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COMMENTS: AQUIFER RESTORATION PROJECT DELIVERABLES

12/06/96

OEPA DOE-FEMP
17
COMMENTS

OhioEPA
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K-0799

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George V. Voinovich
Governor

December 6, 1996

RE: DOE FEMP
MSL 531-0297
HAMILTON COUNTY
COMMENTS: AQUIFER
RESTORATION PROJECT
DELIVERABLES

Mr. Johnny Reising
U.S. Department of Energy, Fernald Area Office
P.O. Box 538705
Cincinnati, OH 45253-8705

Dear Mr. Reising:

This letter provides as attachments Ohio Environmental Protection Agency comments on the draft versions of the following documents: "Restoration Area Verification Sampling Program Project Specific Plan","Baseline Remedial Strategy Report Remedial Design for Aquifer Restoration (Task 1)" and the "Remedial Design Preliminary Design Package for Task 4: Injection Demonstration and Task 5: South Plume Optimization".

If you have any questions, please contact Tom Ontko or me.

Sincerely,

Tom Ontko for

Thomas A. Schneider
Fernald Project Manager
Office of Federal Facilities Oversight

cc: Jim Saric, U.S. EPA
Terry Hagen, FERMCO
Ruth Vandergrift, ODH
Mike Proffitt, DD&GW
Sharon McLellan, PRC
Manager, TPSS/DERR,CO
Dave Ward, GeoTrans

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partial
action response
to doe-1417-96(10056)
partial
action response
to doe-1418-96(11053)

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Ohio Environmental Protection Agency Comments:"Remedial Design
Preliminary Design Package for
Task 4: Injection Demonstration and
Task 5: South Plume Optimization"

) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2 Pg #: 2-1 Line #: Code: M
Original Comment #:
Comment: What provisions are in place to modify the scope of the South Plume Optimization strategy if the current access difficulties are resolved? This package should include a brief discussion of the modelling described in the draft Baseline Strategy Report and a discussion that acknowledges that the well locations are constrained by access problems.

) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 1.4.2 Operation and Maintenance Plan - Task 2 Pg. #: 1-3 Code: C
Original Comment #
Comment: The description of the master O&M Plan is more of a Operation Plan for the integrated groundwater remediation system at the FEMP. This is certainly necessary, but so is the inclusion of the maintenance procedures. The success of the groundwater remediation project will be very dependent on adequate maintenance of the system, insuring that it is operational. It would seem that Task 4 and Task 5 systems operations would be an opportunity to develop and refine maintenance procedures. Is there a way to integrate this information into Task 2, Operation and Maintenance Plan after it has been submitted? The submittal date is July 1, 1997.

) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 2.1, Project Objectives Pg. #: 2-2 Line # Code: C
Original Comment #
Comment: Objective 2 states the design, construction and operation of the planned ID system will verify that injection technology enhances the aquifer remediation efforts. How will this enhancement be quantified and implemented beyond the specific wells involved? In Table 1-1 under Remedial Action Work Plans and Technical Reports, there are no reports or designs which would utilize the findings of Task 4, Injection Demonstration to benefit the remainder of the aquifer restoration project. Objective 6 of this section indicates the design should provide for expansion. What will cause this expansion to be implemented?

) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 3.5 Secondary Containment Pg. #: 3-20 Line # Code: C
Original Comment #
Comment: In this section, it is stated that the need for secondary containment is governed by DOE Order 6430.1A. It is also stated that this project does not require secondary containment because a safety assessment classified this project as an industrial facility conducting hazardous

waste activities. Please reference the safety assessment described in this section.

Ohio EPA comments : "Draft Restoration Area Verification Sampling Program Project Specific Plan"

1) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 1.1 FRL Exceedances Detected Outside of the Restoration Area Code: M
Original Comment #
Comment: One of the purposes of this document is to evaluate FRL exceedences of non-uranium constituents outside the uranium restoration footprint. This evaluation is documented in Appendix A. A concern is that the evaluation fails to include a discussion of the occurrence of these constituents inside the footprint when evaluating their occurrence up and down gradient from the footprint. This information is essential to determining if these occurrences are due to the FEMP.

2) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 1.1 Pg #: 3 Line #: 30-34 Code:
Original Comment #:
Comment: The FRL for fluoride is .89 mg/l. This is the limit agreed to by DOE, USEPA, and Ohio EPA in the OU5 ROD. It is inappropriate to modify this after it went through formal public comment and after the ROD was agreed to by all parties.

3) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 1.1 Pg #: 4 Line #: 1-6 Code:
Original Comment #:
Comment: These bullet items warrant more discussion. Specify why these contaminants are not attributable to the FEMP and reference the detailed discussion in Appendix A.

4) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 1.1 Pg #: 4 Line #: 7-14 Code:
Original Comment #:
Comment: The FRL which is in the ROD should be used.

5) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 1.2 Pg #: 5 Line #: figure 1-2 Code:
Original Comment #:
Comment: Modify figure 1-2 based on FRLs defined in the ROD.

6) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1.2 Pg #: Figure 1-3 Line #: Code: e
Original Comment #:
Comment: This is a very busy figure. Can the SWIFT model grids and the FEMP boundary lines be omitted? It is also hard for the reader to figure out the location of the map. Unless the reader already knows where the plume delineation activity is taking place, this figure will not help him figure it out. Adding labels to Willey Road and the South Entrance Road would help a

reader orient the map.

7) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 3.2 Pg #: 11 Line #: 37 Code:
Original Comment #:
Comment: Geoprobe completion to 150 feet below ground surface may not be deep enough for this study. No information exists to characterize the type 4 aquifer in this area. This study needs to define the full vertical distribution of uranium in the ground water near the southeast drainage ditch. This is especially important now that uranium has been found in monitoring well 4125 according to the most recent DMEPP report. Additionally, the Geoprobe investigation may require follow-up study based on initial findings. If appreciable uranium contamination is found in the type 4 aquifer system, then a study utilizing monitoring well clusters will be warranted in order to asses the rate and extent of this newly identified plume component.

8) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 1.2 Uranium Plume Delineation in the Area of Monitoring Well 3069 Code: C
Original Comment #
Comment: The uranium plume bifurcates near the water table at Well 3069. The suspected cause is recharge from a drainage ditch in this area. Is there any groundwater chemistry data which supports this conclusion? Recharge water from the ditch would probably have a different water chemistry than the aquifer. Comparing the chemistry of the groundwater upgradient of the bifurcation, at the bifurcation, and recharge water from the ditch or recharge zone would help verify this theory.

9) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: Appendix A Pg #: A-4 Line #: 19-32 Code:
Original Comment #:
Comment: This approach is unacceptable to Ohio EPA. The ROD has been signed by DOE, USEPA, and Ohio EPA after a period of public review and comment. DOE cannot simply modify the FRL's at this point.

11) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: Appendix A Pg #: A-5 Line #: 5-16 Code:
Original Comment #:
Comment: This approach is unacceptable to Ohio EPA. The ROD has been signed by DOE, USEPA, and Ohio EPA after a period of public review and comment. DOE cannot simply modify the FRL's at this point.

12) Commenting Organization: Ohio EPA Commentor: DDAGW

Section #: Appendix A.4 Pg #: A-9 Line #: 20-24 Code:
Original Comment #:
Comment: This approach is unacceptable to Ohio EPA. The ROD has been signed by DOE, USEPA, and Ohio EPA after a period of public review and comment. DOE cannot simply modify the FRL's at this point.

13) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: Appendix A.4 Pg #: A-9 Line #: 30-37 Code:
Original Comment #:
Comment: This approach is unacceptable to Ohio EPA. The ROD has been signed by DOE, USEPA, and Ohio EPA after a period of public review and comment. DOE cannot simply modify the FRL's at this point.

Ohio Environmental Protection Agency comments: Draft Baseline Remedial Strategy Report
Remedial Design for Aquifer Restoration (Task 1)

1) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Pg #: Line #: Code: M
Original Comment #:
Comment: The major goals of the Baseline Remedial Strategy Report as outlined in the Remedial Design Work Plan for Remedial Actions at OU5 have been addressed in this submittal. These goals are:

- use the SWIFT model to evaluate four cleanup scenarios (25, 15, 10, 7.5 years)
- compare the costs of the scenarios
- recommend a revised strategy to serve as a design basis for a full-scale program

There are however two major limitations to this Report: property access difficulties and modeling uncertainties.

Ohio EPA acknowledges that to a large extent the property access issues are outside of DOEs control. However, at the meeting between DOE, USEPA, PRC, Ohio EPA and Mr. Knollman, Mr. Knollman seemed quite receptive to PRCs suggestion of alternative technology (remote wellhouse and valving). This report makes no mention of any efforts undertaken by DOE to pursue this technology. It is Ohio EPAs expectation that DOE aggressively pursue the implementation of this technology and make any possible concession to his privacy concerns. We are especially eager to have the four wells in the South Plume Optimization module sited as originally conceptualized. There are major inefficiencies in operating the South Plume extraction wells in a plume containment mode if the 2N and KN wells can not be used. It is also worth reiterating that the Ohio EPA does not support the possibility of now or in the future condemning any property to gain access for well installation.

While in general we agree that the SWIFT groundwater model is accurate and useful, we have several reservations about how it was used to support this report:

- the full three-dimensional nature of the model simulations has not been addressed
- the Kd's change in an unrealistic manner
- DOE is using the model beyond the model's capability and credibility

The first bullet is addressed in a more specific comment below. Our concerns with how the model is used center mostly around the making of distinctions between scenarios that appear to be different but may in fact be the same considering the uncertainties of the models. For example, the system performance measures for the 10-year scenario (Table 4-6) and the baseline scenario (Table 5-2) are distinctly different even though the major difference between the scenarios is that extraction wells 26 and 27 are not used in the 15 year scenario. It would appear that dominant controlling factor is the time at which the Kd is changed from 1.78 to 17.8. This Kd effect overwhelms the effect of not using the two South plume wells. The importance of understanding the limitations of the model are critical in planning a long-term remedial strategy.

2) Commenting Organization: Ohio EPA Commentor: OFFO

Section #: 1.4 Pg #: 1-8 Line #: last bullet Code: c
Original Comment #:
Comment: It is premature to mention the possibility of pursuing a technical impracticability waiver. In practice, there are several technical options (such as fine tuning to reduce stagnation zones, lixiviant addition, etc.) that would be evaluated prior to reaching the conclusion that the remediation has become asymptotic. Please add a bullet with a brief discussion of some of the enhancements to the remediation project that will be evaluated if the rate of progress becomes asymptotic.

3) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 1.1 Role of the FS "Base Case" Remedy Pg. #: 1-2 Line # 5-8 Code: C
Original Comment #
Comment: Is this present worth cost of this 27-year base case comparable to the costing included for the alternatives later in this document? Where is the information on these costs located?

4) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 1.3 Key Factors Affecting Cleanup Performance Pg. #: 1-6 and 1-7 Code: C
Original Comment #
Comment: Please include a discussion of the deleterious effects of iron bacteria on the performance of injection wells in this section.

5) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 1.3 Pg. #: 1-7 Line #: 30-31 Code: C
Original Comment #
Comment: The two natural factors that affect cleanup time and cost for the aquifer are the hydraulic characteristics and capacity of the aquifer, and the geochemical processes that occur within the aquifer (i.e., K_d). Lines 30-31 indicate that a complete uncertainty analysis was performed for both factors. However, in Appendix F, only a discussion of the uncertainty analysis associated with K_d is presented. Either clarification as to what the quantified uncertainties associated with K_d should be presented here, or reference should be made to uncertainty discussion in Appendix F.

6) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: Pg. #: 3-2 Code: C
Original Comment #
Comment: The regional groundwater flow directions are not consistent with the potentiometric surface (i.e., Figure 4-7 and 5-4).

7) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 3.1.5 Pg #: 3-4 Line #: 20-21 Code:

Original Comment #:
Comment: The only reason 27 years was found to be acceptable was because DOE stated that it would take that long. The DOE committed to investigating alternative technologies (injection) as part of the approved FS document. Now that faster alternatives have been found, 27 years is no longer considered an acceptable time frame to Ohio EPA.

8) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 3.1.5 Pg #: 3-4 Line #: 24-25 Code:
Original Comment #:
Comment: Shortening operations and maintenance (O&M) is only part of the cost savings. Shortening the period which DOE incurs resource damage liabilities is also a real savings.

9) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 3.2 Pg #: 3-5 Line #: 20 Code:
Original Comment #:
Comment: Change to **on and** off-property cleanup time.

10) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 3.2 Pg #: 3-5 Line #: bullets Code:
Original Comment #:
Comment: Add a bullet stating that DOE will seek alternative technologies to address owner access problems.

11) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 3.2 Pg #: 3-6 Line #: 14-17 Code:
Original Comment #:
Comment: Add bullet stating that DOE will investigate alternative construction technologies to deal with known problems, such as iron fouling and electrical malfunctions.

12) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 3.3.3 Pg #: 3-7,3-8 Line #: 29-3 Code:
Original Comment #:
Comment: The DOE needs to be flexible in these instances. Efforts to compromise with the landowners through the use of alternative technologies are appropriate.

13) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 3.4.4 Pg. #:3-12 Line: 12 Code: E
Original Comment #

Comment: The values of K_d should include units.

14) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 3.4.4 Geochemical Conditions Pg. #: 3-12 Line # 30-31 Code: C
Original Comment #
Comment: The assumption that the fouling problems caused by iron bacteria can be resolved for long term injection is probably not realistic. Chemistry of the groundwater can be controlled at the treatment facility, but when it is reinjected and mixing with untreated groundwater occurs, fouling problems will begin to occur.

15) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: Table 4-1 Pg. #: Line # Code: E
Original Comment #
Comment: On Column 6, lists Years 11 to 10. This should be 11 to 20.

16) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 4.2.5.2 Extraction/Injection pumping Rate Schedule Pg. #: 4-21 Line # 11-14 Code: C
Original Comment #
Comment: Will "plugging rate" change, or will the period between required scale removal be lengthened? It seems like the latter would be the case, and this would not necessarily translate to lower maintenance requirements, only less frequent maintenance requirements?

17) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 4.2.5.2 Extraction/Injection pumping Rate Schedule Pg. #: 4-21 Line # 8-14 Code: C
Original Comment #
Comment: The cost estimates include cost associated with maintaining the horizontal wells as identical to maintenance of vertical wells. Won't these wells have a significantly higher O&M expense?

18) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 4.3.1.1 Pg #: 4-26 Line #: Table 4-9 Code:
Original Comment #:
Comment: What is the relative costs of a vertical well with underground supply lines such as proposed to DOE by PRC in the September 17, 1996 meeting with DOE, Ohio EPA, USEPA, and Mr. Knollman?

19) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 4.2.5.1 Pg. #: 4-18 Line 18 Code: C
Original Comment #

Comment: While is it understood that the placement of the horizontal wells is restricted by the groundwater model grid placement and alignment, it is suggested that wells D, E, and F be moved further north. This would greatly facilitate well placement with having to access off-property locations.

20) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 4.2.5.1 Pg. #: 4-18 Line 29 Code: C
Original Comment #
Comment: Please provide a reference and further details regarding the pipeflow model, Fathom.

21) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: Pg. #: Figure 4-4 Code: C
Original Comment #
Comment: The "C" horizontal well shown on Figure 4-4 is not listed in Table 4-7.

22) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 4.3.2.5 Pg. #: 4-32 Line 2-8 Code: M
Original Comment #
Comment: The modeler seem to be placing too much credibility and confidence in their ability to apply models to predict future contaminant transport and geochemical changes. It is difficult to fully accept the notion that DOE would place such great emphasis of the temporal change in K_d. During the transition from a low K_d of 1.78 L/Kg to the higher K_d of 17.8 L/Kg, the model representation lets 89 percent of the dissolved uranium mass simply disappear.

23) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 4.3.3.4 Pg.4-34 Lines: 14-15 #: Code: C
Original Comment #
Comment: The particle tracking (Figure 4-12) should be described in greater detail. In the FS, vertical diagrams were presented to show the variation with depths of migration patterns. It is interesting to note how the particle tracks abruptly change direction. For example particle tracks emanating from the Plant 6 wells make 90 degree turns. Presumably this is caused during the step from zero to 500 gpm during pumpage from years 3-5 (Table 4-7). Please provide additional comments and discussion.

24) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 4.3.2.1 Pg. #: 4-29 Line #: 14-15 Code: C
Original Comment #
Comment: The possibility of significant delays in the source-area remediation schedule given the 10-year site-wide remediation plan is considered moderate. However, a 50/50 chance of

delays occurring should not be considered "moderate", but rather as equal probability of happening as not happening. This statement should be clarified.
In addition, if the additional vertical extraction wells inside the excavated zone do not achieve the predicted clean-up and becomes impractical, what significance will this have on the 10-year site-wide remediation plan? If there are contingencies for this type of delay, they should be presented and discussed.

25) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 4.4.2 Pg. #: 4-48 Line #: 16-17 Code: C
Original Comment #
Comment: Supporting evidence needs to be presented to justify this conclusion. The downward migration of uranium due to additional injection could have an impact on estimated cleanup times. If no vertical expansion of the plume is occurring, then plots which depict the simulated uranium concentrations at deeper layers of the model should be presented. In addition, vertical cross-sections of particle tracking should also be shown which depict the simulated flow field with respect to depth.

26) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 5.1.2 Pg #: 5-7 Line #: 17-19 Code:
Original Comment #:
Comment: Ohio EPA concurs that DOE should not initiate condemnation proceedings against the Knollman property. At the September 17, 1996 meeting, Mr. Knollman stated that he would accept flush mounted extraction wells if O&M were kept to a minimum. The DOE needs to investigate this technology, as they committed to at that meeting. Condemnation or abandonment of installation are not the only two alternatives in this situation.

27) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 5.2.1.1 Pg #: 5-9 Line #: 14-30 Code:
Original Comment #:
Comment: What are the estimated uranium mass removals for the 5 scenarios?

28) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: 5.2.1.1 Pg. #: 5-9 Line #: Code: M
Original Comment #
Comment: The contour plots in Figures 5-12 through 5-16 show simulated uranium concentrations through time. It is unclear from which layer in the SWIFT model these concentrations are associated with. If the groundwater concentrations displayed are combined from all model layers, how are they combined? An examination of the SWIFT data sets used in this modeling, when post-processed (see attached contour plots), shows vertical migration of the

uranium plume to the deeper layers (i.e. model layers 4, 5 & 6). There is no indication that examination of the model's sensitivity to vertical dispersion, or what steps were taken to minimize unwanted numerical dispersion in the vertical plane in the model were undertaken.

While the 20 ppb contour does not migrate to the deepest layer, what these plots do show is the change in concentrations over a fairly short distance (a few hundred feet). For example, in the contour plot included for concentrations in model layer 3, the distance from the 5 ppb to the 20 ppb contour is no more than a few hundred feet in the vicinity of Willey Road. How does an adjustment of hydraulic conductivities (as part of a sensitivity analysis) or dispersivities affect the location of these contours? The extent of the 20 ppb may or may not be significantly affected, but proper documentation of this analysis needs to be presented.

29) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: Pg. #: Line #: Code: C
Original Comment #
Comment: With regards to the vertical migration of the plume based on model simulations, the question is: Based on actual sampling, what is the vertical extent of uranium contamination and does the model accurately predict this vertical migration, or are simulated concentrations observed at deeper layers the result of unwanted numerical dispersion?

30) Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 5.2.1.3 Pg #: 5-11 Line #: 6-8 Code:
Original Comment #:
Comment: Mr. Knollman has not granted approval for placing Wells 2N and KN based on current well design. The DOE has not presented any construction alternatives.

31) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: A.3.1 Pg. #: A-3 Line #: 32-33 Code: C
Original Comment #
Comment: This statement should either be removed or modified. The use of the term "fine tune remedial system designs" indicates that only a modest change is made in the remedial design, whereas the Baseline Remedial Strategy, based on the results of modeling, is significantly different in that site-wide cleanup times have been reduced from 27 to 10 years.

32) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: A.3.1 Pg #: A-3 Line #: Code:
Original Comment #:
Comment: Although it is premature to discuss a technical impracticability exemption at this time, it is Ohio EPAs expectation that complex models would be used to support such a pleading.

33) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: A.4.3 Pg. #: A-7 Line #: 19-26 Code: M
Original Comment #
Comment: While it is true that the SWIFT model cannot simulate a continuous transition process between adsorption and desorption conditions, it does not seem necessary to simplify the continuous process into a two-stage process only. It is unclear if an alternate scenario was considered whereby the transition between adsorption/desorption conditions was modeled more gradually, i.e., at the end of each model year, a revised K_d was used based on an estimate of the transition that had taken place between adsorption and desorption conditions during that time frame. Such a "pseudo-continuous" transition in K_d would provide, it seems, a better representation of the actual continuous change in adsorption/desorption ratios. At the very least, such a simulation would provided an additional sensitivity analysis of K_d by the SWIFT model and its impact on clean-up times.

34) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: F Pg. #: F-6 Line #: 20 Code: M
Original Comment #
Comment: It is stated that the recommended baseline remedial strategy does not increase hydraulic impacts to the GMA even when more extraction wells are included. This statement needs further clarification. The addition of extraction wells should have an impact on the hydraulic characteristics of the aquifer, perhaps a significant impact. If there are no significant impacts on the aquifer under the baseline remedial strategy, then it is unclear how cleanup time can be reduced from 27 years to 10 years.

The addition of extraction wells and groundwater injection, or even a change in the time that an extraction/injection well operates will have an impact on groundwater levels in the aquifer and the capture zone for the well field. The capture zone associated with the baseline remedial strategy is not presented. At the very least, this should be presented so that it could be compared to the capture zone of the well field based on the 7.5, 10, 15, and 25 year scenarios previously performed.

35) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: Pg. Lines: #: Code: C
Original Comment #
Comment: To evaluate the application of the SWIFT model, data sets were converted to MODFLOWT. This is a newly released transport module for MODFLOW. The reason for the model conversion was two-fold. First, by converting the data files from one code to another, further inspection and review is performed. Second, the results of the two models can then be compared to ensure solution accuracy.

In converting the data format, no significant observations were noted. The application of boundary heads from the regional model appear to be correct, as well as the assignments of hydraulic properties (hydraulic conductivity, transmissivity, porosity, etc.).

In comparison the two codes, SWIFT and MODFLOWT, several observations are noted. First, it was confirmed that the two model produce essentially the same results (predicted pressure/head and concentration). Second, tests were made using MODFLOWT regarding the numerical algorithms.

In comparing the code, it was observed that backward differencing techniques were used for both the spatial and temporal derivatives. The use of backward technique, as compared with the centered technique, is less desirable as the backward approximations causes numerical dispersion or spreading of the plume. Through several trial simulations, it was found that switching to centered differencing did not noticeably affect the simulation after one year. This confirms that the solution is not significantly affected by the solution technique.

Using MODFLOWT, an additional input variable is offered, namely vertical dispersivity. Vertical mixing using SWIFT has been identified as a potential problem (FS, Section F.7.7.3). Using MODFLOWT, reduced values of dispersivity were simulated, but due to time constraints, results are not conclusive as the effects this has on the predictive simulations. There is doubt that the 0.1 ft transverse dispersivity used in SWIFT is actually achieved. It is believed that aspect ratios cause this small dispersivity to be overshadowed. The net effect is that the model may predict more vertical mixing than actually occurs. This results in the predicted plume to attenuate as a result of the unrealistic vertical mixing and is not a necessarily a conservative approach in optimizing the remediation wells. The model may cause the plume to unrealistically migrate vertically and spread.
This would then reduce the concentration levels in the upper horizons. When viewed from above, this would cause the size of the plumes to be smaller as a result of the vertical mixing. Thus the model predictions may be somewhat erroneous in the well optimization.

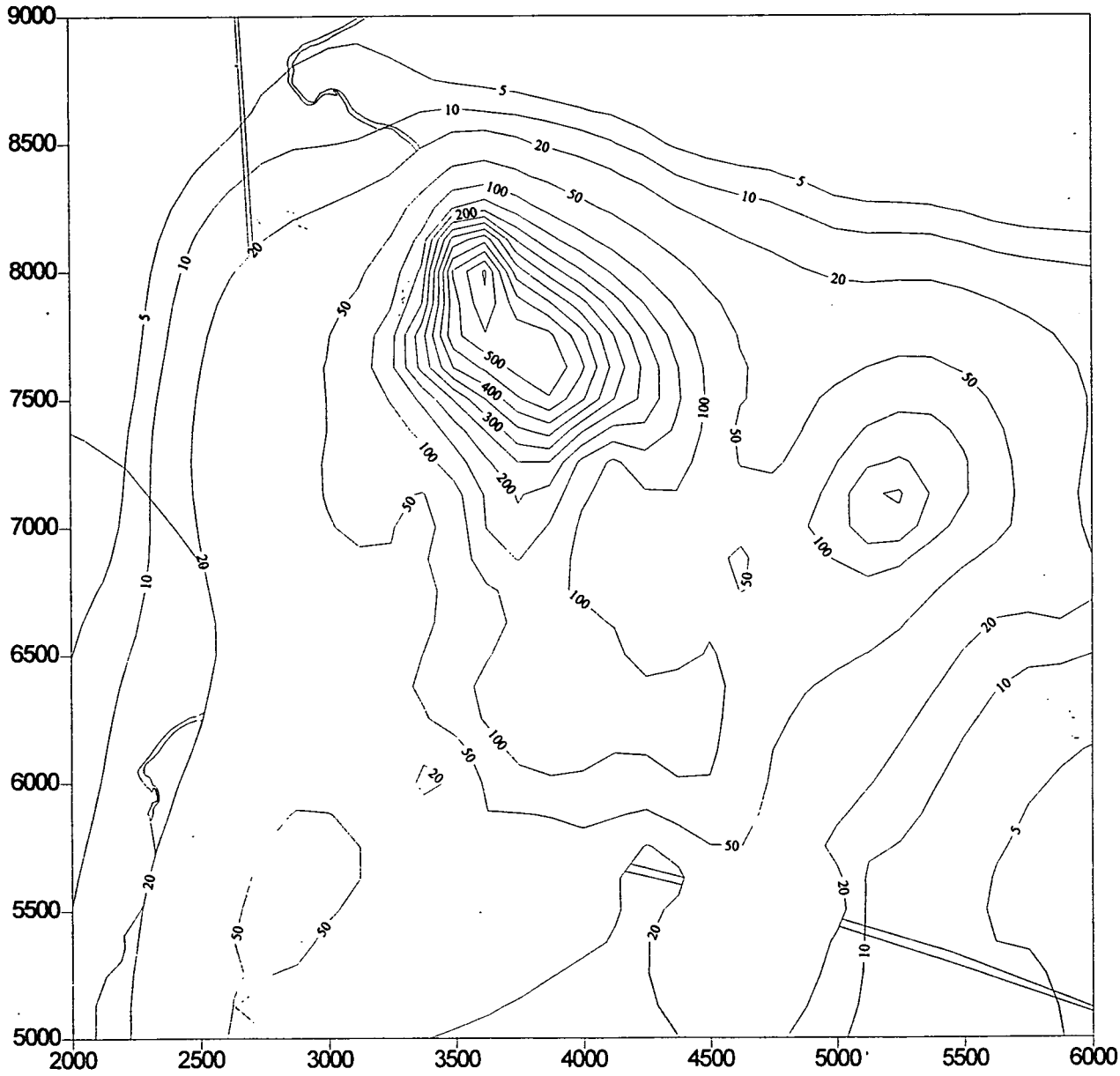
36) Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section #: Pg. #: Code: C
Original Comment #
Comment: Visualization of predictive groundwater contaminant transport is difficult to present in report format. The model results presented by DOE are generally limited to aerial views using simple contour plots. It is not known whether DOE has or plans to use more advanced software to "see" the plume in three dimensions. Using the SWIFT data sets provided, computer simulations for the first year were reproduced and output files sent to the EVS software package, developed by C-Tech. These type of tools are best displayed interactively in which the display

