would effectively contain the majority of the mapped extent of the 1,4-Dioxane plume in the Unit D aquifer. In their estimation, reducing the pumping rates would also result in less drawdown and a lower potential of inducing contamination to migrate to the north, toward the Evergreen System or the PZ boundary.

Proposed System Modifications

On the basis of the particle-tracking analyses, PLS and FTC&H have proposed a modification to the pumping rates required by the Washtenaw County Court's July 17, 2000, Opinion and Remediation Enforcement Order (REO). They have proposed an initial reduction in pumping rates in LB-1 and LB-3 by 25 percent to 67 and 60 gpm, respectively. PLS and FTC&H have proposed that field data be collected from unspecified wells that will demonstrate the capture effectiveness of the two wells at the reduced pumping rate

No simulations in which the location of a replacement well for AE-3 were presented in this report.

DEQ Review Comments

With the exception of the changes to the downgradient constant-head boundary, the 2007 Model is the same as the 2002 Model. It is our opinion that the Department of Environmental Quality (DEQ) review comments for the 2002 Model have not been adequately addressed and are still applicable to the 2007 Model. Model simulations performed in 2002 showed that pumping approximately 200 gpm from the Evergreen System was effective in containing the Unit D aquifer contaminant plume. However, our review of the 2002 Model (dated February 18, 2004) identified three issues with respect to the collection of field data that needed resolving to properly characterize the problem and verify plume containment. Because of the lack of characterization data, the model had limited usefulness for evaluating the capture effectiveness of the Unit D aquifer plume by the Evergreen System These three issues dealt with: 1) Delineation of the 1,4-Dioxane plume using industry-accepted practices (e.g., vertical aquifer sampling), 2) Proper monitoring of the performance of the extraction system to verify model simulations that show complete plume containment, and 3) Assess the potential for vertical migration of contaminants between the Unit D aquifer to the Unit E aquifer through the collection of appropriate field data. In as much as FTC&H continues to use this model for

remedial action decision making, it is our opinion that the issues raised in 2004 are still applicable and are worth repeating. In addition, we discuss issues not raised in our last review that focus on the development and use of the model.

Our comments begin with model conceptualization, calibration, and sensitivity analysis.

Model Conceptualization

1. Hydrogeologic Framework

Geologic data collected during drilling activities in the last couple of years show that the intervening clay layer may be absent near the east end of the Evergreen Subdivision. In spite of these recent findings, no changes were made to the model layers from the 2002 Model. The subsurface geology is represented in both the 2002 and 2007 Models as four discrete model layers, the most important being model layers two (Unit D aquifer) and four (Unit E aquifer). In these models, the clay layer (model layer three) separating the Unit D and Unit E aquifer layers is continuous and has a relatively low hydraulic conductivity. FTC&H has stated that,

"the model is a simplification of the complex hydrogeological characteristics of the Evergreen System and does not incorporate some of the recent interpretations outlined in this report. Nevertheless, this model can be used as a tool to reasonably simulate pumping conditions in the Evergreen System area.

Whether the 2007 Model can be used to obtain reasonable simulations of the impact of different pumping scenarios is debatable. The possible impact that "recent interpretations" might have on the model simulations and the particle-tracking analyses should have been evaluated in a model sensitivity analysis, especially if they result in a fundamental change to the conceptual framework of the model and the model is being used to make changes to the remediation system. Currently, there is an intervening confining layer in the model (model layer three) that separates the Unit D aquifer from the underlying Unit E aquifer. In the model, this confining layer has a low vertical hydraulic conductivity and is assumed to be laterally extensive, restricting the degree of connection between shallower units (Unit D aquifer) and deeper units (Unit E aquifer). FTC&H has stated that it is difficult distinguishing between the Unit D and Unit E aquifers in the eastern end of the Evergreen Subdivision. If data are available that show a greater degree of connection than the model would suggest, the impact of this connection on the simulated extent of capture and plume migration directions must be accounted for in the assessment of the Evergreen System pumping rates. Without this connection, model simulations (water budget analysis) show that the Evergreen System obtains the majority of its water from model layers 1 and 2 (Unit D aquifer), with very little coming from the underlying Unit E aquifer. This results in an overestimation of drawdown and capture in the Unit D aquifer. If the two aquifers are better connected, it is our opinion that there will be less simulated drawdown and a smaller simulated capture extent in the Unit D aquifer than shown in the simulations provided by FTC&H.

2. Groundwater Flow Directions

The direction of groundwater flow in the Evergreen Subdivision is based on a limited number of monitoring wells, especially north of Dexter Road. FTC&H has placed a "no-flow" boundary to the north of the Evergreen Subdivision area and a constant-head boundary along the east side of the model (see Figure 1). The no-flow boundary prevents groundwater from moving to the north and forces all groundwater to flow parallel to this boundary from west to east toward the constant-head boundary. It has always been our contention that there is some component of regional groundwater flow to the north that has not been adequately investigated. Regional groundwater flow directions in the glacial drift were inferred from records of residential water wells that have been installed since 1990. The contours of equal hydraulic head and inferred regional groundwater flow directions (black arrows) are shown on Figure 6. Also shown on this figure are the approximate digitized extent of 1,4-Dioxane contamination, the Montgomery Street well, the Huron River, and monitoring wells MW-77 and MW-92. This information appears to show that the PLS site is located on a "hydraulic head high" and that groundwater appears to be moving away from the site to the west-northwest, north and east away from the site. These inferred flow directions are somewhat verified by the depicted migration of site-related contamination to the west-northwest (not shown), toward the north-northeast (Unit D plume), and east (Unit E plume and Montgomery Street well). This indicates that there may be some validity to the interpolated hydraulic-head surface and inferred groundwater flow directions

using the residential water well records. The presumed impact of pumping from the Montgomery Street well is based on a very limited number of well records; however, these data show a pronounced steepening of the potentiometric surface in the vicinity of Maple Road that is generally consistent with data gathered by PLS in their investigation of the Unit E aquifer contamination.

North of Dexter Road, the inferred directions of groundwater flow (see Figure 6) suggests that there may be the possibility of some contaminant migration to the north. However, the verification of groundwater flow and contaminant migration directions north of Dexter Road is incomplete, primarily because so little good-quality data (obtained through vertical aquifer sampling) have been collected in this area. In the model, the placement of the no-flow boundary to the north prevents the model from simulating a northward groundwater flow direction. As a result, the simulated groundwater flow direction near Dexter Road is due east, rather than to the north. This is an artifact of the manner in which the model is constructed that has not been verified by the collection of field data. Additional good-quality data (groundwater levels or chemical analyses) are needed north of Dexter Road to verify whether the west-to-east simulated flow directions or the regional groundwater flow directions to the north that are shown in Figure 6 are correct.

3. Extent of Contamination

In our review of the 2002 Model, we made the following statement regarding the extent of contamination.

"In order to determine whether the simulated capture is effective, it is necessary to know the full horizontal and vertical extent of the problem requiring containment. The plume delineated in the August 21, 2002 report was based on a limited number of vertical aquifer sampling profiles. Much of the horizontal and vertical delineation depends on existing residential wells or monitoring wells drilled to specified depths without the benefit of vertical aquifer sampling. It is possible that the contaminant plume extends farther horizontally and vertically than has been delineated, ..."

There has been much work completed to the east (downgradient) of the Evergreen System extraction wells delineating the extent of 1,4-Dioxane contamination in the Unit E aquifer or near the PZ boundary. However, the present delineation of the nature and extent of the contaminant plume in the vicinity, and upgradient, of the Evergreen System is still heavily dependent on the sampling of residential wells or from monitoring wells that were installed without the benefit of vertical aquifer sampling (VAS). Because of this, it is not certain that the nature (1,4-Dioxane concentrations) and extent (horizontal and vertical) of the 1,4-Dioxane plume upgradient and northwest of the Evergreen System has been determined. Appropriate pumping rates cannot be determined, nor can the evaluation of the reasons for increasing 1,4-Dioxane concentrations in wells in the Evergreen Subdivision be completed until the nature and extent of the contaminant plume requiring capture has been acceptably delineated.

