APPENDIX B

On Letter Report
"Review of Feasibility Study"
(Roy F. Weston, July 14, 2004)

Introduction

The following comments have been prepared in response to the above-referenced document ("Letter Report") prepared for DEQ by Roy F. Weston. Pall Life Sciences ("PLS") requests that these comments be considered in connection with selection by DEQ of a remedy and that they be included in the administrative record.

The comments are presented following a quotation and reference to a page number in the Letter Report.

Comments on Executive Summary (Letter Report, p. 5)

WESTON does not concur with the statement in the Executive Summary (ES) that the plume of contaminated groundwater does not present an imminent, current threat to public health and safety, or to the environment, because the City of Ann Arbor (City) relies on both surface water and water supply wells for their water source. (p.5).

WESTON provided very little explanation for this conclusion. It does not assert that City water supplies are likely to become contaminated. It does not assert that any private water supplies are likely to be contaminated. The City of Ann Arbor water intake in the Huron River is nowhere near the flow path of the Unit E plume and is not threatened. Of the two water supply well fields that have been used by the City, the northwest area and water supply well has already been taken out of service and has been out of service for three years, with no interruption in volume or quality of service. Accordingly, there does not appear to be a basis for WESTON's lack of concurrence.

Comments on Chapter 2 – Remedial Action Objectives (Letter Report, p. 7)

Higher concentrations of 1,4-dioxane have been detected on the PLS property, and the FS does not provide information to document that these higher concentrations could not migrate away from the source containment system. (p.7)

WESTON did not specify the data relied on for that statement, making it difficult for PLS to respond directly. PLS provides comprehensive data on its groundwater monitoring wells to DEQ on a quarterly basis. This data shows that there is only one monitoring well on site where concentrations have been detected above 2300 ppb of 1,4-dioxane, and that

well is indisputably within the capture zone of an operating purge well. The only other wells on-site with concentrations higher than 2300 ppb are purge wells. This contamination is being extracted and will not be available for future migration at those elevated levels. Under PLS's plan, an additional purge well may also be installed to further halt migration of contaminated groundwater. PLS, therefore, believes that WESTON's statement is not justified.

WESTON does not have any information that this [change of criterion from 77 to 85 ppb] *will occur, and assumes that the court-directed criterion will continue to apply.*

Section 2a(3) of Part 201 of the Natural Resources and Environmental Protection Act requires DEQ to approve the change from 77 ppb to 85 ppb. This is because the 85 ppb standard has been promulgated in administrative rules implementing Section 20a of Part 201, and because PLS has requested that change. The statute and rules are available on DEQ's website. WESTON applied the correct criterion (85 ppb) because it did not have "time" to apply the more conservative criterion. The suggestion that there is uncertainty as to the applicability of the 85 ppb number is, therefore, incorrect and unnecessarily confusing.

The discussion states: "The FS does not assume that a waiver could or would be granted by DEQ for the purposes of establishing the remediation goals for the Feasibility Study." However, WESTON notes that the preferred Alternative 6 would in fact allow the leading edge of the plume to migrate to the Huron River, an additional 8,000 feet, and that Chapter 7 provides a request for the waiver. WESTON is not in a position to reconcile these two positions. (p.8)

PLS was asked by DEQ to provide a waiver request with the feasibility study. That is why it was provided notwithstanding the explanation of the remediation goals. The FS discussion of the remediation goals excluded an assumption about waivers because there would otherwise be no other options presented (save those that allowed for some plume expansion). Finally, it is PLS's position that a waiver is not necessarily required for Alternative 6. DEQ, in its comments on the draft feasibility study, disagreed with PLS position. Thus, the positions are easily reconcilable.

Comments on Chapter 3 – Identification and Screening of Remedial Technologies (Process Options) (Letter Report, p. 8)

The FS does not indicate the manner in which these data were provided to DEQ, or whether the results have been reviewed and approved. WESTON notes that because all six in-situ options have been screened out, the language on pages 20 and 21 should be revised.

PLS agrees that that all six options have been screened out. The data had just come in at the time the FS was being finalized, which explains the discrepancy with page 20. The discussion of the remedial option in 3.3.6 makes it clear that the technology was not found effective at the present time. The FS does not require revision. PLS does not understand the comment about the FS not indicating the manner in which data were provided to DEQ or whether the results have been reviewed or approved. This information was provided electronically to DEQ as requested by them. The results of the study were not offered for approval by DEQ because it was only a study, and not a successful one that did not require approval of data. PLS assumes DEQ has reviewed the information and WESTON could have cleared this up with them if it was a significant concern. In any event, PLS has agreed to submit a narrative report on this subject by September 1, 2004.

