

STATE OF MICHIGAN

IN THE CIRCUIT COURT FOR THE COUNTY OF WASHTENAW

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

Plaintiffs,

Case No. 88-34734 CE

vs

Hon. Donald E. Shelton

GELMAN SCIENCES INC.,
a Michigan corporation,

Defendant.

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AFFIDAVIT OF FARSAD FOTOUHI

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I, Farsad Fotouhi, declare as follows:

1. I am Vice President for Corporate Environmental Engineering responsible for Pall Corporation's global Health, Safety and Environmental Affairs.
2. Before Pall Corporation purchased Gelman Sciences, I was environmental manager for Gelman Sciences Inc. commencing in January, 1996.
3. In my positions for Gelman Sciences and now for PLS, I have responsibility for and personal knowledge of the activities undertaken pursuant to the Consent Judgment entered in the matter of *Attorney General v Gelman Sciences, Inc.* and the remediation orders entered by the Court: July 17, 2000 Opinion and Remediation Enforcement Order ("REO"); and the Opinion and Order regarding Remediation of the Contamination of the "Unit E" Aquifer (the "Unit E Order").
4. I am an environmental engineer and have been practicing for 25 years, including 9 years at MDEQ. A copy of my curriculum vitae is attached hereto as Attachment 1.
5. I am primarily responsible for implementing the remediation program required by the Consent Judgment and the related orders issued by the Court overseeing this cleanup.

I. Current Compliance with Cleanup Objectives

6. All of the available data indicates that PLS is in compliance with the clean up objectives of the current cleanup program.
7. The poor aquifer conditions in the area of Allison Street and falling water levels have caused PLS to expend substantial time, effort and resources to keep the extraction well in that area (currently AE-3) functioning. Although PLS has struggled to maintain the minimum purge rate in AE-3 needed to capture the leading edge of the Evergreen plume, data from the downgradient performance monitoring wells and PLS "Capture Zone Analysis", which the DEQ

has approved, establish that this objective continues to be met. The DEQ has repeatedly claimed that it does not have sufficient data to determine if PLS is in compliance with the Evergreen cleanup objective and has demanded that PLS install more monitoring wells and gather additional data.

8. Even though levels of 1,4-dioxane above 2,800 ppb have not yet approached Maple Road, PLS installed its Maple Road remedial system shortly after the Court issued its Unit E Order. This system has operated nearly flawlessly except for the groundwater injection wells used to dispose of the treated water.

9. PLS also installed its Wagner Road groundwater extraction system to satisfy the Unit E Order's Wagner Road objective of capturing groundwater contamination in the deeper Unit E aquifer above 85 ppb before it migrates east of Wagner Road. This system consists of a large extraction well (TW-18), which is screened in the Unit E aquifer, and related piping that conveys the groundwater to PLS Wagner Road treatment facility.

10. The DEQ has taken the position that, in order to comply with this Court's Unit E Order, PLS must also capture the contaminant plume located in the shallower D2 plume that eventually migrates to the Evergreen area. PLS has never understood the Court's Unit E Order to require PLS to capture the groundwater contamination located in the D2 in the Wagner Road area. Consequently, the Wagner Road extraction system, was not designed to address this plume. The DEQ, which reviewed and approved the proposed location of TW-18, was aware that operation of TW-18 was not intended to capture the shallower contamination present in the D2 aquifer when it was installed.

11. PLS had submitted several "Capture Zone Analyses" (CZA) and data from PLS performance monitoring well network to demonstrate its compliance with the Unit E Order objective of capturing the Unit E plume. Although these data show that PLS is successfully

capturing the entire width of the Unit E plume at this location, DEQ has disputed that PLS has sufficient data to establish its compliance with this objective.

12. Finally, PLS has undertaken significant efforts to implement the REO's requirements. The REO and the authority given to PLS under the related 5-Year Plan allowed PLS to start operating the previously installed Horizontal Well. PLS also installed 11 new extraction wells on or near the PLS property without being required to wait for DEQ approval. This additional infrastructure allowed PLS to increase its overall purge rate from approximately 300 to 1,200-1,300 gpm while continuing to contain the leading edge of the offsite plumes.