4. Nearby Boundary Conditions

The placement of the no-flow boundary and the downgradient constant-head boundary relatively close to the Evergreen System, besides determining groundwater flow direction in the model, results in a distorted cone of depression that will distort the simulated capture extent. Figure 7 shows the simulated drawdown for model layer two (Unit D aquifer) assuming a pumping rate of 202 gpm from the Evergreen System wells. The combined impact that these boundaries, the inferred zone of low hydraulic conductivity to the south of LB-1 and LB-3, and the lack of connection between the Unit D and Unit E aquifers (model layer three was assumed to be continuous throughout this area) have had on the simulated extent of capture should have been assessed.

It is our opinion that the no-flow boundary is not correct, nor is it supported by any field data. The impact of placing the no-flow boundary in this area on simulated flow directions and capture extent must be verified and assessed. In addition, the current constant-head value assignments in this downgradient boundary may be impacted by the elimination of pumping from the Montgomery Street well. Any future model simulations will have to assess the appropriateness of this constant head boundary or its impact on simulation results.

Model Calibration

In this report FTC&H states:

"Some slight modifications to the model were made for this analysis and to further calibrate the existing MODFLOW model."

It has never been the opinion of the DEQ that the 2002 model was calibrated. The emphasis of our February 18, 2004 review of the 2002 model was on the collection of additional data for better plume characterization, determining the direction of groundwater flow, and improving the performance monitoring network to verify, or refute, the extent of capture simulated with the 2002 model. At the time, we felt that further data collection was needed and did not focus our review on the adequacy of model calibration. While the head residuals computed with this model are not "bad", we feel that there are so few measured heads in the vicinity of the Evergreen Subdivision, in both the Unit D and E aquifers, against which to compare simulated heads or flow directions that any measure of calibration that is based strictly on head residuals is not adequate. There needs to be a comparison with groundwater flow directions and flow rates to provide a better assessment of model calibration.

The changes in the head values used for the downgradient constant-head boundary conditions in the 2007 Model are not an exercise in model calibration, but rather an attempt to impose lower hydraulic heads and a slightly steeper hydraulic gradient on the model domain. If the goal was to develop a calibrated model, a better calibration exercise would have been to attempt to reproduce the decline in groundwater levels that have been observed since 1994 or 2002. Decreasing the head values at the downgradient constant-head boundary is an indication that pumping from downgradient locations has been responsible for the decline in heads, not PLS remediation pumping.

An additional calibration exercise, one that is very important for verifying particle-tracking analyses and groundwater flow rates, is the transient simulation of groundwater and contaminant migration directions from the contaminant source areas, provided these are known with some certainty. It does not appear that this calibration exercise was attempted with this model. Our attempt to replicate contaminant migration pathways from site source areas, using the 2007 Model, results in particle-tracking pathlines that follow a more southerly trajectory than the mapped extent of 1,4-Dioxane contamination. This would indicate that the simulated groundwater flow directions or the mapped extent of the 1,4-Dioxane contamination are not entirely correct. Errors in representing the complex hydrogeologic conditions at this site in this model are the reason. These errors will affect model predictions.

Sensitivity Analysis

The predicted capture simulations are presented in the 2007 Model Report as if they are absolute outcomes with no uncertainty or errors of approximation. Predicted simulations should always be presented as a range of possible outcomes, not as absolute certainties. As has been discussed, there was no attempt to demonstrate the impact of model parameter uncertainty, errors in approximating boundary conditions, the impact of shutting down the Montgomery Street well, or "recent interpretations" on the simulations showing capture extent. Each of these should be included in a sensitivity analysis showing their potential impact on the simulated extent of capture. Until a sensitivity analysis is conducted, we cannot assess whether the model simulations depict a reasonable response to the different proposed pumping rates.

Analysis of Northward Migration of Contaminants as a Result of "Overpumping"

FTC&H has stated that one of the reasons for reducing the pumping rate in the Evergreen System wells is that they believe that contamination in the deeper Unit E aquifer is being "pulled toward LB-1, LB-3, and AE-3 wells" and that this is the reason that detected 1,4-Dioxane concentrations are increasing in several monitoring wells in the Evergreen Subdivision. We feel that there is much that is unknown about the degree of hydraulic connection between the Unit D and Unit E aquifers, and that the model is still not calibrated with respect to flow between these two units or within either the Unit D or Unit E aquifers. However, if we assume, for the sake of discussion, that the model accurately depicts groundwater flow conditions in the Unit D and Unit E aquifers, it could be used to test the hypothesis that contamination found in the Unit E aquifer is migrating toward the Evergreen System extraction wells. Two different particle tracking analyses were

performed The first was a reverse particle tracking analysisin which particles are placed around Unit D aquifer monitoring wells; the second analysis was a forward particle tracking analysis in which particles were placed in the Unit E aquifer in close proximity to the Evergreen Subdivision and the Evergreen System extraction wells.

A reverse particle-tracking analysis was performed using the 2007 Model by placing particles around several monitoring wells at which the concentrations of 1,4-Dioxane have been increasing or are near the edge of the simulated capture extent. The objective is to assess the possible origin of the contaminants that have been detected in these Unit D aquifer monitoring wells. Figure 8 shows the reverse particle tracking analysis with the Evergreen System wells pumping at a combined rate of 202 gpm (LB-1 = 90 gpm, LB-3 = 80 gpm, and AE-3 = 32 gpm). Particles were released around wells MW-77, MW-92, MW-100, MW-101, MW-KD1, MW-BE1, 456 Clarendon, and 465 Dupont. These simulations, if accurate, show that contaminants and groundwater found in the wells at 465 Dupont, MW-77, MW-KD1 and MW-92 would have migrated entirely within the Unit D aquifer from the west-northwest, from an area that is north and west of the delineated extent of the Unit D 1,4-Dioxane contamination (north of the intersection of Wagner Road and M-14). The reverse particle tracking analysis also shows that the contaminants and groundwater found at MW-100, 456 Clarendon, MW-BE1, would have migrated entirely within the Unit D aquifer from an area southwest of I-94 and MW-101. This area is south of the delineated southern extent of the Unit D aquifer plume.

The simulated capture extent and delineated extent of Unit D 1,4-Dioxane contamination are also shown on Figure 8. Wells MW-77, MW-100, MW-KD1, MW-BE1, 456 Clarendon, and 465 Dupont are all located within the simulated extent of capture. Only wells MW-92 and MW-101 are found outside the simulated capture extent of the Evergreen System. It's important to point out that the particles representing contaminant and groundwater flow to these wells do not enter the Unit E aquifer at upgradient locations, indicating no upwelling of groundwater from this lower aquifer to the Unit D aquifer. The model simulations would indicate that all of this contaminated groundwater comes from the Unit D aquifer, some of it coming from areas where 1,4-Dioxane concentrations have not been detected in the Unit D aquifer or there has been no investigation of possible 1,4-Dioxane contamination.

The second particle-tracking analysis was performed by releasing particles within the Unit E model layer in relatively close proximity to the Evergreen System extraction wells. The purpose of this analysis was to assess whether the pumping from the Evergreen System has had an influence on groundwater flow directions in the Unit E aquifer. In this analysis, the pumping from the Maple Village System was turned off to maximize the influence of the Evergreen System pumping on simulated heads in the Unit E aquifer. The resulting particle tracks are shown on Figure 9. As shown, there is no influence on simulated heads, groundwater flow directions, or particle tracks in the Unit E aquifer. This simulation does not support the contention that pumping by the Evergreen System wells draws Unit E aquifer contamination toward the wells in the Evergreen Subdivision.

Particle-tracking analyses with the 2007 Model clearly show that the contamination detected at wells in the Evergreen Subdivision would have come from the west and would have migrated entirely within the Unit D aquifer and, in some cases, would have come from areas where no Unit D aquifer contamination has been detected (e g., north of Dexter Road or southwest of I-94) There is no indication from these model simulations that contaminants migrate from the deeper Unit E aquifer toward the Evergreen System extraction or monitoring wells. If the model is correct, the extent of 1,4-Dioxane in the Unit D aquifer is more widespread than indicated in plume delineation maps that have been submitted to the DEQ. This is entirely possible since much of the investigation work in this area has not employed VAS. If the model in not correct and there is better hydraulic connection with the Unit E aquifer so that groundwater and contamination in the Unit E aquifer are drawn into the Unit D aquifer and toward the extraction wells, the simulated extent of capture cannot be accurate and the model cannot be used to assess capture effectiveness or adjust extraction well pumping rates

Recommendations

Use of 2007 Model

Additional extensive calibration and incorporation of new data are needed to improve the reliability of this model. However, we are not asking for further modification or calibration of the model unless PLS chooses to do so. At this time, we feel that time and resources are better spent collecting additional field data to verify the performance of the Evergreen System.