WESTON agrees with this statement [Section 3.5.2 of the FS regarding need for downgradient investigation to support natural attenuation option] and believes that it also applies to all the alternatives. (p. 8)

This statement is not explained. Why does the downgradient investigation need to be completed in the fashion suggested by PLS for options that involve capturing the plume? The downgradient characteristics become only marginally relevant, and in any event would be covered by performance monitoring wells for the other options. In the abstract it is always easy to say that more information is better than a little, but in the case of other alternatives, there is no need for the detailed investigation downgradient called for with the non-capture alternatives reviewed in the FS.

WESTON agrees that constructing a transmission pipeline back to the Wagner Road facility under I-94 would be a significant physical obstacle. WESTON notes that despite this evaluation, the FS had designed the discharge pipelines from both the Wagner and Maple Road treatment systems to travel under the highway. This issue provides justification for … the evaluation of alternative routes for the discharge of water to the river that would avoid crossing the Interstate or state highway M-14. (p. 9)

WESTON's conclusion is arbitrary. It is true that the highway presents a "significant" obstacle. It does not follow, however, that other pipeline routes do not present such obstacles. In fact, it is PLS's position that lengthy pipelines, no matter what the routes, present similar extensive challenges and obstacles that do not differ in significant degree in terms of feasibility. This is primarily a function of access, road closures, in-road utilities, and timing, as explained in the FS. These are the factors that make pipelines as a whole less attractive. The added difficulty to cross I-94 to bring water back to PLS's Wagner Road facility is not a disqualifying factor. Moreover, given the benefits of housing the treatment system at an industrial site that already has industrial power feeds, limited access, and isolation from other uses, it would not have been prudent to eliminate a pipeline in that direction.

The choice of pipeline to the river along M-14 was selected at the suggestion of the City of Ann Arbor. Other routes are available from the PLS facility, but a detailed evaluation would not have lead to a different conclusion.

PLS does not understand the last statement in the quote. I-94 and M-14 lie between the plume and the river until the M-14 bridge, which is in the very heart of Ann Arbor. The only way to avoid crossing the highways would be to build significantly longer pipelines or to go directly through the downtown area. What is the basis for the conclusion that the obstacles associated with these options are less significant?

Given the magnitude of the project, our experience indicates that access to private property should not be necessary. Access to public property for projects that benefit the community would be easier and less time-consuming to obtain. (p. 9)

With all due respect, WESTON's experience with access at other projects is of less value than actual experience on the Pall/Gelman project. Gelman Sciences and PLS have sued and been sued over access numerous times, despite the "benefit to the community" argument. In some cases, it is the municipality that has opposed access for remedial structures such as wells and pipelines in their rights of way.[1] In others, it is private parties. PLS has, on several occasions, had to resort to private access agreements and arrangements when it was unable to obtain agreements from municipalities, including the City of Ann Arbor. Given that the City of Ann Arbor is plaintiff in a recently filed lawsuit seeking its own version of a cleanup WESTON's statement based on its experience should be given little if any weight in evaluating the difficulty of access.

WESTON concludes that constructing a pipeline to transmit contaminated groundwater back to the Wagner Road facility is less practical than constructing a similar pipeline along rights-of-way to a treatment unit near Maple Road, as discussed in Alternative 4. (p. 9)

PLS concluded in its FS that the practicality of construction of lengthy pipelines to handle Unit E water is uncertain. WESTON offers no opinion as to whether any pipeline is a practical solution for remediating the identified problem. WESTON only offered that of the two alternatives, one route was "less practical" than the other. As explained in the FS, PLS believes that due to the length of the pipelines involved there will be implementation and access problems and disruption to the community. WESTON agrees with this later in its Letter Report (p. 17). The Huron River is, however, over 8,000 feet from the Maple Village area if a direct route could be found. All other routes to the river will be longer. This is not disputable, and, unfortunately, not commented on directly by

[1] Virtually every local municipality and public body corporate has in some way been involved in opposing access sought by PLS. The Washtenaw County Road Commission and City of Ann Arbor were each sued on different occasions. Access to drains and sewers have been opposed by the County Drain Commission, Washtenaw County and the City. The City of Ann Arbor, Washtenaw County, Scio Township and local citizens have opposed access to Honey Creek for discharge. Few, if any, significant off-site programs have been implemented on public property without attendant delays and lawsuits.

