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GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
JACKSON DISTRICT OFFICE



STEVEN E. CHESTER
DIRECTOR

November 16, 2005

Mr. Farsad Fotouhi
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600 S. Wagner Road
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2430 First National Bank
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Detroit, MI 48226-3535

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

Dear Sirs:

SUBJECT: Gelman Sciences, Inc. Remedial Action
Work Plan for Groundwater Extraction, Unit E Aquifer
Wagner Road, dated August 1, 2005

We informed Pall Life Sciences (PLS) in electronic mail dated September 29, 2005, that our review of the above referenced submittal (Work Plan) was not complete. In that communication, we approved the installation of piping to connect TW-18 to the PLS treatment system, as it is clear that TW-18 is located in an area that would allow for significant mass reduction from the Unit E plume in that location. It is our understanding that PLS has not yet resolved access for the pipeline.

We have now completed our review and are conditionally approving the Work Plan. Enclosed are two Interoffice Communications from Mr. James Cogger and Mr. Rick Mandle, dated November 10 and November 3, 2005, respectively, which include review comments on the Work Plan and the TW-18 Aquifer Test.

As you know, the objective of the remediation of the Unit E plume at Wagner Road was the subject of the dispute resolution process, which was addressed in a December 17, 2004 Opinion and Order from the Washtenaw County Circuit Court. Our position remains that PLS must take all necessary steps to capture the entire width of the Unit E plume at Wagner Road and prevent further migration of groundwater contaminated above 85 parts per billion east of Wagner Road. PLS has not shown, nor do the current data establish, that it is not feasible to capture the entire width of the Unit E plume. There is additional treatment capacity currently available, as well as some capacity committed to other Unit E wells, that could be re-allocated if needed. There is no indication that a modification of the NPDES permit or reduction of other existing groundwater extraction rates is needed until reasonable efforts are made to apply all of the additional available capacity toward meeting the objective of capturing the entire width of the Unit E plume.

As indicated by Mr. Cogger and Mr. Mandle, we do not believe the existing data are sufficient to demonstrate that TW-18 will capture the entire width of the plume when pumped at 200 gallons per minute (gpm). On page 4 of the Work Plan, PLS acknowledges that there is some uncertainty as to the precise location of the southern boundary of the plume. In any case, the performance monitoring plan will be relied upon to determine the effectiveness of extraction from TW-18 in meeting that objective.

As indicated by Mr. Cogger, two additional sets of monitoring wells will be required to monitor the effects of extraction from TW-18, in addition to other existing monitoring wells. Please see

Mr. Cogger's Interoffice Communication for details on the locations of these new monitoring wells. Mr. Cogger has also indicated that the performance monitoring plan needs to be enhanced by using pressure transducers/data loggers in some monitoring wells.

We have additional concerns about your proposed performance monitoring plan. Footnote 3 on Table 2 indicates the purpose of monitoring to be to monitor for lateral expansion of the Western System Plume. This concern has not been communicated to us before, and it does not appear that the two monitoring wells identified would accomplish that goal, if that concern is valid. However, we are concerned about the possible lateral expansion of the Unit D₂ plume and will require additional monitoring to accomplish that. One such monitoring well would be MW-94s. Some monitoring wells in close proximity to TW-18 may need to be monitored more often than quarterly. We propose to discuss our concerns in more detail during our technical meeting planned for November 21, 2005, and that PLS submit a revised performance monitoring plan by December 5, 2005. Please refer to Mr. Mandle's review of the performance monitoring plan for additional concerns that need to be addressed. The performance monitoring plan should also include a prediction of the response PLS expects to see in monitoring wells over time that would indicate that the extraction from TW-18 is meeting its objective.

The Work Plan states that "...the performance monitoring plan will not serve as a basis for imposing penalties or for a finding that PLS is in violation of any applicable requirements". The Department of Environmental Quality (DEQ) does not accept this statement. As noted above, the DEQ believes that capture of the entire width of the Unit E plume at Wagner Road is both feasible and consistent with the December 17, 2004 Opinion and Order. The DEQ recognizes there may be some difficulty in determining compliance with the objective of capturing the Unit E plume (above 85 ppb) at Wagner Road during the first months of operation and will discuss any concerns that this objective is not being met with PLS prior to making any such determination.