Plume Delineation:

In order to determine whether the simulated capture is effective, it is first necessary to know the full horizontal and vertical extent of the problem requiring containment. PLS has recently agreed to install a monitoring well north of the MW-KD cluster. A VAS boring should be completed prior to the installation of this well. A monitoring well cluster should be installed depending on the encountered subsurface geology regardless of whether the VAS data indicate the presence of multiple zones of contamination or multiple aquifers. In addition to the single monitoring well that PLS has agreed to install north of the MW-KD cluster, additional VAS borings will be needed to fully define the extent of the contaminant plume north of Dexter Road and west of Rose Drive.

Determination of Groundwater Flow Direction

The direction of groundwater flow north of Dexter Road and west of Rose Drive is not known. It may be that groundwater and 1,4-Dioxane contamination are migrating to the north. This may be the reason for the increase in 1,4-Dioxane concentrations at 465 Dupont and MW-77. It is necessary to collect additional groundwater level measurements north of Dexter Road to determine whether groundwater moves to the north or to the east. The design of the Evergreen System, and the orientation of the simulated capture extent, is based on the presumption that the direction of groundwater movement is to the east. If the direction of groundwater flow is to the north-northeast, the simulated groundwater flow directions, and the orientation of the extent of capture are incorrect.

Performance Monitoring

Previous comments with respect to monitoring the effectiveness of hydraulic containment (performance monitoring) were:

"Proper performance monitoring of the Evergreen extraction system is required since DEQ does not rely on model simulations as proof of remedy effectiveness. "Proof of remedy effectiveness" means the collection of physical data beyond the effective extent of treatment of the remedy. For a hydraulic containment system, hydraulic-head measurements and groundwater sample analyses are required at points beyond the estimated extent of capture. Model simulations show that a pumping rate of approximately 200 gpm will contain the delineated contaminant plume. The composite capture zone for this pumping rate is shown in particle-tracking plots in Figures 4 and 5. Currently, there is one monitoring well cluster (MW-47S and D) located downgradient of the simulated extent of capture. It is necessary to monitor more than one monitoring well cluster to verify the containment of the delineated plume in the Evergreen Area."

It is necessary to have data upon which to make timely decisions regarding the effectiveness of the performance of the Evergreen System or whether to adjust system pumping rates. This requires that monitoring well clusters be placed immediately beyond the estimated capture extent of the Evergreen System, not far downgradient. PLS has proposed to monitor selected unidentified monitoring wells while pumping rates in wells LB-1 and LB-3 are decreased; however, there are no existing wells that can be used to measure hydraulic gradients that would show hydraulic containment. Most available wells are not screened on the basis of VAS investigations, are not part of a monitoring well cluster, or are located too far downgradient to make a timely decision regarding the effective or optimum operation of the Evergreen System.

PLS and FTC&H are referred to two documents published by the U.S. Environmental Protection Agency (EPA) that describe the required elements to monitor the effectiveness of a hydraulic containment system and for locating performance monitoring wells or piezometers. These publications are:

Cohen, S.M., Vincent, A.H., Mercer, J.W., Faust, C.R., and C.P. Spalding. 1994. Methods For Monitoring Pump-And Treat Performance. EPA/600/R-94/123, June 1994, 102 p.

GeoTrans. 2003. Capture Zone How-To Guide for Ground Water Pump and Treat Systems. Draft document prepared for the U.S. Environmental Protection Agency under Tetra Tech Contract No. 68-W-02-034, Subcontract No. G9015.0.037 03.01, and under Dynamac Contract No. 68-C-02-092, Subcontract No. 092580 60 p.

In particular, the discussion of the location of hydraulic-head measurement piezometer pairs in section 2.2.1.3 and groundwater quality monitoring locations in section 2.2.6.2, both in Cohen and others (1994), and pages 31-43 in GeoTrans (2003) should be reviewed in developing a performance monitoring network and plan for the Evergreen System. In keeping with the concepts discussed in these publications, we have prepared a figure (Figure 10) that shows the simulated extent of capture, and a buffer zone within which performance monitoring data are needed. We recommend that four monitoring well/piezometer pairs and a deeper monitoring well at the MW-47 well cluster be installed specifically for the purpose of monitoring the performance of the Evergreen System. The exact locations will be based on site access and buried utilities.

Evergreen System Pumping Rates

The pumping rates for the Evergreen System wells should not be adjusted until additional data delineating the extent of upgradient contamination, groundwater flow directions, and performance of the Evergreen System at present pumping rates are collected and evaluated.

You may contact me to discuss the model simulations and performance monitoring to verify model simulations at mandler@michigan.gov or (517) 241-9001.

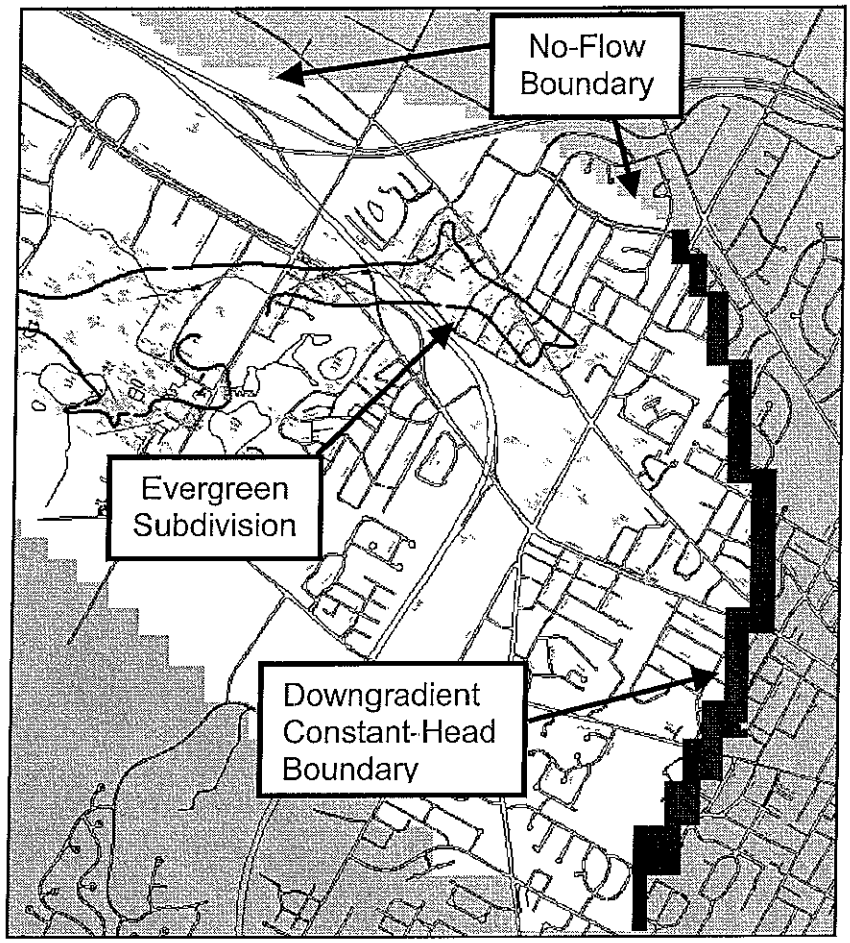


Figure 1 – Location of downgradient constant-head boundary.