options can be changed and the plume rotated. To convey the concept, a sample display is shown below. This is a first draft showing an exploded view of the six-layer model.

The figure below helps to convey the importance of addressing the plume with depth. This issue of plume containment with depth can be easily visualized using similar software.

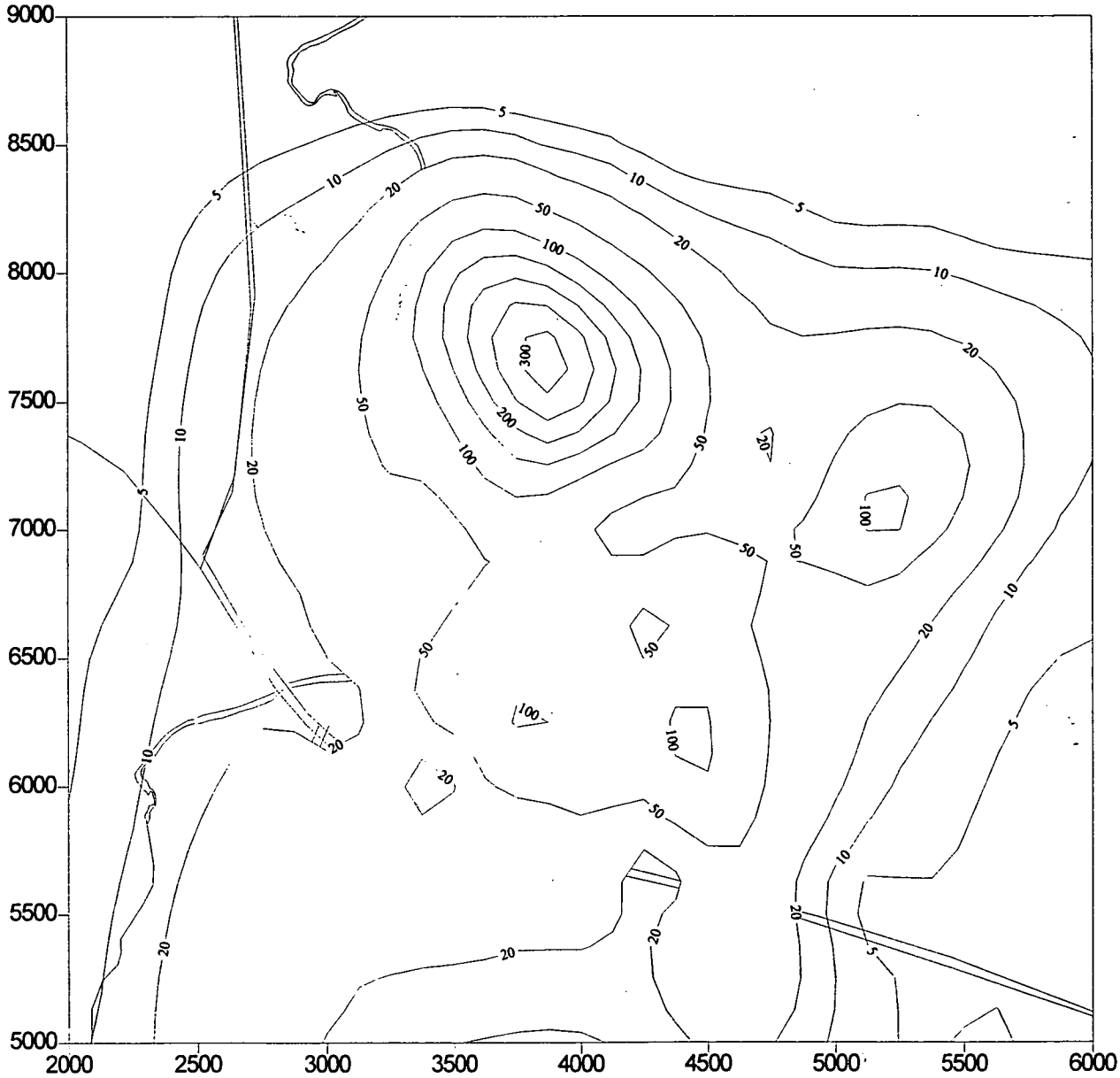
Ohio EPA comments
Draft Baseline Remedial Strategy Report
Figures

OEPA - Plume Optimization - Results after 3 Years
SWIFT - Plume "A" [PLUMA99.DAT] - Layer 1