The Work Plan indicates that PLS intends to continue operating extraction wells TW-11 and TW-17, but has discontinued extraction from TW-12 due to low concentrations of contamination. The September and October 2005 NPDES monitoring reports indicate that TW-12 has been extracting at about 28 gpm since September 22, 2005.

PLS believes TW-18 will capture the entire width of the Unit E plume at Wagner Road. Operation of TW-12 is likely to have an affect on the Unit E plume and should be considered in relation to extraction from TW-18. Please inform us of your plan to continue using TW-12 by January 9, 2006, including what information PLS will use to decide on any future changes in its use. An evaluation of the operation of any Unit E extraction wells in meeting the objective of the Work Plan should be included in each quarterly report after operation of TW-18 begins.

Due to the uncertainty of whether or not the operation of TW-18 at 200 gpm can meet the objective of capturing the Unit E plume (above 85 ppb) at Wagner Road, please provide us with a contingency plan by January 9, 2006, to be implemented in the event that capture cannot be demonstrated.

The Work Plan indicates that the pipeline to transport untreated groundwater from TW-18 to the treatment system will be pressure tested, but does not outline any leak detection methods to be used during operation. A leak detection plan must be approved before extraction is started.

Mr. Farsad Fotouhi
Mr. Alan D. Wasserman
Mr. Michael L. Caldwell

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November 16, 2005

Please provide us with a leak detection plan by January 9, 2006, or at least two weeks before implementation, if that is expected before January 23, 2006.

PLS has been attempting to gain access for installation of the pipeline for several months. Please provide us with your schedule for implementing the Wagner Road interim response by November 28, 2005. If access has not been resolved by November 28, 2005, PLS's submittal should indicate that it has sought to obtain court-ordered access or its plans for doing so, and include an estimated schedule for implementing the interim response.

In summary, the Work Plan is approved subject to the following conditions:

- Installation of two additional sets of monitoring wells;
- A revised performance monitoring plan to be submitted by December 5, 2005, subject to approval by the DEQ;
- Submittal of information on the planned operation of TW-12 by January 9, 2006;
- An evaluation of the operation of Unit E extraction wells to be included in each quarterly report after operation of TW-18 begins;
- Submittal of a contingency plan by January 9, 2006;
- Submittal of a leak detection plan by January 9, 2006, or sooner if interim response will begin before January 23, 2006;
- Submittal of a schedule by November 28, 2005, identifying a schedule for implementation of the interim response.

Please contact me if you have any questions.

Sincerely,

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

SK/KJ

Enclosures

cc/enc: Ms. Mary Ann Bartlett, Pall Corp.
Mr. Robert Reichel, Department of Attorney General
Mr. Rick Mandle, DEQ
Mr. Mitchell Adelman, DEQ/Gelman File
Mr. James Coger, DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

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

FROM: Rick Mandle, Groundwater Modeling Specialist, RRD

DATE: November 3, 2005

SUBJECT: Review of TW-18 Aquifer Test and Wagner Road Work Plan, Pall Life Sciences

We have completed our review of the TW-18 Aquifer Test and Wagner Road Work Plan reports. These reports were prepared by Fishbeck, Thompson, Carr & Huber, Inc. (FTC&H) for Pall Life Sciences (PLS) in Scio Township, Washtenaw County. The review comments are provided separately; first for the report on the TW-18 Aquifer Test, followed by the comments for the Wagner Road Work Plan.

TW-18 Aquifer Test

A new test extraction well (TW-18) was installed on the west side of Wagner Road. The eventual purpose of this well is to provide additional near-source containment of the 1,4-Dioxane contaminant plume in the Unit E aquifer. The test of this well took place on May 24 and 25, 2005. The purpose of this test was to determine the transmissivity of the aquifer to be used in estimating the necessary pumping rate to contain the contaminant plume. TW-18 was pumped at a rate of 200 gallons per minute (gpm) for a 24-hour-long period, during which time water-level declines were measured in TW-18 and 13 nearby observation wells. Water-level recoveries were measured in these same wells for a period of approximately eight (8) hours. An in-line flow meter was used to measure pumping rates during the drawdown phase of the test. Barometric pressure was measured before and during the test to assess the impact of changing barometric pressure on groundwater levels during the test. The data collected during the test were analyzed using a variety of methods, each of which estimated very similar values of transmissivity and storativity.