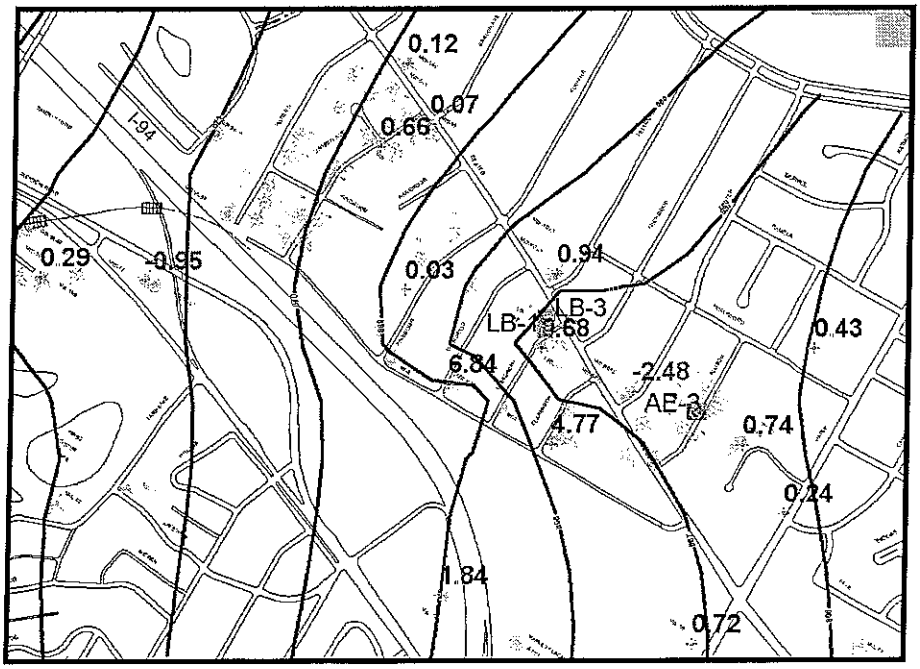


Figure 2 – Simulated calibration residuals for Model Layer 2.

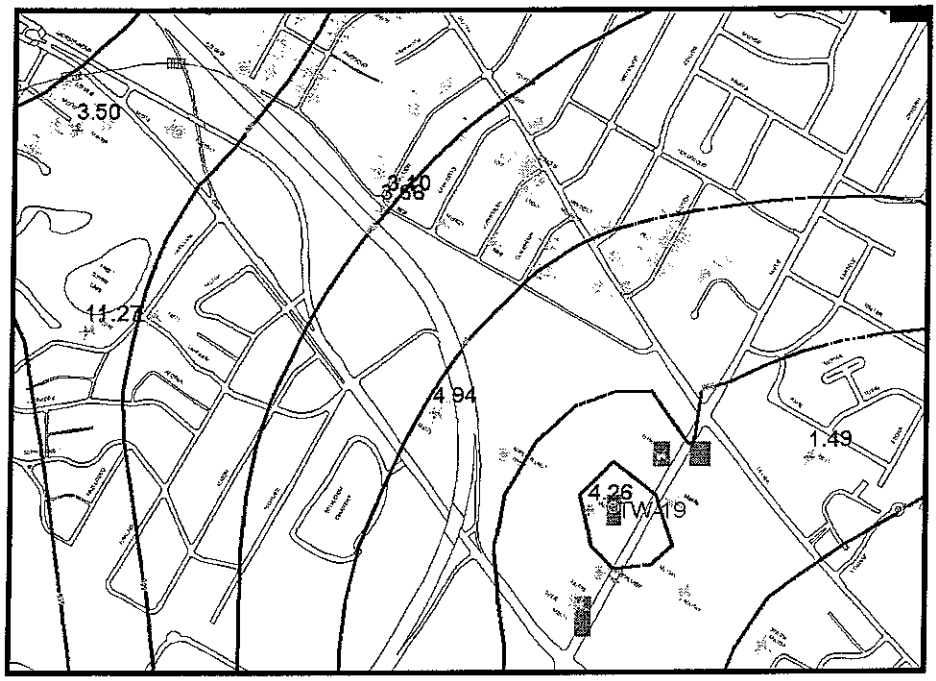


Figure 3 – Simulated calibration residuals for model layer 4.

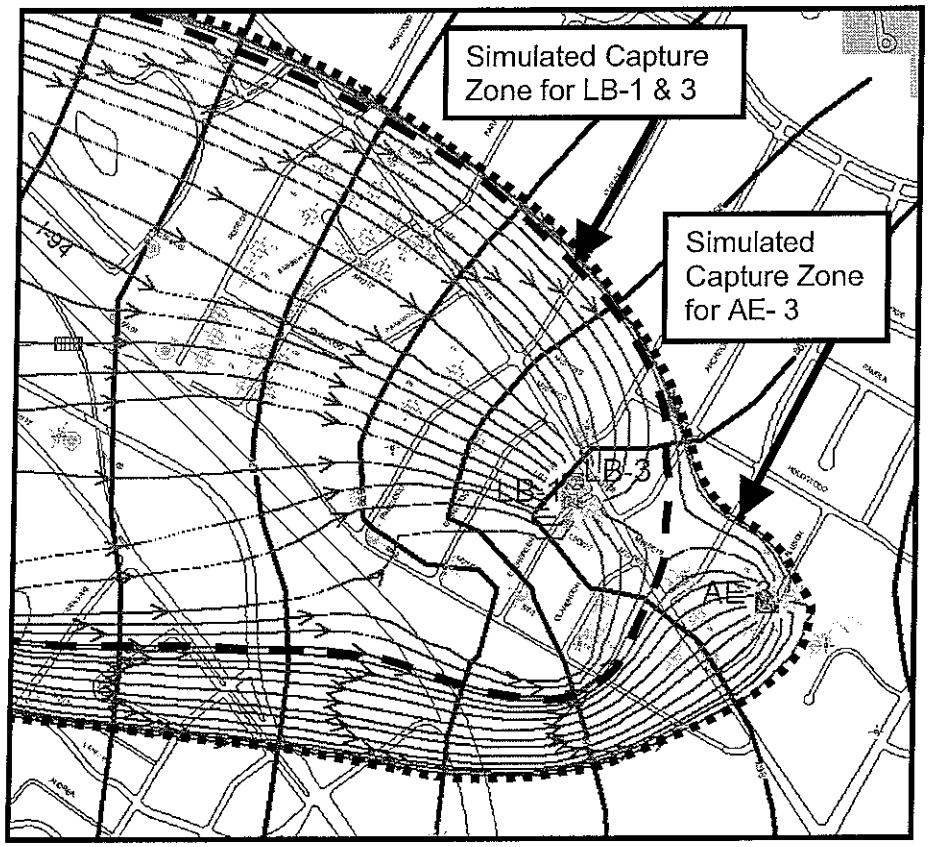


Figure 4 – Simulated heads and capture extent for Model Layer 2 (LB-1 = 90 gpm, LB-3 = 80 gpm, and AE-3 = 32 gpm).

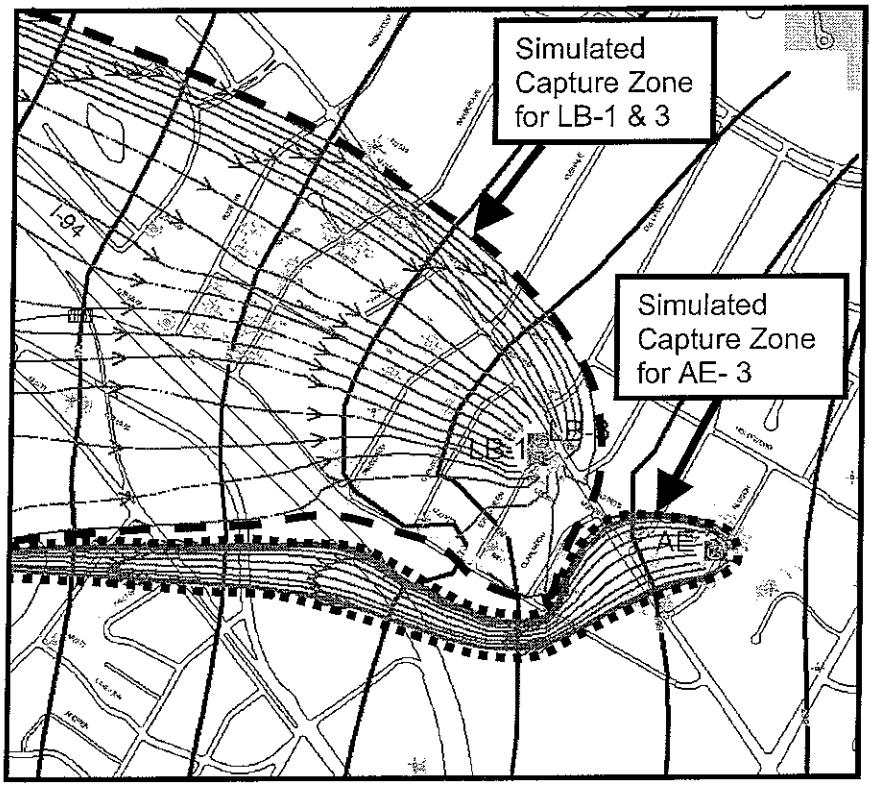


Figure 5 – Simulated heads and capture extent for Model Layer 2 (LB-1 = 67 gpm, LB-3 = 60 gpm, and AE-3 = 10 gpm).