WESTON. In fact, WESTON does not dispute the disruption that would be caused by the pipelines, or that there will likely be opposition and delays. That some other unidentified route may in an unspecified way reduce the delays or length of pipeline is not only speculative, but also misleading. Is any scenario that requires installation of nearly miles of pipe appropriate or justifiable when balancing costs and benefits?

WESTON notes that these same concerns [transportation, handling, storage and use of chemical oxidants in congested commercial areas] *would be associated with the IR options that are proposed in Chapter 4 (page 34). These challenges appear manageable for the IR and should be equally manageable for Alternative 4. (p. 10)*

WESTON's inference is not justified. The IR consists of using a mobile, 200 gpm capacity system that can fit within the footprint of approximately two semi-trailers. Alternative 4 would require a system approximately several times that size (including adequate areas for spill prevention, materials off loading, etc) and with 3 times the capacity. The larger system would require more raw materials, more frequent product deliveries, more maintenance, and more power than a 200 gpm system. WESTON erroneously concluded that the scale of the systems for the various alternatives would not be relevant. Also, it should be noted that DEQ's proposed remedy would require a far larger system at Maple Village than that required for Alternative 4, on the same scale as PLS existing on site treatment system. (See Comment Summary for further discussion).

PLS' experience with the treatment system operation will minimize risks to human health and safety, regardless of the location of the treatment system. (p 10)

PLS appreciates WESTONS' confidence in its operations. PLS does have an excellent record of health and safety compliance at Building 5, and expects to continue in that fashion. PLS's competence, however, WESTON does not address the issue of whether it is appropriate to locate a large-scale industrial process in the Maple Road area. There is still a question of zoning and public acceptance, particularly where larger systems than PLS's 200 gpm system would require liquid oxygen. And the larger the system, the more raw materials shipments are required and the higher the risks generally with respect to matters outside of PLS's control, such as transportation and delivery. PLS does not understand how this consideration can be disregarded.

Until the additional investigation that is proposed in this chapter is completed, WESTON does not agree that this alternative would be as protective of any potential receptors as the other alternatives. (p. 10)

It should be noted that WESTON apparently agrees that the alternative would be protective if the investigation confirmed what PLS has offered in the FS regarding flow path and fate of the plume. Once the investigation is completed there will be enough information for WESTON to revisit this conclusion. As stated earlier, PLS disagrees that the information is so inadequate to justify a completely different, more intrusive and intensive response when ultimately one might not prove necessary.

In WESTON's opinion, the proposed investigation to determine the fate of the Unit E plume and the potential receptors should be conducted regardless of the selected alternative, so that the fate and transport of 1,4-dioxane can be getter defined and protection of human health and the environment assured. (p. 10).

PLS disagrees. If the plume were captured at the leading edge and at two other places, as proposed by DEQ, there would be no need to conduct detailed investigations downstream of the leading edge. A performance monitoring system would be in place to assure long-term protection of the public health, safety, welfare and the environment.[2]

Comments on Chapter 4 – Identification and Screening of IR Process Options

However, WESTON agrees that groundwater treatment in this area appears feasible for both the IR and the final remedy because the difference between the two options is a matter of size and volume and not the treatment process.

PLS does not understand why WESTON minimizes the difference between the two options as only a matter of size and volume. Feasibility cannot be divorced from the reality that a smaller system using non-intrusive water disposal method (via reinjection) has significant advantages in terms of feasibility over a larger system that must meet stringent NPDES discharge limits. These are discussed in connection with PLS response to comments on Chapter 3, page 5 above.

Therefore, this disposal method [reinjection downgradient into the plume] *would require additional investigation and modeling of the effects before WESTON could consider it a viable option. (p.11)*

WESTON's need for additional information is selective (and biased against PLS's proposed response) and outside of the scope of a FS. While there are technical demonstrations that would be needed for groundwater injection, enough is known about the aquifer so that tentative conclusions can be drawn by PLS and others that reinjection of approximately 200 gpm of treated groundwater can be considered viable in the Maple Village area. In addition, PLS is submitting a modeling report with these comments that should alleviate WESTON's alleged concerns.