In their analysis of the test data FTC&H concluded the following:

- The Unit E aquifer in this area appears to behave as a laterally extensive confined aquifer.
- While there was an observable impact on groundwater levels by fluctuating barometric pressure, the impact was small and did not appreciably change the type-curve matching or estimates of transmissivity and storativity.
- The transmissivity is estimated to range from approximately 18,000 ft²/day to 21,300 ft²/day.
- The storativity is estimated to range from approximately 0.00037 to 0.0043.

Wagner Road Work Plan

In this work plan, FTC&H discussed the analysis of the capture-zone extent resulting from variable pumping rates from TW-18, the transport and treatment of purged groundwater, the proposed plan to monitor the capture effectiveness of TW-18, and the reporting and scheduling of work. Our review only addresses the capture-zone analysis and proposed monitoring plan.

Capture-Zone Analysis

The capture zone extent was estimated using an analytical method that assumes a uniform hydraulic gradient and transmissivity. The hydraulic gradient was assumed to be 0.00105 ft/ft and the transmissivity was estimated to be 20,000 ft²/day on the basis of their analysis of the TW-18 aquifer test. The capture zone extent was estimated using pumping rates of 200, 300, 400, and 500 gpm. These capture zones were superimposed on the contour map of measured hydraulic head near the end of the test of TW-18. Also, shown on this figure (Figure 3 of the Wagner Road Work Plan) are contours showing the estimated extent of 1,4-Dioxane in the Unit E aquifer. FTC&H concludes that, on the basis of the analytical modeling and measured hydraulic heads at the end of the pumping phase of the aquifer test, a pumping rate of 200 gpm should be sufficient to capture that portion of the 1,4-Dioxane plume requiring remediation as delineated on Figure 3.

Performance Monitoring Plan

Table 2 in the Work Plan contains a listing of all monitoring wells that are to be sampled to evaluate the performance of the remediation of the Unit E Aquifer. Of these 45 wells, six (6) wells are located along Wagner Road and 3 are located east of Wagner Road within 1600 feet. In addition, PLS has proposed to install an additional monitoring well immediately downgradient of TW-18 on the east side of Wagner Road. These wells are to be sampled either quarterly or semi-annually, depending on their proximity to the highest detected 1,4-Dioxane concentrations.

Review Comments

TW-18 Aquifer Test

In general, we only have a small disagreement with the conclusions reached by FTC&H regarding the interpretation of results from this aquifer test. We found that, in matching the field data using different well-hydraulics models, the Hantush leaky confined aquifer model appeared to match the field data better than either the Theis confined aquifer or the Hantush confined aquifer with partial-penetration corrections. After all, there has to be some degree of leakage through the overlying clay layers to account for the presence of contaminants at this depth. We found that FTC&H consistently ignored the early data when performing the type-curve matching. Experience has shown that the selection of the most appropriate well-hydraulics model is highly dependent on the use of the early test data. If FTC&H had used these data during the curve-matching process they would have seen the impact of leakage in the aquifer response data (deviation from the Theis curve). Also, by "correcting" the field data for barometric pressure effects, even though these corrections are small, the fit to the Hantush leaky-confined type curves is improved. The result is that the estimates of transmissivity from our analysis are only slightly lower than those obtained by FTC&H. However, in order to provide for a more conservative design for the extraction well pumping rate, it is better to use the estimated transmissivity values reported by FTC&H.

Capture-Zone Analysis

In trying to be consistent with past review comments (those provided for the Western, Evergreen, and Maple Village systems capture analyses), we will re-iterate our primary comment with respect to the use of these simple two-dimensional analytical methods. These methods, that are used to estimate the required pumping rate to capture a plume, are applicable provided the method is being used for estimation purposes only and that the assumptions made in developing the analytical method reasonably fit the field conditions where the method is being applied. In this case, the data from the testing of TW-18 suggest a somewhat laterally extensive confined aquifer with some degree of leakage from overlying (assumed) aquifers. The assumption that the groundwater flow within the aquifer can be approximated using a two-dimensional method, while not entirely correct, is probably reasonable. Also, the data from the aquifer test appears to be relatively consistent between observation wells indicating that the use of uniform hydraulic properties (hydraulic conductivity and aquifer thickness) for this area is also a reasonable assumption. There are, however, some concerns with respect to the plume width, the proposed pumping rate, and the hydraulic gradient used in this analysis.