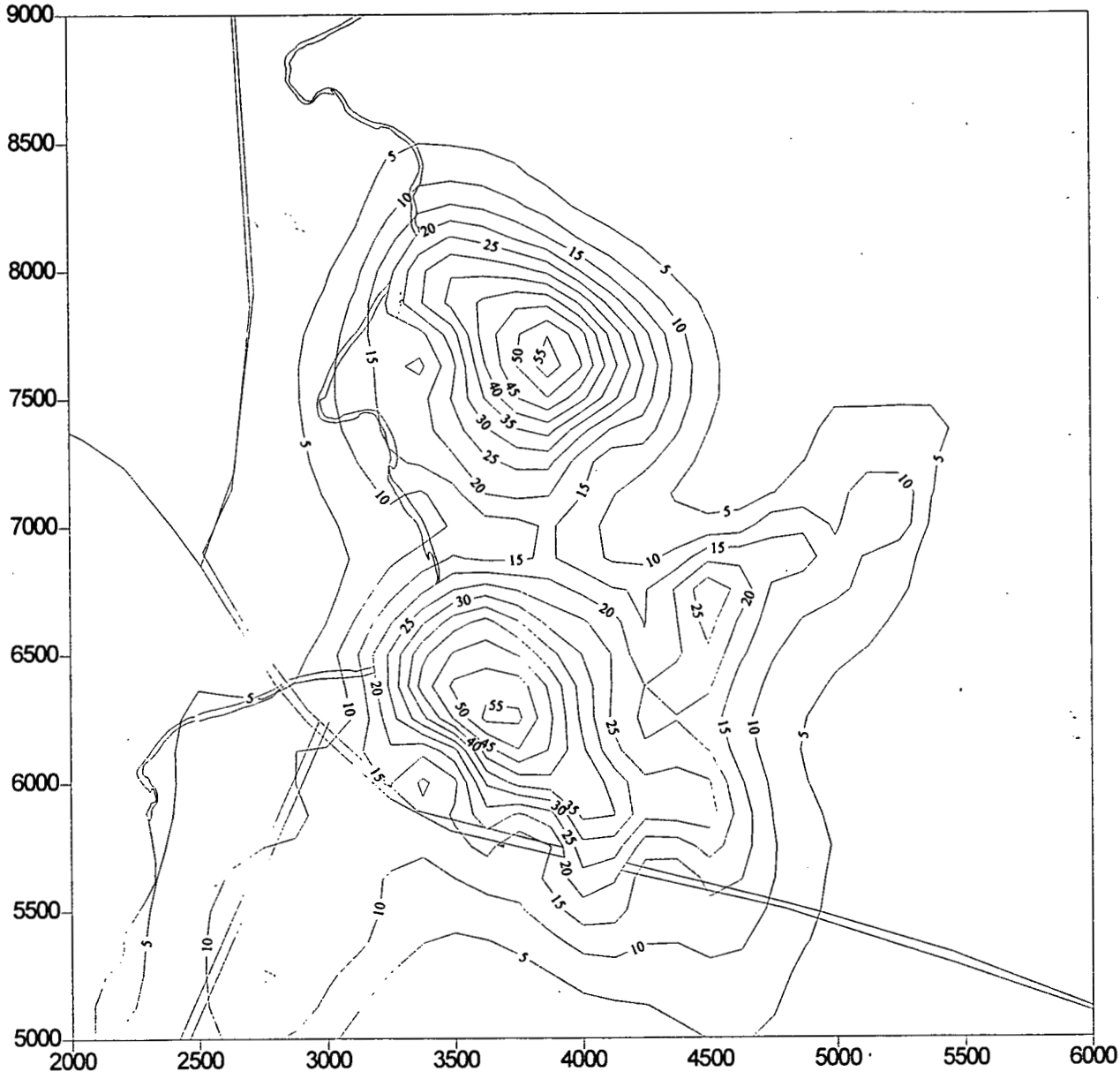
Ohio EPA comments
Draft Baseline Remedial Strategy Report
Figures

OEPA - Plume Optimization - Results after 3 Years
SWIFT - Plume "A" [PLUMA99.DAT] - Layer 2



Ohio EPA comments
Draft Baseline Remedial Strategy Report
Figures

OEPA - Plume Optimization - Results after 3 Years
SWIFT - Plume "A" [PLUMA99.DAT] - Layer 3



Ohio EPA comments
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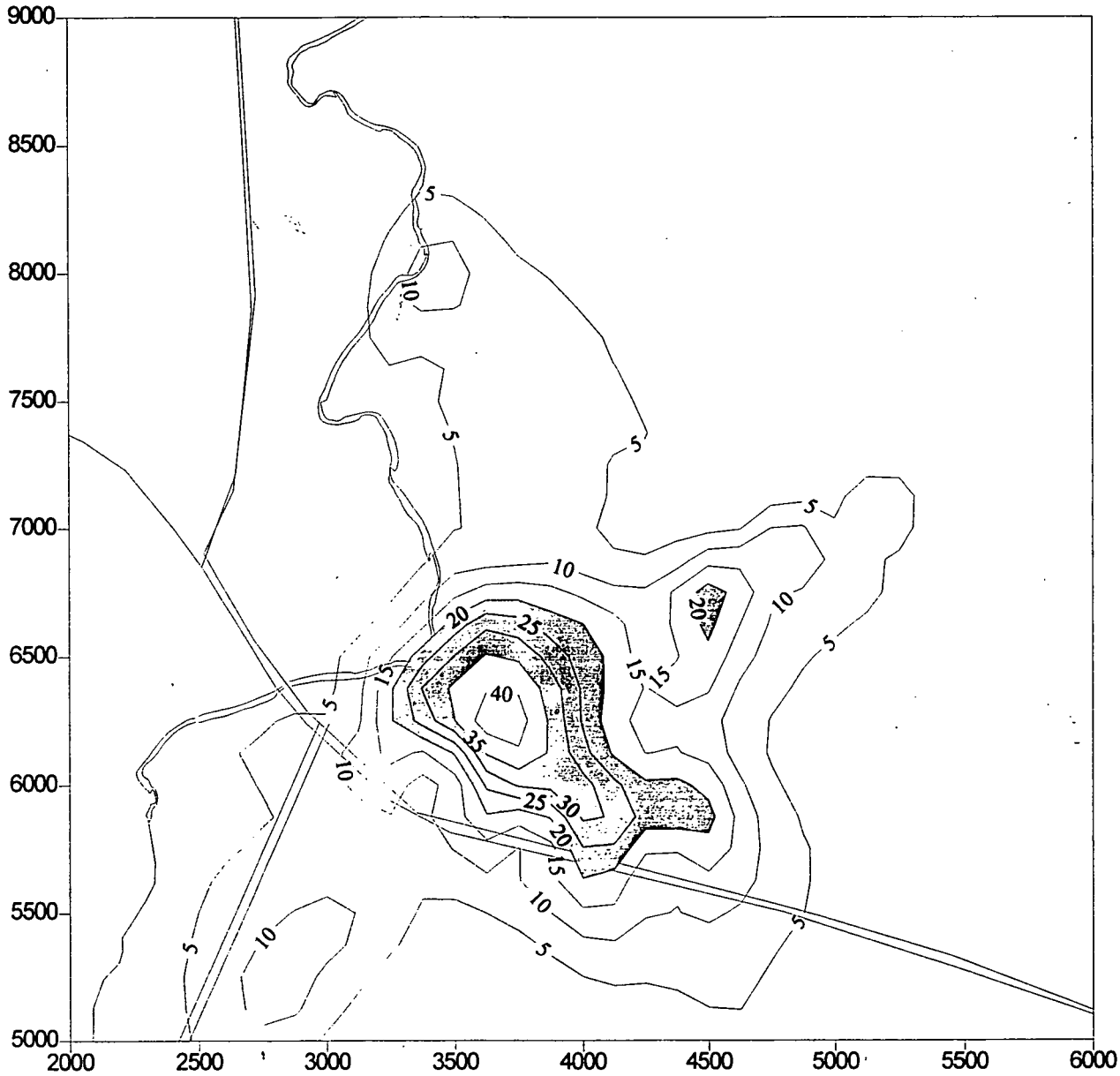
OEPA - Plume Optimization - Results after 3 Years
SWIFT - Plume "A" [PLUMA99.DAT] - Layer 4