There are laws in place regulating groundwater injection, which is a well-understood principle for water disposal. PLS would have to apply for and have to obtain an appropriate permit or exemption under the applicable laws, each of which would require a demonstration sufficient to meet the legal requirements for reinjection. PLS did not provide that level of information in the FS because it was premature and is no more a part of the FS than an NPDES permit application or amendment. PLS notes that until an

[2] Weston made a similar statement in several parts of its comments, and PLS's response is the same to all. *See* Comments on Chapter 2, page 3 above.

NPDES permit is applied for and processed, it does not know (and neither does WESTON) if there is some issue which would make the disposal of water in the Huron River unviable. Yet that option was not similarly rejected by WESTON (or DEQ). For the purposes of the FS, PLS believes that all water disposal options that are not illegal should be considered equally. This includes disposal via reinjection, deep well injection, amendment to the existing NPDES permit (and discharge to a tributary of Honey Creek), and disposal in the Huron River. While there are acknowledged limitations on the volume of water that may be disposed of via injection (especially deep well injection) the available data all indicate that the Unit E could accept 200 gpm in a properly designed system. It could not, however, accept all of the purged and treated groundwater required under DEQ's solution.

WESTON notes the internal inconsistency of this statement [regarding the non-cost effectiveness of combining interim response with leading edge containment] because the final proposed remedy combines the Interim Measure with Alternative 6, which includes the potential to capture the plume proximate to the Huron River. (p.12)

There is no internal inconsistency. The inconsistency is created by an improper construction of PLS's proposal. The modeling submitted in the FS indicates that no interim response is needed in order to protect potential receptors from contamination above criteria. Nevertheless, PLS proposed interim response, in order to add an additional level of protectiveness to its plan, and to ensure that it will not be necessary to activate the very expensive near-river contingency. PLS's willingness to commit to such an expensive contingency does not support the conclusion that there is "considerable uncertainty" in the predicted flow path. Rather, it is consistent with PLS's confidence that the receptors will not be affected and that the contingency will not be needed.

While WESTON concurs with this evaluation [that PLS's proposed IR measures will remove more mass in the near term than a potential leading edge alternative and that they can be implemented sooner] *, it should be noted that the plume will continue to migrate unimpeded while this response action is implemented. (p. 12).*

PLS does not understand this position. If, as WESTON agrees, the IR will remove more mass in the near term and be implemented faster, there is no basis for the conclusion that the IR measures allow the plume to continue unimpeded. As mass is removed, the concentrations that continue to migrate are lowered.

WESTON notes that the driving logic appears to be that the interim measures will produce a more manageable volume of water for treatment and disposal than a final remedy that captures the leading edge of the plume. Therefore, this alternative is limited to removal of some of the mass of the plume of contaminated groundwater, rather than more comprehensive alternatives that would minimize the continued migration of the plume itself. (p. 12).

This is a fair, if incomplete, paraphrase of the logic behind PLS's interim response measures. PLS has concluded that construction of large-scale pipelines and treatment facilities in a commercial residential area is not feasible, so "manageable volume" of water needs to be put in that context. Moreover, as PLS noted in its FS, no one appears to disagree with the proposition that if the plume is not going to reach receptors (especially with the added margin of safety from the IR and contingency plans) then there is no justification for "more comprehensive alternatives that would minimize the continued migration of the plume."

Assuming that the IR action will be operated for 20 years or more, WESTON believes that the costs for this alternative are underestimated. (p. 13).

PLS provided one year of O&M costs so that different cleanup horizons could be evaluated. At the present time, the cleanup horizons are not known until there is agreement on the level of remediation needed to protect downstream receptors. One year of costs was provided as an example, so reviewers could determine roughly how much it would cost to continue the IR into subsequent years. This was explained in email to DEQ. The costs were not intended to presume that the system would be operated for only one year, as suggested by WESTON.

Comments on Chapter 5—Screening of Remedial Alternatives

The FS provides no information concerning the evaluation of pipeline routes to either the Wagner Road facility or to the Huron River. (p. 13).

It was not necessary or proper to provide detailed evaluation of alternative pipeline routes. The routes selected were intended to be examples. The objections raised by PLS would apply over virtually any route of comparable length.[3]

Although the reinjected volumes are substantial larger for Alternative 3b than for the interim measures, WESTON notes the internal inconsistency between the evaluation of this alternative and the evaluation of the IR actions. (p. 13).