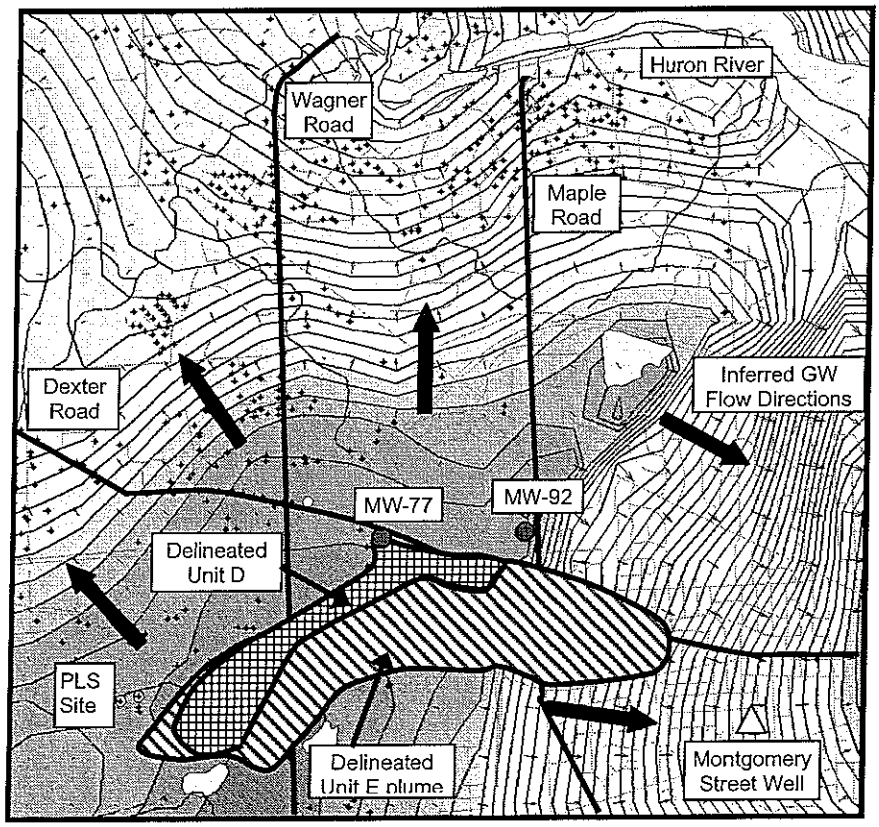


Figure 6 – Direction of Regional Groundwater Flow

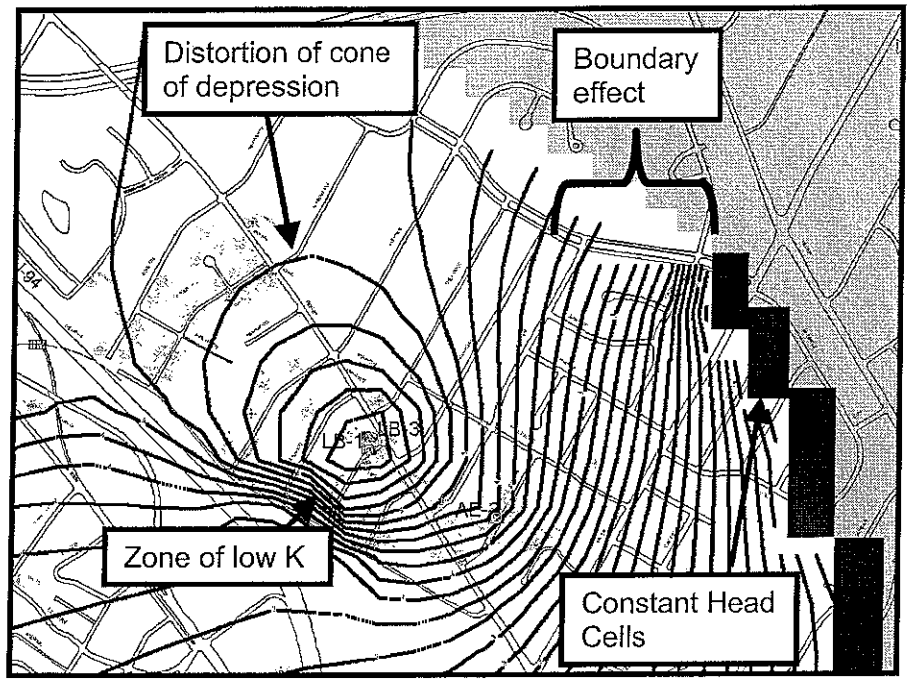


Figure 7 – Distortion of simulated cone of depression in Unit D aquifer (Model Layer 2).

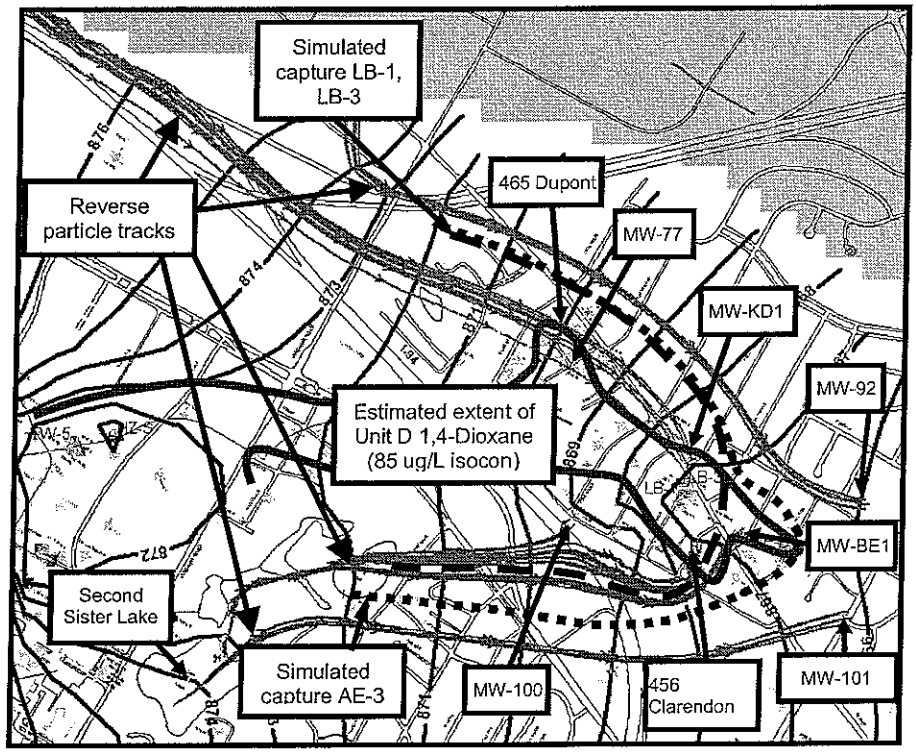


Figure 8 – Reverse Particle-Tracking in Model Layer 2, Evergreen System pumping 202 gpm.