Ohio EPA comments
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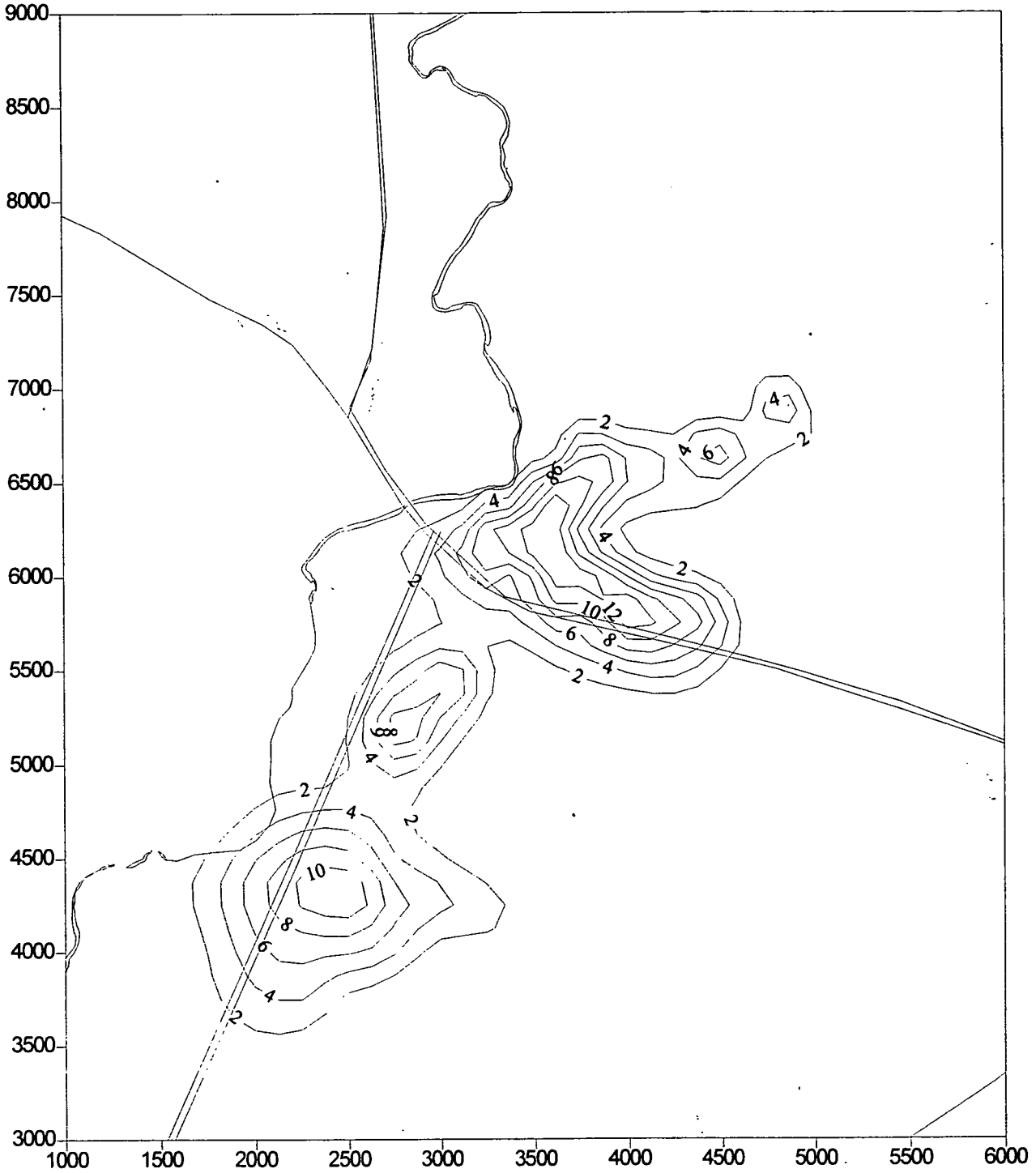
OEPA - Plume Optimization - Results after 3 Years
SWIFT - Plume "A" [PLUMA99.DAT] - Layer 5