There is no internal inconsistency. Reinjection under Alternative 3b is infeasible precisely because the volumes required for extraction and capture under that alternative are so large. PLS believes it has developed adequate information about the Unit E to conclude that it can safely and legally inject 200 gpm, but not the 500 gpm needed to capture. Moreover, as explained in detail in the FS on page 43 (and ignored by WESTON), Alternative 3b, unlike the IR, would require injection a significant distance downgradient of the extraction wells. This is inherently more complex and problematic, as fully explained in the FS. Because the proposed IR is not attempting to capture the entire plume, it would allow for injection in the same area of the extraction well. The balance between what's being withdrawn and what's being injected makes PLS's IR

[3] See PLS's comments to similar statements on pages 3 and 4 earlier.

significantly easier to engineer. These are fundamental differences that apparently escaped WESTON.

The discussion in Section 5.3.4 (page 47) of Alternative 4a indicates that the discharge pipeline would pass under I-94. The cost of this pipeline makes this alternative the most expensive of those in this group of alternatives. As discussed previously, WESTON did not observe documentation in the FS to support the selected path for the pipeline and believes that alternate, shorter routes may be possible from Maple Road to the Huron River; therefore construction could proceed more quickly and be more cost effective than the FS assumed. (p 13-14).

As explained in the FS, it is PLS's position that lengthy pipelines, no matter what the routes, present similar extensive challenges and obstacles that do not differ in significant degree in terms of feasibility. This is primarily a function of access, road closures, in-road utilities, and timing, as explained in the FS. These are the factors that make pipelines as a whole less attractive.

Using the scale maps provided by the FS, a pipeline directly from Maple Village to the Huron River, cutting diagonally across properties and not taking into account any obstacles, would be approximately 8,000 feet. No route could be shorter than that distance, and of course, that distance is not attainable as it tramples property rights, traverses house lots, etc. Any realistic route would be longer than 8000 feet. WESTON's cost analysis assumes the length of pipelines would be similar to what PLS has estimated. WESTON's suggestion that a "shorter" route may be possible is, therefore, speculative (no such route is proposed) and misleading. (See comments, above on the same issue).

<u>Comments on Chapter 6 – Detailed Analysis of Remedial Action Alternatives</u> (Letter Report, p. 14)

As indicated previously, until the results of all the proposed additional investigations are available, WESTON does not have sufficient information to concur with this assumption [that all of the remedial alternatives are equally protective of the environment]. (p. 14)

Pall disagrees that there is insufficient information to concur with the assumptions made in the FS. WESTON makes no distinction between the level of information that may be required for DEQ to approve a remedial action plan, and the level of information necessary to support a decision on whether a remedial approach has merit. PLS explained the basis for its conclusion that the remedial alternatives were equivalent in terms of protection of public health and safety in Section 6.2.1. of the FS.

WESTON does not concur with this evaluation because the downgradient hydrogeology and migration of the plume are not well understood, because alternate pipeline routes could be evaluated that could be less disruptive for shorter time frames, and because the timing of installation of extraction wells should follow the completion of infrastructure

rather than precede it. In addition, the proposed investigation of the plume and the downgradient hydrogeology could be completed concurrently with the infrastructure project. (p. 14).

PLS has previously commented on these conclusions.

Evaluation of Cost Information

Table 2 presents WESTON's evaluation of the individual unit cost items on the FS Tables 1 though 14 and Appendix G, which make up the total costs of the alternatives. Table 2 reflects our understanding of how various alternatives would be implemented and compares the costs provided in the FS to our knowledge of common costs for similar activities, given the time constraints. The table identifies some of the costs in the FS that are overestimated and some that are underestimated. WESTON has also identified omissions from the costs of some alternatives that should have been included in the FS, such as groundwater investigation and modeling and monitoring wells.

See PLS's Summary Comments.

Comments on Section 6.2.2.1 Alternative 2 – Monitored Natural Attenuation and Institutional Controls (Letter Report at 16)

No comments. WESTON did not evaluate the merits.