Contaminant Plume Width

The stated objective of the capture zone analysis was to determine the pumping rate for TW-18 that would “prevent – to the maximum extent possible – further downgradient migration of 1,4-Dioxane in the Unit E Aquifer along Wagner Road.” In order to achieve this objective it is necessary to know the width of the plume that requires containment. FTC&H has assumed that the lateral extent of the 1,4-Dioxane plume has been adequately defined. On Figures 1, 2, and 3, the depicted plume width requiring capture appears to extend from MW-94D to approximately 300 feet south of MW-95. By their analysis, using a pumping rate of 200 gpm, there is contamination between MW-95 and MW-65 that is beyond the estimated capture extent. Earlier maps submitted to the DEQ by FTC&H showing the extent of the 1,4-Dioxane plume in the Unit E aquifer (e.g. Figure 6, Unit E Work Plan, 2003), combine the contamination found in the vicinity of the MW-65 monitoring well cluster with the main body of the contaminant plume. In the Wagner Road Work Plan, the contamination found at MW-65i and d has been isolated from the main Unit E Aquifer plume implying that the area in between MW-65 and MW-95 does not require containment. This depiction of the contaminant distribution along Wagner Road is very misleading as no chemical monitoring data have been collected since 2003 that show that there is a “clean zone” separating MW-65 from the apparent main body of the contaminant plume. The extent of contamination in the E Unit Aquifer between MW-95 and MW-65 on Figure 4 of the Work Plan is identified as discontinuous with a question mark although no data are provided to indicate a “break” in the contaminant plume. In the work plan, FTC&H state that extraction well TW-12 was recently turned off because of low contaminant concentrations in the purged groundwater. This may or may not indicate that the edge of the contaminant plume is located in close proximity to this well (TW-12). Until data from vertical profiling along Wagner Road are provided indicating otherwise, we feel that the extraction wells along Wagner Road should capture the entire area between MW-95 and MW-65.

In addition, the extent of contamination to the south of MW-65 exceeding applicable criteria does not appear to have been adequately defined. Groundwater samples presented on Figure 4 were collected from the well cluster at MW-65 on April 15, 2004. These data show 1,4-Dioxane concentrations exceeding 85 ug/L at MW-65i (205 ug/L) and MW-65d (92 ug/L). Groundwater samples collected in April 2005 from these wells show 1,4-Dioxane concentrations below 85 ug/L. Also, sampling at MW-68, approximately 1000 feet south of

MW-65, show no detectable 1,4-Dioxane in the sampled well-screen interval. The actual "edge" of the contaminant plume can be located at MW-65, as the most recent data suggest; or, the plume edge may be anywhere to the south within the 1000-foot distance between the well cluster at MW-65 and MW-68, as all previous data show. Department policy states that, for the latter case, we would consider the entire distance between MW-65 and MW-68 as having groundwater with 1,4-Dioxane concentration exceeding applicable criteria until a sufficient amount of chemical monitoring data were provided to demonstrate otherwise. If groundwater analyses from MW-65 show 1,4-Dioxane concentrations above 85 ug/L, it will be necessary for PLS to vertically-profile the aquifer between these locations and continue to collect groundwater samples from all monitoring wells in this area to define the extent of the area exceeding criteria and requiring capture.

Capture of Shallow Contamination near MW-94

It's our opinion that the relatively shallow contamination found near the screened interval for MW-94S (shown in Figure 4) and any contamination found at this depth between MW-94 and MW-69 will not be contained at Wagner Road by pumping 200 gpm from TW-18. We realize that capture of this contamination was not the intended purpose of TW-18. However, pumping from this well will change hydraulic-head gradients and impact the direction of the downgradient migration of this portion of the 1,4-Dioxane contaminant plume. The use of this relatively simple analytical model does not allow an analysis of the impact of pumping from TW-18 on shallow 1,4-Dioxane contamination migration directions. Rather than make the assumption that the horizontal wells and the Evergreen system will fully contain this portion of the contamination, a better design would be to install an additional extraction well in this area to contain this part of the contaminant plume.