Ohio EPA comments
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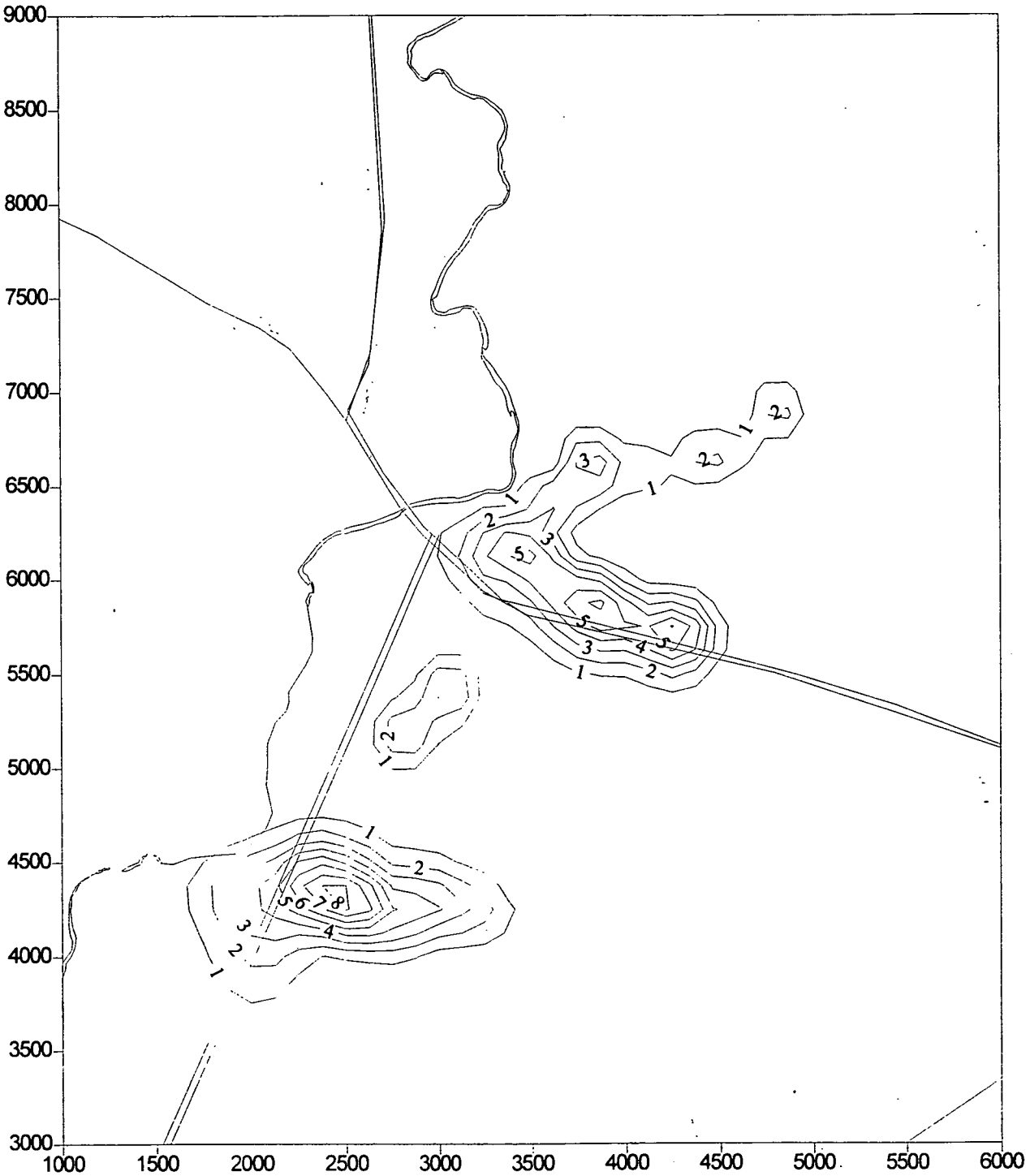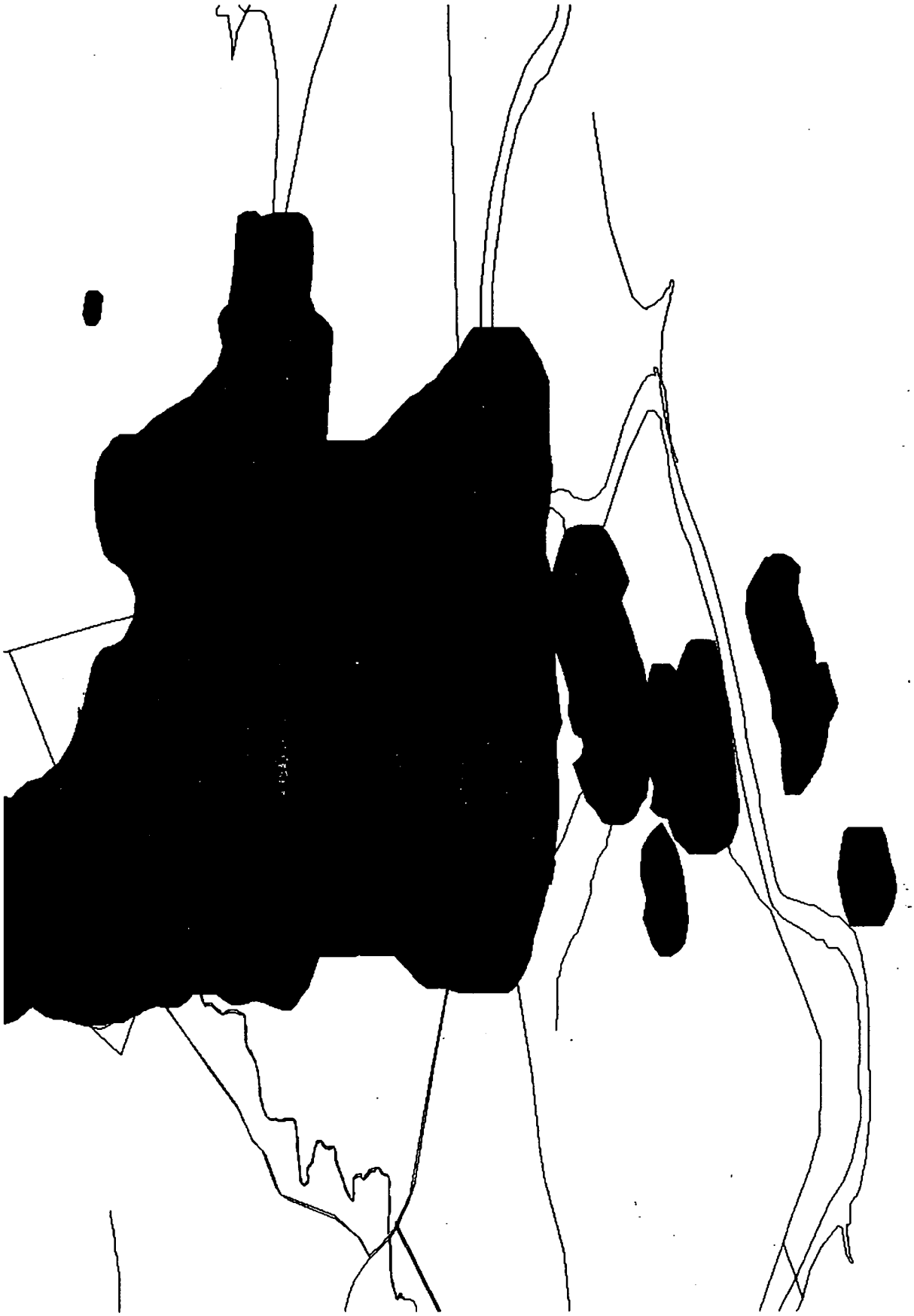
OEPA - Plume Optimization - Results after 3 Years
SWIFT - Plume "A" [PLUMA99.DAT] - Layer 6