Comments to Section 6.2.2.2 Alternatives 3a, 3c, and 3e – Groundwater Pumping – Pipeline to and Treatment at Wagner Road (Letter Report at 17)

WESTON concurs with the evaluation of the challenges of constructing the pipelines as described. WESTON understands that community opposition to construction of pipeline infrastructure could delay the project and provide uncertainty in timing. WESTON did not find documentation in the FS to support the selected routes for the pipelines and believes that alternate, shorter routes may be possible, allowing construction to proceed more quickly and more easily at less expense than the FS assumed.

WESTON agrees that there are significant challenges that are posed by construction of lengthy pipelines. It should be emphasized that this alternative and others involving transmission pipelines evaluated conceptual routes for the purpose of drawing generalizations about the challenges that are faced. The conceptual routes were not intended to be exhaustive of all possible alternatives. This is explained in the FS. PLS therefore believes the "lack of documentation" assertion to be irrelevant and appears to be a smoke screen intended to avoid rendering an opinion as to the feasibility of a pipeline at all, in light of the concerns which WESTON acknowledges. The suggestion that alternative, shorter routes may be possible that allow construction to proceed more quickly, easily and at less expense is mere conjecture. To be sure there are alternative routes. The shorter ones cross the highways. WESTON would apparently not

recommend them.[4] Pipeline routes to the river that do not cross the highways, are longer, not shorter and cross far more frontage of individual parcels. WESTON did not identify which routes it would recommend nor do we see any basis for conjecture that alternative routes present significantly less challenges than the conceptual route discussed.

The FS did not provide information about the rate of migration of the plume, nor an estimate of how far the plume might travel during construction of the pipelines.

The FS included groundwater flux calculations for Unit E in the Maple Road area in Appendix B. PLS did not provide an estimate of how far the plume might travel during the construction of the pipelines because, as stated in the FS, the timeframe for construction of the pipelines is unknown because of the uncertainty inherent with putting in such an intense amount of infrastructure. The problem is not that purge wells will be located first, as WESTON incorrectly inferred.[5] The problem is that the final configuration of pipelines needed to convey water from the leading edge cannot be reliably determined until it is known how long the rest of the infrastructure can be in place and operational. It is likely that plans for the pipeline will have to be revised, additional access obtained, drawings approved, etc. while the project is being constructed. This raises additional complexity and delay.

WESTON agrees that constructing a transmission pipeline back to the Wagner Road facility under I-94 would be a significant physical obstacle. This situation provides justification for construction of a treatment unit at Maple Road, described under Alternative 4, where the I-94 would not be an obstacle.

For the reasons discussed earlier, this observation by WESTON is not of value. Not only does WESTON not account for the difficulty of *any* pipeline that must extend for miles, the fact is that in order to avoid a pipeline through the heart of Ann Arbor it may well be necessary to cross I-94 or M-14 because that obstacle, formidable as it may be, is less than construction through downtown Ann Arbor. It appears that the real reason WESTON continues to raise I-94 as an obstacle, but not other highway crossings, is purely political. It seems that WESTON is trying to push the location of the treatment system away from the PLS site where it would discharge to the Honey Creek tributary.

While Alternative 3e would be technically feasible, the FS did not provide information to indicate whether the receiving stream could accept the increased discharge volume of treated water. The FS notes (page 63) that NPDES permit issues could create

[4] It is WESTON's opinion that crossing I-94 and M-14 should be avoided as "less practical'. See Letter Report at >>>.

[5] The problem is not the need to reposition extraction wells. The problem is the need to reposition or redesign the pipeline from an extraction well so that it efficiently reaches the leading edge of the plume. Obviously the well itself would not be installed until the pipeline can be approved and installed to the proposed location.

implementation problems. In the absence of information related to the capacity of the receiving stream, WESTON cannot evaluate this alternative further. (p. 18).

WESTON again evades reviewing another discharge alternative due to "lack of information." Similar objections could be raised with respect to **every** discharge option that requires a state permit. Ordinarily a feasibility study it is not the appropriate document to cover all of the technical areas involved in a discharge permit. There is far more information available on the capacity of Honey Creek (as well as other objections) than there is on any of the other discharge options. Most of the potential issues, including capacity, have been raised and litigated in contested cases. WESTON could have reviewed that information. It appears to PLS that although capacity might be an issue that is challenged (again) in a contested case, it is a manageable issue. With the exception of injection (which could be done under an exemption to state permit requirements) PLS expects any discharge permit for Unit E will be controversial, whether the receiving waters are the Huron River, the Honey Creek, a lake or the City's storm or sanitary sewer. Because there is no existing permit, there is less information and more potential uncertainty regarding a discharge to the Huron River than to either the Honey Creek tributary or via reinjection. To the extent, then, that this is an issue, it disfavors constructing miles of pipeline without knowing if a permit will be issued.