13. PLS' efforts have dramatically reduced contaminant concentrations and mass throughout the site. The treatment systems that I designed, including the current ozone treatment system, have successfully treated 5.1 billion gallons of highly contaminated groundwater to trace levels, removing over 80,000 pounds of 1,4-dioxane. The decrease in concentrations across the site has been dramatic.

II. Purpose and Timeline of Proposed Evergreen/Maple Road Modifications

14. PLS initially proposed in June 2008 to make certain modifications to the Maple Road and Evergreen remedial systems. Although PLS was in compliance with its obligation to capture the plume in both the Evergreen area (85 part per billion (ppb)) and Maple Road (2,800 part per billion (ppb)) areas, it was clear to me that it would be prudent to make changes to increase each system's reliability.

15. Specifically with regard to the Maple Road system, I was concerned that, although groundwater with concentrations above 2,800 ppb had not yet reached the Maple Road area, difficulties with the injection wells used to dispose of the treated groundwater might make it difficult to continuously operate the Maple Road groundwater capture system when/if

groundwater with concentrations above 2,800 ppb reach this area. I felt that it was prudent to investigate alternative methods of disposing of the groundwater from this system.

16. I was also concerned with the long-term reliability of the Evergreen system's leading edge extraction wells in the Allison area. Although PLS has consistently been able to extract enough groundwater from the Allison Street wells to contain the leading edge of the Evergreen plume, PLS has had to repeatedly rehabilitate and replace the leading edge extraction wells in this area to comply with this requirement.

17. I was also concerned with the sustainability of the Evergreen system in the sense that the MDEQ has repeatedly demanded that PLS refine its definition of the plume in this area, so that the DEQ could be satisfied that PLS was meeting its Consent Judgment objective, even though the MDEQ-approved down gradient performance monitoring wells never showed any increase in 1,4-dioxane levels. These wells have always been at or near non-detect.

18. In my opinion, neither the level of effort the DEQ has felt obligated to allocate to the Evergreen issues nor the resources PLS was forced to expend to respond to the DEQ's demands could be sustained over the long term.

19. For these reasons, I developed the concept of connecting the Maple Road groundwater extraction system to the Evergreen area system by installing a shallow pipeline. This would allow PLS to convey groundwater extracted from the Maple Road area directly to the Wagner Road facility's treatment system, *vis a vis* proposed pipeline, and the existing deep transmission line.

20. The related modifications to the Evergreen system -- elimination of the capture requirement and expansion of the Prohibition Zone -- which would be needed so that the transmission line would have sufficient capacity to accommodate flow from the Maple Road

system – would have the added benefit of resolving the long-term operational issues regarding PLS ability to contain the Evergreen plume in the Allison Street area.

21. In November 2008, PLS submitted its work plan for pipeline installation to DEQ for approval in the hopes that DEQ would approve this aspect of the plan. PLS needed to obtain the DEQ's approval as a prerequisite for obtaining access to the road right-of-ways from the City of Ann Arbor. (Appendix 25). Although the DEQ did not object to the installation of the pipeline, it specifically refused to approve PLS' use of the pipeline. Understandably, the City has not been willing to consider PLS' access request until use of the pipeline is approved.

III. Proposed Monitoring Well Network/Compliance Monitoring Points – Western Area

22. Prior to submission of the proposed groundwater monitoring plan submitted with PLS' comprehensive proposal, I carefully evaluated the monitoring well data from the existing network and the proposed modifications with Mr. Brode to determine which wells would provide information that could be used to evaluate potential changes brought about by the proposed modifications and to confirm that PLS would continue to prevent expansion of the Western Area plume in the future. (Appendix 13, Attachment 1).

23. We proposed to eliminate certain wells from the monitoring well program, because we did not feel that they had provided useful information in the past and would not be relevant to monitor PLS' proposed cleanup objective of preventing expansion of the onsite plumes. The monitoring well network included in PLS' proposal includes sufficient monitoring points to allow PLS to determine whether future changes in groundwater extraction will lead to an unpermitted expansion of the plume.

24. On June 3, 2009, PLS submitted its Plan for Verifying Protectiveness of Proposed Remedial Modifications (Appendix 14), which supplemented PLS' proposed monitoring plan with regard to the Evergreen area.