Static-Water-Level Measurements and Hydraulic Gradients

It's not apparent that any static water levels were measured in Unit E Aquifer wells west of TW-18 to verify the orientation or magnitude of the hydraulic gradient with this lower aquifer. If extraction wells TW-11 and TW-17 are pumping from this aquifer, as stated in the work plan, they will affect hydraulic gradients within this aquifer to the west of TW-18. Because no data were provided, it's not possible to tell whether: the assumed hydraulic gradients in the capture-zone analysis are reasonable, or the analysis using these gradients result in a conservative estimate of the required pumping rate. This information is necessary for our assessment of plume containment.

The extent of the cone of depression around TW-18 shown in Figures 2 and 3 may be somewhat misleading. The contour lines give the impression that a well-defined cone of depression extends well away from TW-18, especially in the west and northwest directions. There are no data in these areas to determine the hydraulic head near the end of the aquifer test, to estimate the extent of the cone of depression, or to infer the extent of hydraulic capture at the end of this test. Also, the water level in TW-18 should not have been used in generating the contours on these figures, regardless of an attempt to account for probable well inefficiencies.

Also, the presumed orientation of the potentiometric surface contours shown at the bottom of Figures 1, 2, and 3 are not consistent with other studies covering a larger geographic area or the migration direction of 1,4-Dioxane in the Unit E Aquifer. Static-water-level measurements were collected from several deep wells for the Wellhead Protection Area delineation study performed for the City of Ann Arbor's Montgomery Well. The contours on that potentiometric

surface show a more north to south orientation implying an easterly groundwater flow direction. As depicted in the Wagner Road work plan, the direction of groundwater flow is from the area in which wells MW-8d and MW-68 (as an example) are located toward MW-65. This would imply that the 1,4-Dioxane contamination found at MW-65i and d came from a source located between MW-8d and MW-68. We believe that the contamination detected at MW-65i and d may have actually followed a more west-to-east migration direction. We believe that this is an error in the characterization of groundwater-flow directions in the Unit E Aquifer that should be corrected, regardless of its impact on the capture-zone analysis.

Pumping Rate

FTC&H has determined that a pumping rate of 200 gpm will be adequate to contain the contaminant plume shown on Figures 2 and 3 of the work plan. If we assume that their capture-zone analysis is reasonable (correct transmissivity and hydraulic gradient), in order to capture the area along Wagner Road between MW-95 and MW-65, the pumping rate will have to be increased to 400 to 500 gpm. If the hydraulic-head contours are re-drawn as we've suggested, the capture zone may be re-aligned so that it is oriented in a more west to east direction, possibly reducing the southerly extent of capture. A prudent alternative would be to continue pumping from TW-12 so that the capture zone from TW-18 and TW-12 overlap, possibly including the entire area between MW-95 and MW-65. An assessment of the combined capture extent for TW-18 and TW-12 should be conducted to evaluate this alternative.

Performance Monitoring Plan

This report is labeled "Work Plan for Groundwater Extraction, Wagner Road, Unit E Aquifer." This title and the Introduction Section of the Work Plan give the impression that this document will focus on the containment of the contaminant plume at Wagner Road "to the maximum extent possible." It follows that we expected that the performance monitoring plan would focus on evaluating the effectiveness of the proposed extraction well in containing the 1,4-Dioxane plume (concentrations exceeding 85 ug/L) at Wagner Road. This plan fell far short of our expectations. We expected to see:

- A listing of wells located near or downgradient of Wagner Road that would be used in this evaluation process.
- A proposal for the installation of additional wells (more than one) beyond the expected downgradient extent of capture where there are no existing monitoring wells.
- A description of the data that would be collected at these wells.
- The process by which the data will be evaluated.
- The performance standard for determining containment effectiveness.
- Contingency plans in the event the proposed extraction well is not effective.

PLS has to provide adequate information to evaluate the containment effectiveness at Wagner Road, regardless of the number of wells or their pumping rates. However, the data that will be gathered from the proposed monitoring plan will not provide the necessary information to perform this evaluation.

You may contact me at (517) 241-9001 or mandler@michigan.gov if you wish to discuss these review comments or have questions.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: Sybil Kolon, Pall Life Science (PLS) Project Manager
Remediation and Redevelopment Division (RRD)
Jackson District Office

FROM: Jim Coger, Geologist, RRD
Jackson District Office

DATE: November 10, 2005

SUBJECT: Review of the July 6, 2005, PLS Report on the TW-18 Aquifer
Performance Test and the August 1, 2005, PLS Work Plan for
Groundwater Extraction Wagner Road Unit E Aquifer

The following are my comments addressing the TW-18 Aquifer Performance Test, the Work Plan for Groundwater Extraction at Wagner Road, and Mr. Rick Mandel's November 3, 2005 Memo addressing the subject reports.