Comments on Section 6.2.2.3 Alternatives 41 and 4c – Groundwater Pumping – Treatment near Maple Road (Letter Report at 18)

The evaluation of protection of public welfare and public perspective (page 65) indicates that installation of the treatment system near Maple Road is not consistent with current land uses and may raise public objections and legal challenges. WESTON notes this concern was not raised in the discussion of the IR action, which would also include a treatment system in the same location. (p. 18).

See PLS Summary Comments, which identify the huge differences between the impacts of two systems on the community.

As WESTON noted previously, the FS does not provide information on the effects of reinjection on the plume of contaminated groundwater. As a result, this alternative cannot be fully evaluated based on the existing information. (p. 19)

As noted earlier, PLS disagrees with this statement. It is inconsistent, moreover, for WESTON to cite this as a reason for discontinuing review of this alternative when it assumes, within even less information, that there is enough information to evaluate the discharge via pipeline from Maple Village to the Huron River. PLS does not have an NPDES permit for that discharge. The issues and/or objections related to such a discharge are not yet known. On the other hand, PLS has performed two pump tests and has installed numerous wells in the Unit E in the vicinity of the proposed injection. There is, therefore, less information available for evaluation by WESTON for the Huron

River discharge option than for the groundwater discharge proposed by PLS. In addition, PLS has provided still more information and a modeling report with these comments.

Comments on Section 6.2.2.5 Alternative 6 – Groundwater Pumping with Active Remediation and Treatment Proximate to the Huron River (Letter Report at 19)

Therefore, sufficient information was not available for WESTON to review regarding the potential future migration of the plume of contaminated groundwater, and therefore, WESTON cannot concur with the conclusion that this alternative is, or can be, equally protective of human health and the environment.

In the absence of the additional hydrogeological information, the FS does not propose locations for the contingent extraction and treatment system. Therefore, WESTON cannot evaluate the degree which this alternative would reduce or minimize disruptions, delays, and/or costs. (p. 19)

This comment is inconsistent with the position that WESTON takes on Alternative 4a. The pipeline route and treatment in the vicinity of Maple Village is no more certain than the location of a contingent extraction and treatment system in terms of evaluating delays, disruptions, and/or cost. Either a more detailed evaluation should be provided using the information provided by PLS (the relative distances seem obvious from a map, and the flow path used by PLS was predicted using the City's own information), or the conclusion drawn for this alternative should also apply to Alternative 4a and to the remedy selected by DEQ.

If the proposed investigation, monitoring, and modeling of the groundwater plume support the assumption that the potential receptors will be protected, then the contingency for extraction of contaminated groundwater near the Huron River would not be necessary. In that event, Alternative 6 would be comparable to Alternative 2, but without the institutional controls. However, the plume of contaminated groundwater would still be migrating under those properties. In WESTON's opinion, some institutional controls would be prudent to ensure that the contaminated groundwater is not consumed. (p. 20).

This comment appears to concede that if the proposed investigation confirm PLS's observation that potential receptors will be protective, then capturing the plume at the leading edge would not be necessary. WESTON adds that in its "opinion," some institutional controls would be prudent to ensure that the contaminated groundwater is not consumed. As detailed in the FS, institutional controls *are already in place* that would prohibit installation of drinking water wells in the plume. WESTON did not review the adequacy of these controls, thus its analysis of the Alternatives proposed by PLS is not complete.

Comments on Chapter 7—Overall Response Plan and Waiver Request (Letter Report at 20)

As the Final Response Plan, the FS proposes to combine the IR Actions described in Chapter 4 with Alternative 6 to aggressively remove mass from near the most contaminated portions of the plume while it continues to migrate toward the river. (p. 20).

WESTON, not PLS, coined the term "Final Response Plan". PLS is not certain what this term means. PLS explained its approach and rationale in the FS (Section 7.0, p. 71). Also, PLS notes that every remedial option, including those that capture at the leading edge, remove mass while allowing some water contaminated with 1,4-dioxane to migrate toward the river. The only difference between the options is how much groundwater is removed and from what locations, and the infrastructure involved with each. PLS does not concur with the inference that only PLS's proposed overall response plan (and waiver request) allows mass to continue toward the river.