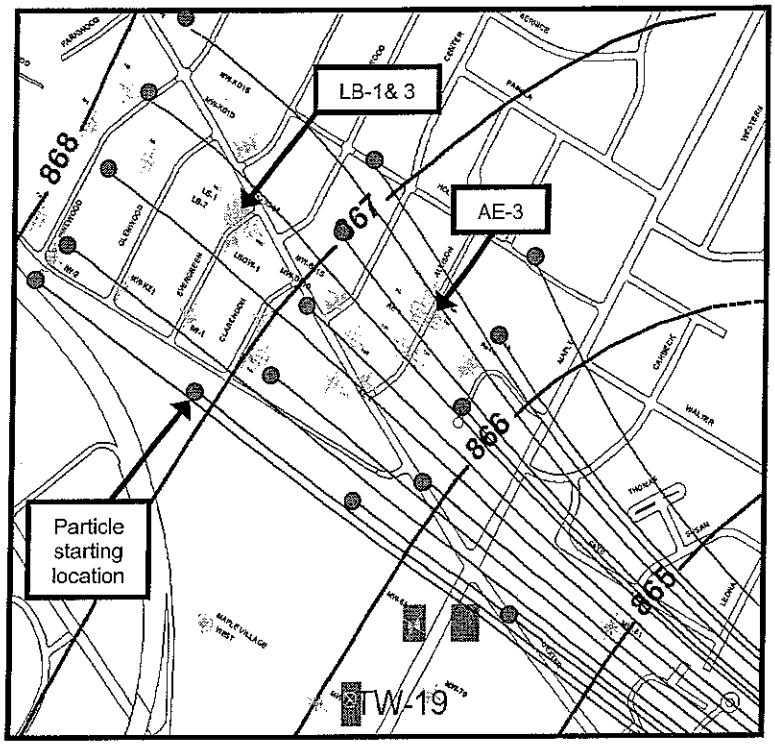


Figure 9 – Forward Particle-Tracking in Model Layer 4, Evergreen System pumping 202 gpm, and no pumping from Maple Village System.

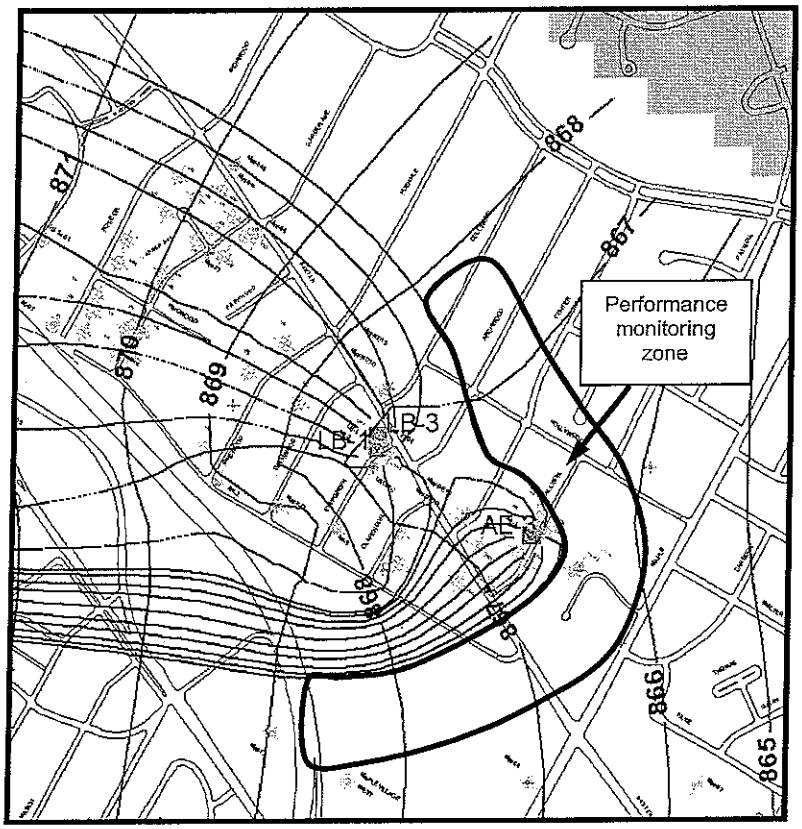
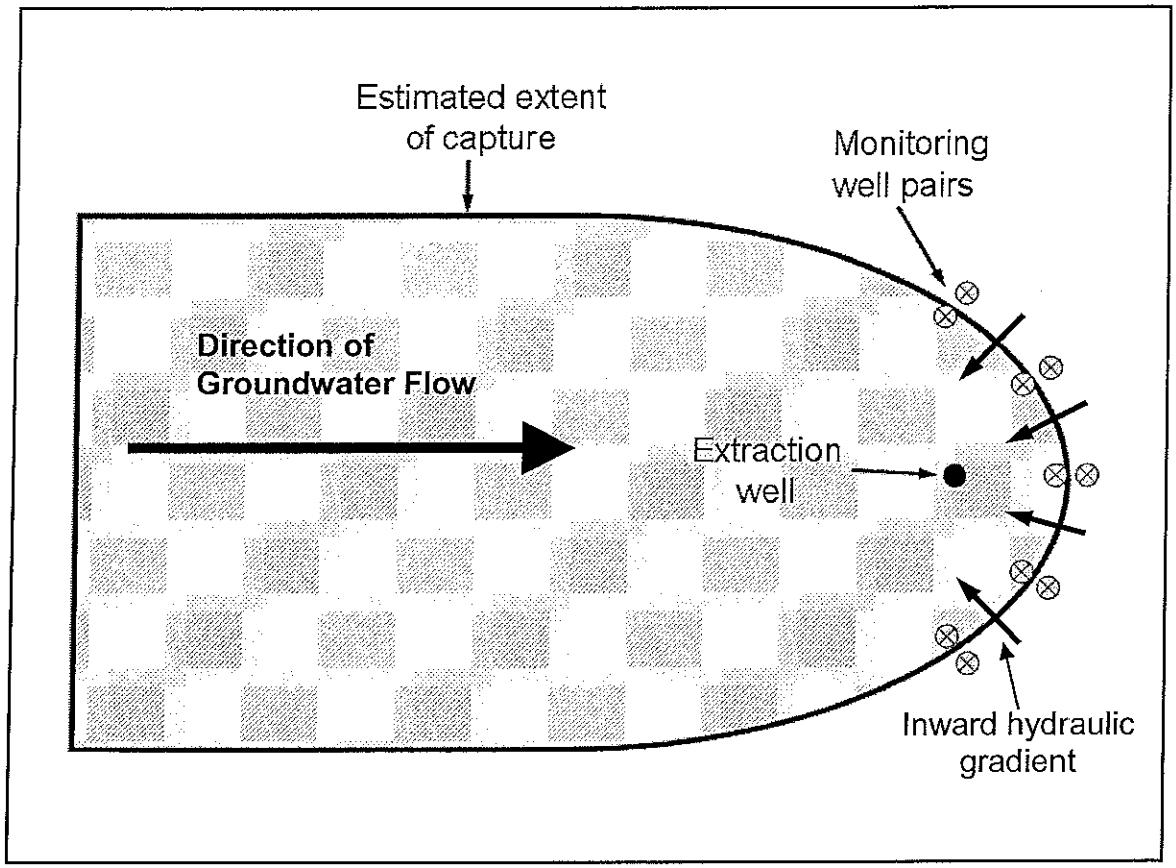
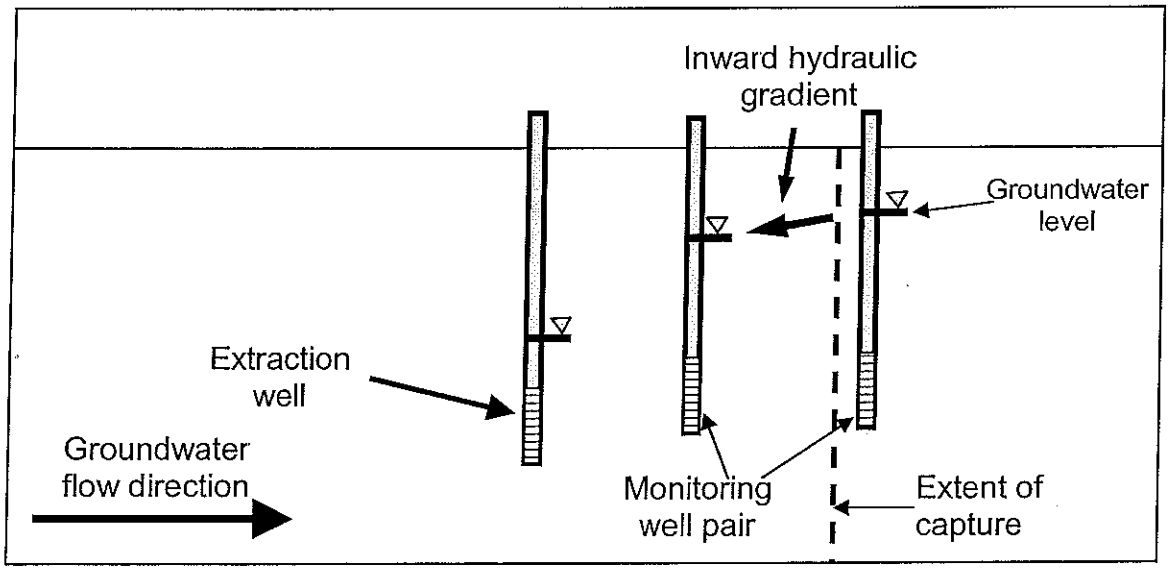