25. In its June 15, 2009 response to PLS' proposal (DEQ Denial), DEQ specifically demanded that additional well locations be included in the monitoring network that could serve as "compliance monitoring points" to ensure that the objective of preventing expansion of plumes is satisfied (i.e., wells around the perimeter of the plumes that are currently below 85 ppb). PLS did not originally include such wells because they are not necessary for PLS to evaluate its system. I understand, however, that DEQ requires such wells so that it will have a basis for enforcing the cleanup objective, which is a legal issue separate from performance evaluation, which is the criterion PLS used to develop the monitoring plan.

26. Appendix 26 is a map that identifies the existing monitoring wells that can be used to monitor compliance with the cleanup objective (non-expansion) of the Western Area. These wells have been deemed by both the DEQ and PLS to be sufficient to define the extent of the existing contamination for many years. Any significant expansion of the Western Area plume in directions that do not lead to the Prohibition Zone would be reflected in the data from these wells. Therefore, there is no need to supplement this network with newly installed wells as the MDEQ has proposed.

IV. Performance Monitoring/Compliance Points – Maple Road Area

27. Even though the Unit E plume above 2,800 ppb has not reached (and may never reach) Maple Road, the MDEQ demanded that PLS install three additional monitoring wells just east of Maple Road in the City's Veterans Park. The purpose of these wells is to determine if any groundwater with 1,4-dioxane concentrations above 2,800 is migrating past Maple Road.

28. PLS installed two of the three wells requested by the MDEQ, but argued that the existing monitoring well MW-84 (s-d) could serve as a performance monitoring well. This well is located about 500 feet east (downgradient) of the area the MDEQ wanted PLS to install a new well. The MDEQ denied PLS' request to use MW-84. The only reason the MDEQ gave for its

denial was that, in the MDEQ's opinion, MW-84 was too far east of Maple Road. The MDEQ is apparently concerned that groundwater contamination above 2,800 ppb may migrate past the Maple Road extraction well, but dilute to levels below 2,800 ppb before it reaches MW-84.

29. I strongly disagreed that this was a sufficient reason to require PLS to install a new monitoring well. The distance between the MDEQ's preferred location and MW-84 is insignificant considering that the closest receptor – the Huron River – is many thousands of feet downgradient. Moreover, the City of Ann Arbor was not pleased to have to put another monitoring well in its heavily used park. Nevertheless, PLS agreed to try to comply with the MDEQ's demands in order to avoid having to file a motion with the Court.

30. Unfortunately, PLS has been unable to install a monitoring well in the area selected by the MDEQ. Both times PLS' contractor attempted to install the well, the drilling auger met refusal before reaching the desired depth resulting in the loss of very expensive two augers.

31. I do not think that the MDEQ's demand that employ even more expensive drilling techniques in an attempt to drill through the underground boulders PLS encountered the first two times PLS tried to install this well is reasonable when the existing MW-84 monitoring well is well suited for use as a performance monitoring well.

V. Continued Mass Removal Efforts

32. To date, PLS' groundwater extraction system has significantly reduced contaminant concentrations across the site. One measure of that success is the concentration of the influent water from the extraction wells that goes to PLS' treatment system. These concentrations have fallen from approximately over 20,000 ppb in 1997 when PLS began groundwater extraction to approximately 550 ppb currently.

33. It no longer makes sense from a technical standpoint to operate wells that are extracting low concentrations of 1,4-dioxane, so long as any residual contamination above the Drinking Water Criterion (DWC) flows into the Prohibition Zone where use of the groundwater is illegal.

34. PLS has proposed to operate on-site purge wells until concentrations in the individual purge wells fall below 500 ppb even though, from a technical standpoint, additional mass removal in the Western Area is not needed in order to make the cleanup program protective. Even without additional mass removal, the remaining 1,4-dioxane west of Wagner Road should migrate east into the Prohibition Zone and migrate safely within the Prohibition boundaries to the Huron River. Nevertheless, PLS is proposing to continue its mass removal efforts in order:

- a. to reduce the DEQ's concerns regarding any uncertainty associated with the possibility that the plume contamination could expand outside of the Prohibition Zone boundaries; and
- b. to reduce mass loading to the Huron River when the plume ultimately vent to that surface water body.

35. The mass reduction PLS expects to occur under its proposal is similar to the reduction that would occur if PLS continued to operate its current system. As noted in Mr. Brode's Affidavit, the mass removed under PLS' proposed modifications will be within ten percent of the mass that would be removed after ten years if PLS continued with the current groundwater extraction program.