WESTON notes that the costs provided in Appendix G of the FS for the IR portion of this alternative included operation of the additional extraction wells and treatment /reinjection system at Maple Road for only one year… Therefore, the total cost for the final response plan appears to be lower than it should be because it would be expected that the IR action would continue for more than one year. (p. 20).

PLS provided one year of O&M costs so that different cleanup horizons could be evaluated. At the present time, the cleanup horizons are not known until there is agreement on the level of remediation needed to protect downstream receptors. One year of costs was provided as an example, so reviewers could determine roughly how much it would cost to continue the IR into subsequent years. This was explained in email to DEQ. The costs were not intended to presume that the system would be operated for only one year, as suggested by WESTON.

WESTON's responses to these technical impracticability arguments have been addressed previously. WESTON concurs that reinjection would not be reliable based upon the level of information provided in the FS. The criteria for selection of the proposed pipeline routes were not provided in the FS, and other routes should be evaluated because they may be more cost-effective and less disruptive than those proposed. (p. 21)

PLS has previously responded to WESTON's responses on impracticability. To sum up those responses: (1) WESTON's argument is selective in favor of construction of pipelines, even though no known route has been identified or proposed that can be determined to be feasible and that does not cause significant disruption; (2) the technical unknowns regarding injection are no more significant than those involved in permitting any of the disposal options, including discharge into the Huron River; and (3) WESTON apparently does not understand or give any weight to the level of effort needed to treat the high volumes of water at Maple Village required for its preferred pipeline alternatives. These factors strongly support PLS's waiver request.

The discussion of determents to the environment beginning on page 75 provides new information not previously discussed in the FS, including groundwater level and surface water level declines that could result from aggressively extracting groundwater from the Unit E plume. The FS does not provide any data or other information to support these statements. As a result, WESTON cannot provide technical evaluation of their validity. (p. 74).

As mentioned earlier, whenever PLS has made a technical argument in support of its position, WESTON evades review by claiming PLS did not provide any (or inadequate) information. As with other such statements, it this one is not accurate. The FS at page 75, PLS explained what has been observed in the other two aquifers that are being actively remediated. Water levels have declined by approximately 12 feet. The water level information for all of PLS's wells are communicated regularly to DEQ in quarterly report and other project related documents.

Moreover, WESTON made no comment at all on the five other categories of environmental considerations it has raised in connection with the waiver request. (FS at 75-79). PLS assumes that is because there is no dispute regarding the environmental detriment that would be created by remediating the plume.

Finally, WESTON notes, as if this were improper, that this information "was not previously discussed in the FS." The details were provided in this section because the waiver request specifically requires a balancing of the adverse environmental impact of implementing a remedial action to satisfy R 299.5750(5) and 5705(6) with the environmental benefit of complying with the rules. (MCL 324.20118(6)). PLS would be pleased if DEQ could and would consider this information in connection with selection of overall response activities as well, because PLS believes this supports its position on remedial action.

ESTIMATED COST OF DEQ-PROPOSED REMEDIAL ALTERNATIVE (Letter Report, at 22).

In this section, WESTON provides an estimated cost of DEQ's proposed remedial alternative. PLS questions why WESTON did not provide a technical analysis of DEQ's response. PLS notes that according to WESTON, DEQ's response calls for construction of approximately 25,500 linear feet of pipeline. However, the pipeline routes are ill defined or not defined at all in the case of pipeline to the river. This very issue was flagged by WESTON as a criticism of PLS's review of the pipeline alternatives in the FS. PLS also notes that the cost estimates for the pipeline assume open cut, with directional drilling only at street crossings. (See Tables 5 and 6). Not only is this technique highly disruptive of neighborhoods, it is also inconsistent with public representations made by DEQ that open cut would be minimized. It may also indicates that, contrary to these representations, directional drilling may not be feasible.

PLS has reviewed WESTON's cost estimates. The following appear to be major oversights or omissions from WESTON's costs.[6] These errors are discussed further in PLS's Summary Comments.

[6] PLS also does not agree with WESTON on some routine numbers, such as those for installation of monitoring wells or purge wells and various unit costs. PLS can provide more detail on the rationale for its costs, which is typically based on experience with installations at this site over the last ten years, if such detail will provide a basis for a different remedy.