Figure 10 – Simulated heads and capture extent for Model Layer 2 (LB-1 = 67 gpm, LB-3 = 60 gpm, and AE-3 = 32 gpm).

EXHIBIT 2



Location of monitoring well pairs for demonstrating inward hydraulic gradient – map view.



Location of monitoring well pairs for demonstrating inward hydraulic gradient – profile view.

EXHIBIT 2

AFFIDAVIT OF James M. Coger

I, James M Coger, being first duly sworn, attest as follows:

1. The facts stated in this Affidavit are based on my personal knowledge and I am competent to testify to them.

2. I am a Senior Geologist for the Remediation and Redevelopment Division (RRD) of the Michigan Department of Environmental Quality (MDEQ), in Jackson, Michigan. I work in the Jackson District Office. I have been employed by the MDEQ and its predecessor, the Michigan Department of Natural Resources since April 1991. I received a Bachelor's of Science degree in Geology from Eastern Michigan University in 1986.

3. My primary responsibilities as Senior Geologist for RRD involve review of complex hydrogeological reports required by Part 201, Environmental Remediation, and Part 213, Leaking Underground Storage Tanks, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA) for the Jackson District staff.

4. I have been the RRD's District Geologist for Gelman Sciences, Inc. site, 600 South Wagner Road, Ann Arbor, Michigan, for approximately two years. As the District Geologist, I have reviewed and commented on the Western System Report,

dated January 25, 2006, the Downgradient Investigation Report, dated March 30, 2006, and the Performance Monitoring Plan for Wagner Road Extraction, dated September 22, 2005

5. I have reviewed the Evergreen System Review (ESR) dated May 2007, and other relevant documents related to the operation of the extraction wells identified as AE- purge wells. My comments address the Allison Street purge wells.

AE–Extraction Wells

6. PLS did not submit a work plan for the installation of AE-3. As depicted in the hydrograph, Figure A-6 of the ESR, water levels in selected Evergreen Wells demonstrated a steady decline from August 1996 through August 2003. The fouling of AE-1 was attributed to the declining water table. The subject hydrograph reflects that water levels stabilized in 2004. AE-3 was installed in April 2004.

7. Cross Sections of the Evergreen Subdivision, included in the ESR, depict approximately 60 feet of aquifer matrix below the screened interval of AE-1. In previous e-mails, Farsad Fotouhi had described the stratigraphy in the Allison Street area as 'fining downward'. The boring log for the screened interval at AE-3 describes the soil as sand, fine to very fine, with clay.

8. The boring log for AE-3 does not reflect that this boring was vertically profiled down to the till unit for the purpose of finding a hydraulically conductive zone to

purge water from. PLS did not provide a rationale as to why AE-3 was screened at approximately the same elevation as AE-1.

9. The LB extraction wells to the west, AE-2, and monitor well MW-107, at the south end of Allison Street, encountered conductive sand and gravel units at deeper intervals above the till unit.

10. The installation of AE-2, as a purge well, was not unsuccessful due to well yield issues. If the boring had been vertically profiled for 1,4-dioxane it would have been apparent that the AE-2 location was south of the D2 plume and, therefore, not an effective purge well location.

This affiant says nothing further.

James M. Coger

James M. Coger

Subscribed and sworn to before me, July 19, 2007.

Karen Louise Jordon Notary

Jackson County
My commission expires: 2/18/12

KAREN LOUISE JORDON
Notary Public, Jackson Co., MI
My Comm. Expires Feb. 18, 2012

EXHIBIT 3

AFFIDAVIT OF SYBIL KOLON

I, Sybil Kolon, being first duly sworn, attest as follows:

1. The facts stated in this Affidavit are based on my personal knowledge and I am competent to testify to them.

2. I am an Environmental Quality Analyst for the Remediation and Redevelopment Division (RRD) of the Michigan Department of Environmental Quality (MDEQ), in Jackson, Michigan. I work in the Jackson District Office. I have been employed by the MDEQ and its predecessor, the Michigan Department of Natural Resources in this position since October 1992. I received a Bachelor's of Science degree in Forestry from Michigan State University in 1974.

3. For the past 15 years, my primary responsibilities have included coordination of enforcement actions at numerous sites of environmental contamination pursuant to Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA) and oversight of the performance of response activities at the Gelman Sciences, Inc. site of environmental contamination.

4. I have been the RRD's Project Manager at the Gelman Sciences, Inc. site, 600 South Wagner Road, Ann Arbor, Michigan, since 1995. As Project Manager, I have coordinated the MDEQ's role in the implementation of the response activities performed

by Pall Life Sciences (PLS) and their predecessors. These response activities have included remedial investigations to identify the nature and extent of groundwater contaminated with 1,4-dioxane and remedial actions to clean up the contamination as required by Part 201 of the NREPA, the Consent Judgment and subsequent amendments to the Consent Judgment, and court orders related to the site.

5. As part of my duties as Project Manager I review all submittals related to the required response activities, coordinate technical, policy and legal reviews, and draft and finalize responses to those submittals.

6. I have reviewed the Evergreen System Review dated May 2007, Mr. Farsad Fotouhi's letter, dated May 17, 2007, and other relevant documents related to the operation of the Evergreen System extraction wells. The MDEQ's responses to these submittals, dated May 29, 2007 and July 16, 2007, recommends that multiple extraction wells be installed to overcome the problems identified in the Allison Street area. The affidavit by Mr. Richard Mandle, dated July 19, 2007, provides additional information on such multiple well installations.

7. PLS's experience with the installation and operation of extraction well AE-2 does not support its claim that a multiple well extraction system is unworkable or that a multiple well extraction system would only multiply problems caused by the poor aquifer conditions and low water levels in the Allison Street area.

8. I was informed by Mr. Farsad Fotouhi, of PLS, about the planned installation of extraction well AE-2 via electronic mail dated July 27, 2001. The borehole log for AE-2 indicates this well was installed on August 1, 2001. The MDEQ did not request installation of AE-2, and no work plan for its installation was submitted to the MDEQ. The MDEQ was not informed in advance of the location of AE-2, nor offered an opportunity to comment on the location or installation methods. There is no information in our file to indicate that any vertical aquifer sampling was performed during the installation of AE-2.

9. According to information submitted to the MDEQ by PLS, AE-2 was operated beginning on September 5, 2001 and continued through January 9, 2002, at an extraction rate between 17 to 27 gallons per minute. During this time, PLS analyzed samples from the extraction well on a weekly schedule, during which time the highest concentration of 1,4-dioxane detected was 2 parts per billion. AE-2 was not used for extraction for the remainder of 2002. AE-2 was next used for extraction during parts of the months of January, February and March of 2003 and then in June 2004 for part of two days. During this time the highest concentration of 1,4-dioxane detected was 11 parts per billion. AE-2 was not used again for extraction before PLS had the well plugged on July 20, 2006.

10 It is my understanding and belief that PLS installed AE-2 to supplement the extraction from AE-1, both to maintain the minimum extraction rate at AE-1, as

required by the Five Year Plan, and to attempt to capture the southern edge of the groundwater contamination.