TW-18 Pumping Test:

I concur with Mr. Mandel's concern that extracting groundwater at 200 gallons per minute (gpm), at the TW-18 location, will not capture the full extent of deep (Unit E) 1,4-Dioxane contamination exceeding 85 ug/l along Wagner Road. Based on April - May 2005 data, groundwater contamination on a north-south axis exceeds 85 ug/l between monitoring well MW-94 s, and d, north of TW-18, and MW-65 s, i, and d, south of TW-18.

Purge well TW-12, located proximal to the MW-65 nest has been used on an intermittent basis. A capture zone analysis addressing the intermittent purging of TW-12, and/or simultaneous purging from TW-12 and TW-18 was not provided with the Wagner Road Work Plan (Work Plan).

Performance Monitoring Plan:

PLS proposes to install one or more monitor wells, in a downgradient location from TW-18 for the purpose of obtaining water level and water quality data. PLS states that the well(s) will be installed one month after obtaining access. Sampling will be performed on a schedule with other Unit E wells.

Recommendations:

I recommend that conditional approval be given to commence purging from TW-18. The approval should be contingent on PLS demonstrating hydraulic capture of the full extent of the Unit E contamination (MW-94 to MW-65), and on submittal of a contingency plan that specifically outlines what actions will be taken if capture can not be demonstrated. Contingencies may involve increasing the pumping rate, purging from TW-12 and TW-18 simultaneously, and/or installing additional purge wells.

I do not agree with PLS's statement in the Performance Monitoring Plan, that "it will be impossible to immediately confirm the effectiveness of the proposed mid-plume capture through performance monitoring". The Monitoring Plan should specifically address the

utilization of data acquisition systems to evaluate TW-18's hydraulic capture. Data from pressure transducers/data loggers and potentiometric surface measurements should be used to establish and evaluate pressure and hydraulic gradients towards the pumping well. This information could then be used to target specific wells for chemical analysis on a weekly or monthly basis. Upon TW-18 achieving steady-state capture, the hydraulic and chemical data can be used to develop a conceptual flow and contaminant transport model. The purge system modifications that may be required to demonstrate full capture of the Wagner Road plume should be apparent within 30 – 60 days after TW-18 is put online.

PLS proposes to install one nested monitor well on the east side of Wagner Road. It is my opinion that at least two nested wells will be needed on the east side of Wagner Road to evaluate TW-18's capture performance.

One nested well should be installed directly east of Wagner Road and TW-18. This well should be installed at the south end of the New Well Access Search Area, depicted on Figure 5 of Fishbeck's Work Plan. The boring should be vertically profiled to bedrock. Screened intervals should be based on vertical profiling data. The first or shallow screened interval should be installed at a depth which allows for an evaluation of the hydraulic connection between the "perched" surface waters of the Sister Lakes system with the first unconfined aquifer. This first screened interval should determine if there are any groundwater/surface water interface issues with shallow groundwater contamination and Sister Lakes. The first screened interval will also provide a monitoring point for evaluating water table elevation data when TW-18 is under pumping conditions. Drawdown of the water table may affect leakage from the Sister Lakes system and potentially impact gradient and/or flow conditions. As discussed above, a pressure transducer should be used in the deep screened interval for this well to evaluate pressure gradients during TW-18 purging.

A second nested well, located at the east end of Rhea Street, appears to be a good location for evaluating TW-18's downgradient capture. PLS depicts this area as being outside the 200 gpm capture zone of TW-18. PLS also depicts this location as being the approximate centerline of the Unit E contamination without support from any actual groundwater data. A nested monitor well at this location will determine what the actual levels of 1,4-Dioxane is and establishes groundwater elevations for gradient and flow evaluations. This location should also demonstrate rapid decline of groundwater contaminant levels when TW-18 is put into operation.

If you have any questions or comments, please let me know.

JC/KJ

cc: Mitch Adelman, RRD
Dowe Parsons, RRD
Rick Mandle, RRD