36. Monthly or annual mass removal benchmarks are not, as suggested by the MDEQ, necessary to measure progress in this regard. Progress will be measured by the efficiency of the groundwater extraction wells, i.e., by the 1,4-dioxane concentrations in the water being

extracted. The protectiveness of PLS' proposal is not dependant on a specific mass removal amount or goal.

37. The parties' previous attempts to estimate the amount of mass in the aquifer systems was an expensive and time-consuming exercise that was ultimately unsuccessful. There is no reason to repeat this futile effort because PLS' proposal is not dependant on achieving any specific mass removal goal. Therefore, specific benchmarks are not necessary or easily determined.

38. Moreover, the MDEQ has demanded that PLS install numerous additional groundwater monitoring wells that it feels will be necessary to gather the data needed to calculate the amount of remaining mass. This huge and expensive effort that would delay approval of PLS' proposed modifications and would not yield any information that is needed to insure that PLS' proposed modifications are protective.

VI. Contingency Plans

39. The MDEQ has demanded that PLS develop numerous contingency plans before it can consider PLS' proposed modifications. Based on my experience as a former project manager with the MDEQ and as the person responsible for implementing the cleanup program for this site and other Pall sites nationwide, preparing such contingency plans in advance to address remote risks of "remedy failure" is not part of the generally accepted site cleanup procedures.

40. Typically, the agency overseeing the cleanup approves a plan for addressing the contamination and then reserves the right to seek to compel the responsible party to conduct additional response actions if subsequently obtained information reveals that the the agreed upon remedy is not protective.

41. My goal has always been to keep PLS in compliance with its legal obligations regarding the cleanup program. PLS has attempted to anticipate operational difficulties with the various aspects of the cleanup program so that they can be addressed before they cause PLS to be out of compliance.

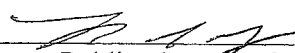
42. My attempt to reconfigure the Maple Road and Evergreen cleanup systems is an example of PLS' efforts to address operational issues before they get to the point where they cause compliance problems.

43. I have personal knowledge of the above-stated facts and can testify as to these facts if called as a witness in this matter.

FURTHER, AFFIANT SAYETH NOT.


FARSAD FOTOUHI

Subscribed and sworn to before me
on this 26th day of August 2009


Notary Public, County of Washtenaw
My Commission Expires: 9-11-2012

LAUREL A. BEYER
NOTARY PUBLIC, STATE OF MI
COUNTY OF WASHTENAW
MY COMMISSION EXPIRES Sep 11, 2012
ACTING IN COUNTY OF Washtenaw

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39. The MDEQ has demanded that PLS develop numerous contingency plans before it can consider PLS' proposed modifications. Based on my experience as a former project manager with the MDEQ and as the person responsible for implementing the cleanup program for this site and other Pall sites nationwide, preparing such contingency plans in advance to address remote risks of "remedy failure" is not part of the generally accepted site cleanup procedures.

40. Typically, the agency overseeing the cleanup approves a plan for addressing the contamination and then reserves the right to seek to compel the responsible party to conduct additional response actions if subsequently obtained information reveals that the the agreed upon remedy is not protective.

41. My goal has always been to keep PLS in compliance with its legal obligations regarding the cleanup program. PLS has attempted to anticipate operational difficulties with the various aspects of the cleanup program so that they can be addressed before they cause PLS to be out of compliance.

42. My attempt to reconfigure the Maple Road and Evergreen cleanup systems is an example of PLS' efforts to address operational issues before they get to the point where they cause compliance problems.

43. I have personal knowledge of the above-stated facts and can testify as to these facts if called as a witness in this matter.

FURTHER, AFFIANT SAYETH NOT.

Farsad Fotouhi
FARSAD FOTOUHI

Subscribed and sworn to before me
on this 26th day of August 2009

Laurel A. Beyer
Notary Public, County of Washtenaw
My Commission Expires: 9-11-2012

LAUREL A. BEYER
NOTARY PUBLIC, STATE OF MI
COUNTY OF WASHTENAW
MY COMMISSION EXPIRES Sep 11, 2012
ACTING IN COUNTY OF Washtenaw