This affiant says nothing further.

Sybil Kolon

Subscribed and sworn to before me, July 19, 2007.

Karen Louise Jordon Notary

Jackson County

My commission expires: 2/18/12

KAREN LOUISE JORDON
Notary Public, Jackson Co., MI
My Comm. Expires Feb. 18, 2012

EXHIBIT 4

PALL Life Sciences

TABLE #2

UNIT D2 DOWNGRADIENT EXTRACTION DATA

Month of: May-07

Date	LB-1 Gallons	GPM	Run Hrs.	LB-3 Gallons	GPM	Run Hrs.	AE-3 Gallons	GPM	Run Hrs.	Daily Flow GPM	Daily Total Gallons
Tue-5/1/07	129,668	90	24.00	115,298	80	24.00	32,598	23	24.00	193	277,564
Wed-5/2/07	129,672	90	24.00	115,168	80	23.98	25,263	18	24.00	188	270,103
Thu-5/3/07	129,668	90	24.00	115,312	80	24.00	32,510	23	24.00	193	277,490
Fri-5/4/07	129,671	90	23.98	115,350	80	24.00	36,083	25	24.00	195	281,104
Sat-5/5/07	129,665	90	24.00	115,309	80	24.00	36,071	25	24.00	195	281,045
Sun-5/6/07	129,673	90	24.00	115,166	80	23.98	36,060	25	24.00	195	280,899
Mon-5/7/07	129,666	90	24.00	115,318	80	24.00	35,991	25	24.00	195	280,975
Tue-5/8/07	129,624	90	23.98	115,362	80	24.00	36,022	25	24.00	195	281,008
Wed-5/9/07	129,660	90	24.00	115,140	80	24.00	36,067	25	24.00	195	280,867
Thu-5/10/07	129,666	90	24.00	115,298	80	24.00	36,033	25	24.00	195	280,997
Fri-5/11/07	129,650	90	24.00	115,190	80	23.98	36,059	25	24.00	195	280,899
Sat-5/12/07	129,674	90	23.98	115,117	80	24.00	36,052	25	24.00	195	280,843
Sun-5/13/07	129,658	90	24.00	115,365	80	24.00	36,041	25	24.00	195	281,064
Mon-5/14/07	128,858	89	24.00	114,491	80	24.00	36,054	25	24.00	194	279,403
Tue-5/15/07	126,534	90	23.42	112,457	80	23.42	36,058	25	24.00	191	275,049
Wed-5/16/07	129,677	90	24.00	115,224	80	24.00	36,032	25	24.00	195	280,933
Thu-5/17/07	129,681	90	24.00	115,375	80	23.98	36,030	25	24.00	195	281,086
Fri-5/18/07	129,674	90	23.98	115,354	80	24.00	36,055	25	24.00	195	281,083
Sat-5/19/07	129,670	90	24.00	115,375	80	24.00	36,047	25	24.00	195	281,092
Sun-5/20/07	129,669	90	24.00	115,294	80	24.00	36,044	25	24.00	195	281,007
Mon-5/21/07	129,675	90	24.00	115,191	80	23.98	36,034	25	24.00	195	280,900
Tue-5/22/07	129,662	90	23.98	115,228	80	24.00	36,046	25	24.00	195	280,936
Wed-5/23/07	129,642	90	24.00	115,135	80	24.00	36,029	25	24.00	195	280,806
Thu-5/24/07	129,643	90	24.00	115,319	80	24.00	36,044	25	24.00	195	281,006
Fri-5/25/07	129,666	90	24.00	115,366	80	24.00	36,021	25	24.00	195	281,053
Sat-5/26/07	129,698	90	24.00	115,331	80	23.98	36,041	25	24.00	195	281,070
Sun-5/27/07	129,675	90	23.98	115,215	80	24.00	36,024	25	24.00	195	280,914
Mon-5/28/07	129,677	90	24.00	115,378	80	24.00	36,036	25	24.00	195	281,091
Tue-5/29/07	98,733	90	18.28	87,645	80	18.28	27,391	25	18.30	148	213,769
Wed-5/30/07	129,666	90	24.00	115,303	80	24.00	25,052	17	24.00	188	270,021
Thu-5/31/07	129,661	90	24.00	115,294	80	24.00	21,563	15	24.00	185	266,518
TOTALS	3,984,776	90	737.58	3,542,368	80	737.58	1,065,451	24	738.30	192	8,592,595

TOTAL VOLUME EXTRACTED :	8,592,595 GALLONS
DAYS IN MONTH :	31 DAYS
MONTHLY AVERAGE FLOW RATE :	192.49 GPM

5/29/07 - Evergreen extraction was shut down briefly for maintenance.

EXHIBIT

5

FINK, ZAUSMER & KAUFMAN, P.C.
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STATE OF MICHIGAN
IN THE CIRCUIT COURT FOR THE COUNTY OF WASHTENAW

JENNIFER M. GRANHOLM, Attorney General for the State of Michigan, ex rel, MICHIGAN NATURAL RESOURCES COMMISSION, MICHIGAN WATER RESOURCES COMMISSION, and MICHIGAN DEPARTMENT OF NATURAL RESOURCES,

Plaintiffs,

v

GELMAN SCIENCES, INC., a Michigan corporation,

Defendant.

File No. 88-34734-CE

Hon. Donald E. Shelton

ROBERT P. REICHEL (31878)
Assistant Attorney General
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Lansing, MI 48913
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Attorney for Plaintiffs

FINK, ZAUSMER & KAUFMAN, P.C.
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31700 Middlebelt Road, Ste. 150
Farmington Hills, MI 48334
(248) 851-4111
Attorneys for Defendant

STIPULATED ORDER ADOPTING FIVE YEAR PLAN

At a session of said Court held in the City of Ann Arbor, County of Washtenaw, State of Michigan on _____

PRESENT: THE HONORABLE _____
Circuit Court Judge

This Court presided over the evidentiary hearing held in connection with Plaintiffs' Motion to Enforce Consent Judgment and Defendant's Motion for Hearing on Oral Testimony. Based on the evidence presented, this Court issued its July 17, 2000 Opinion and Remediation Enforcement Order ("the REO"). Since entry of the REO, Defendant Pall/Gelman Sciences Inc. ("PGSI") has

FINK, ZAUSMER & KAUFMAN, P.C.
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implemented or is in the process of implementing the specific response activities required by the REO. Pursuant to the REO, PGSI has also submitted to this Court its plan for reducing the 1,4-dioxane levels in all affected drinking water supplies to legally acceptable levels within five years from the date of the REO. The MDEQ has approved the Five-Year Plan attached hereto ("the Plan"). The parties having stipulated to entry of this order, and the Court being otherwise fully advised in the premises:

IT IS HEREBY ORDERED that the Plan is incorporated as fully set forth herein and made part of this Order. The Plan shall be fully enforceable as an order of this Court;

IT IS FURTHER ORDERED that the Plan supersedes and replaces the work plans required under Subsections V(A-C) of the Consent Judgment;

IT IS FURTHER ORDERED that, to the extent they conflict, this Order and the Plan shall supercede any work plan previously approved pursuant to the Consent Judgment;

IT IS FURTHER ORDERED that the MDEQ, having approved the Plan, shall be deemed to have approved, to the extent provided in the Plan, the following response activities in advance pursuant to Section X of the October 26, 1992 Consent Judgment entered in this matter ("the Consent Judgment") and any other provisions of the Consent Judgment requiring prior MDEQ approval:

a. Increasing or decreasing purge rates of individual extraction wells, increasing the volume of its discharge to the Honey Creek Tributary (provided such discharge is authorized by an enforceable NPDES permit);

b. Moving existing extraction wells, replacing existing extraction wells, installing additional extraction wells, converting monitoring wells into extraction wells by installing jet pumps, replacing the existing UV/Oxidation treatment units, and installing additional UV/Oxidation treatment units.

Hon._____
CIRCUIT COURT JUDGE

It Is So Agreed:

Michael L. Caldwell (P40554)
Attorney for Defendant

Robert P. Reichel (P31878)
Attorney for Plaintiffs

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